CHAPTER 4

RURAL LANDSCAPES

Sugar-cane burn at Hawkin's Creek, Queensland. Photograph by Peter Finch, 1983.

THIS CHAPTER PRESENTS an overview of Europeans' use of the environment. Pastoral occupation and changes in landuse are mapped. So too are specific uses of land, including cane growing, dairying and viticulture. From the early years of European settlement farmers and graziers developed a reputation for pragmatism and innovation. But mistakes were made: some introduced plants and animals became major pests and, in the case of rabbits, environmental disasters.

Although the majority of Europeans who settled on the land were from the United Kingdom, other nationalities also left a distinctive impression on the landscape. Pre-eminent among these were the Germans who introduced middle European village and field patterns to South Australia.

From the first quarter of the nineteenth century many people believed that Australia could become a nation of small farmers. Successful and unsuccessful attempts to achieve this ideal are shown on the maps dealing with selection, closer settlement and soldier settlement after both world wars. The chapter concludes with one of the most distinctive elements in the rural landscape: the changing nature of building materials and housing styles.

Land tenure

THESE TWO DIAGRAMS illustrate the complex history of land tenure since 1788.

Before the earliest European settlement, the right to dispose of Australian land was appropriated by the crown; Aboriginal possession was ignored. Until self-government in each of the colonies, land policy was decided in London and carried out by colonial governors. With self-government, the colonies were given the right to determine their own land policies.

Crown land in Australia was treated in three main ways. The land could be alienated, which meant it passed from government to private hands. There were two methods of alienation, grants and sales. Alternatively, land could be held by individuals or companies under licence or lease: this gave the government the right to resume the land when it wished, and allowed public land to be used for private purposes. Finally, the crown might hold land as reserves, or leave it vacant.

The diagram 'Land disposal systems and tenures' shows these three elements in more detail.

The granting of land was introduced in 1788. The governor had the power to make free grants as he saw fit. Land was granted extensively in New South Wales, Van Diemen's Land and Western Australia until 1831, when the free grant system was abolished. Most went to wealthy settlers. Grants were made again in the 1970s to satisfy some Aboriginal land claims.

Land was also sold. From 1825 it was sold by tender, and from 1831 at auction. From the 1860s land was also sold using time payment. This was regulated by selection acts passed in the various colonies. From the 1880s selection was replaced by closer settlement acts designed to break up large landholdings. Colonial governments began to buy back and subdivide large estates and sell them as small farms in order to promote closer settlement. The soldier settlement schemes established after the two world wars were part of this process.

Licence and lease regulations were more complicated. A licence was usually issued for a specific purpose and for a short period, whereas a lease gave longer tenure and therefore more secure occupation. The best known example of a licence still in use today is the mining licence, first introduced on the goldfields in 1851.

Leases still remain in use. Many are perpetual, which means government has virtually no right to resume the land. In commonwealth territories, no land can be alienated; even Canberra's suburban blocks are held under a 99-year lease. The same principle was applied to agricultural land after the 1880s. Queensland was the first colony to introduce perpetual leases in 1884 for both pastoral and agricultural landholders.

Reserves are crown lands set aside by governments for a specific purpose. They can be withdrawn at any time although some, notably national parks, require an act of parliament for this to be done. Common examples include land for railways, roads, schools, hospitals and churches. Aboriginal reserves were first set up in the 1820s. Reserves for public recreation have been designated since the 1840s. The first nature reserves were set aside in the 1870s. Forest and timber reserves were initially created to control the exploitation of valuable timbers (for example, the river red gum) and later to plant stands of timber required for industry (for example, pine).

By the 1970s, 12 per cent of Australian land had been or was being alienated. Licences and leases accounted for a further 56 per cent. Of the 32 per cent left as crown land, 12 per cent was reserves.
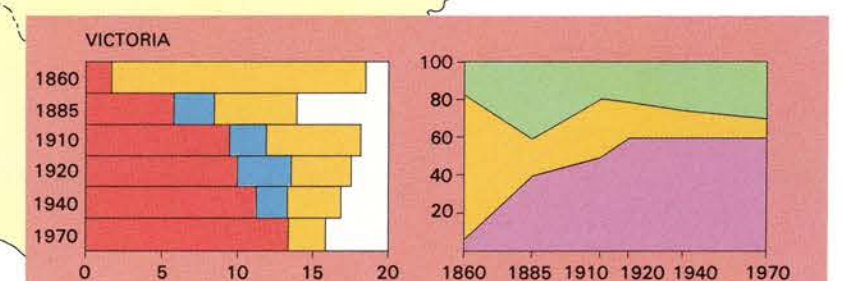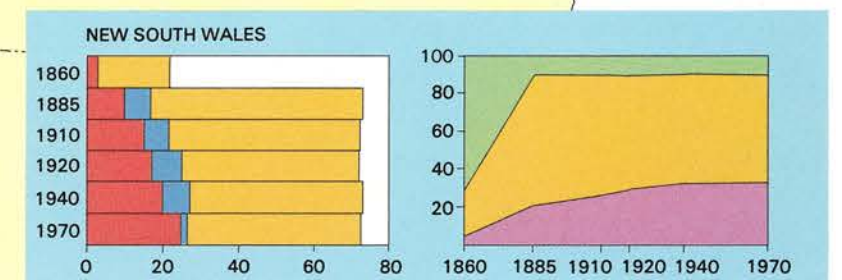
Land disposal systems and tenures
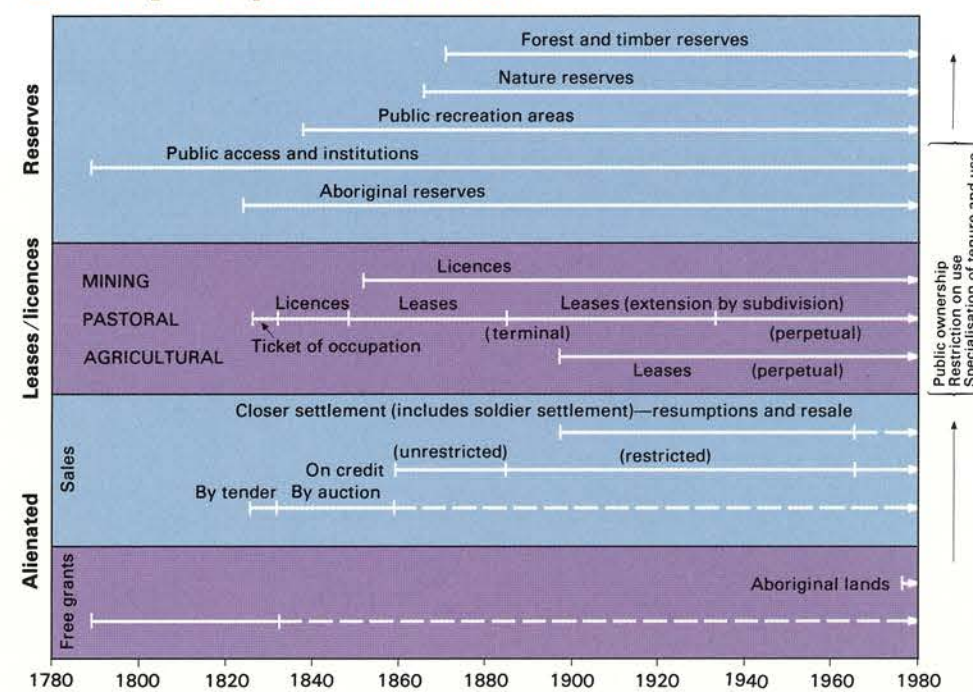
Land allocation
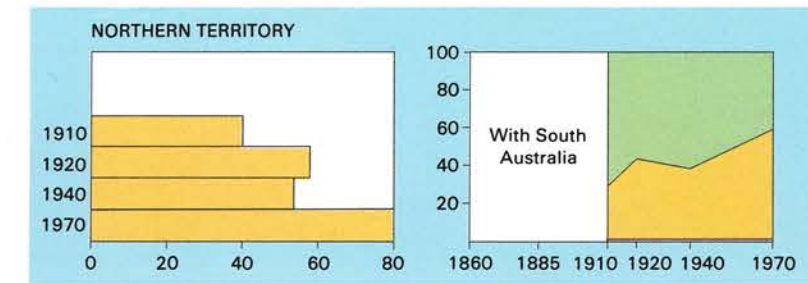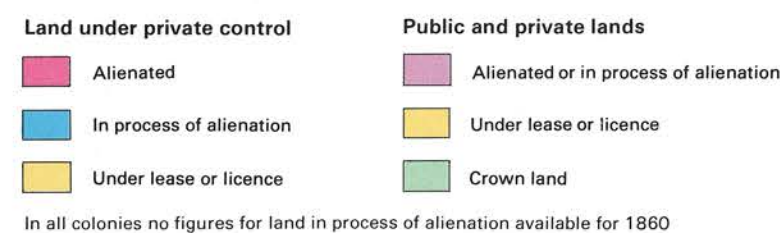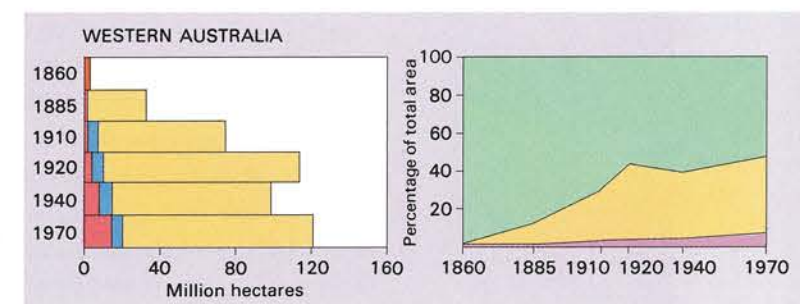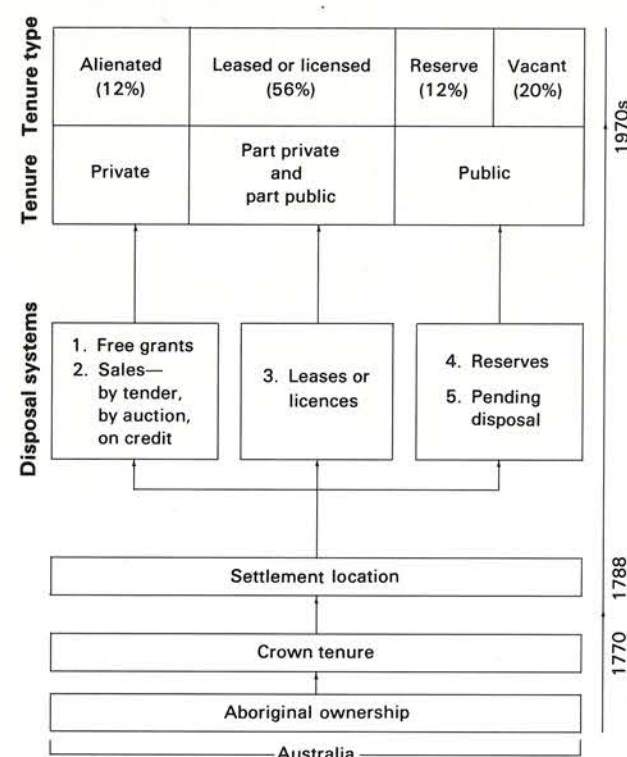
Land disposal

The two graphs for each state or territory show its history of tenure. The disposal of land under licence and lease provisions was the dominant practice in Western Australia, South Australia and Queensland. In Victoria and Tasmania, alienation was the major land disposal system used. South Australia, Tasmania and Western Australia have proportionately large areas still held by the crown. Physical geography is the main explanation, but the existence of reserves set aside for Aborigines is also a factor in Western Australia. In all states except Victoria, the amount of land under direct government control has declined markedly since 1860. Western Australia and South Australia have both experienced fluctuations in the proportion of land controlled by the crown. Drought and depression in South Australia during the 1880s caused many to abandon farms. A similar pattern occurred in Western Australia during the 1930s. Tasmania's pattern of land disposal is unique in Australia. By 1860, most of the suitable land in the island had been alienated, and there has been little alienation since.

NORTHERN TERRITORY

QUEENSLAND

NEW SOUTH WALES
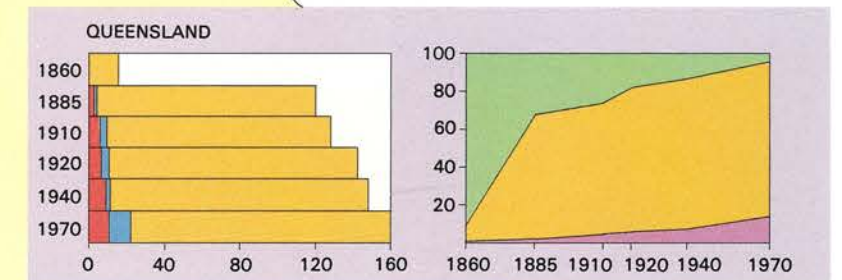
VICTORIA

The Victorian lease/licence figure reflects the colony's estimate of pastoral leases in 1860

WESTERN AUSTRALIA

SOUTH AUSTRALIA   Includes Northern Territory to 1910

TASMANIA

Land under private control

- Alienated
- In process of alienation
- Under lease or licence

Public and private lands

- Alienated or in process of alienation
- Under lease or licence
- Crown land

In all colonies no figures for land in process of alienation available for 1860
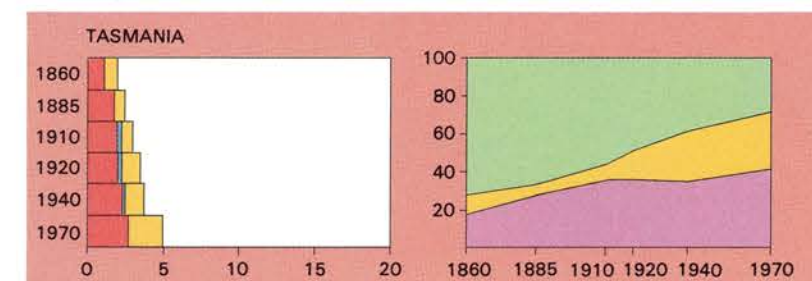
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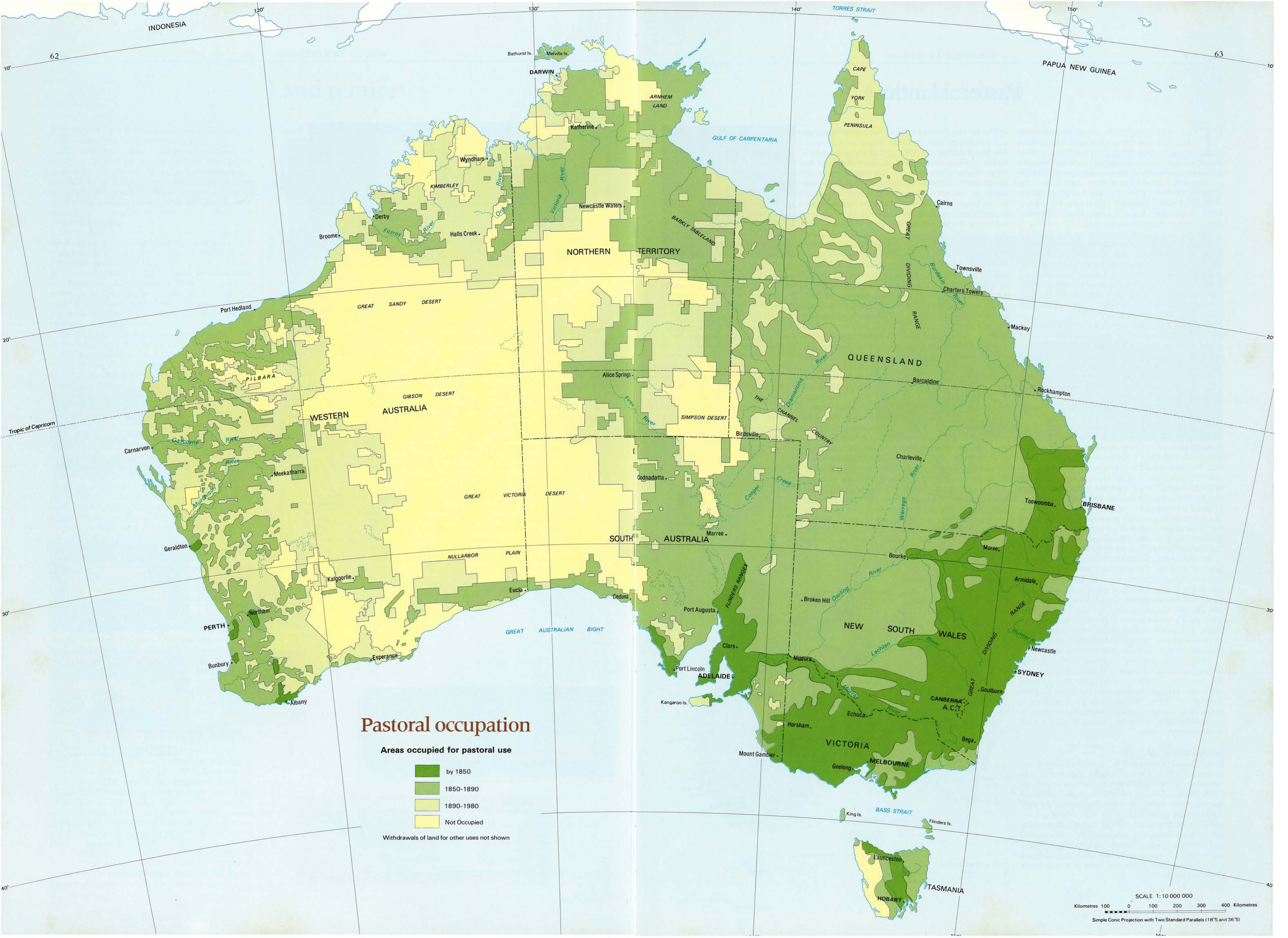
Pastoral occupation

Areas occupied for pastoral use

- by 1850
- 1850–1890
- 1890–1980
- Not Occupied

Withdrawals of land for other uses not shown

SCALE 1:10 000 000

Kilometres 100   0   100   200   300   400 Kilometres

Simple Conic Projection with Two Standard Parallels (18°S and 36°S)

INDONESIA

TORRES STRAIT

PAPUA NEW GUINEA

DARWIN

Bathurst Is.   Melville Is.

ARNHEM LAND

CAPE YORK PENINSULA

GULF OF CARPENTARIA

Wyndham

KIMBERLEY

Katherine

Newcastle Waters

BARKLY TABLELAND

Cairns

Derby

Fitzroy River

Halls Creek

Ord River

Victoria River

NORTHERN   TERRITORY

GREAT DIVIDING RANGE

Townsville

Charters Towers

Broome

Port Hedland

GREAT SANDY DESERT

Mackay

PILBARA

GIBSON DESERT

Alice Springs

SIMPSON DESERT

QUEENSLAND

Barcaldine

Rockhampton

WESTERN   AUSTRALIA

Carnarvon

Gascoyne River

Tropic of Capricorn

Finke River

THE CHANNEL COUNTRY

Diamantina River

Charleville

Meekatharra

Murchison River

GREAT VICTORIA DESERT

Birdsville

Cooper Creek

Warrego River

Toowoomba

BRISBANE

Oodnadatta

SOUTH   AUSTRALIA

Marree

Geraldton

Northam

PERTH

Kalgoorlie

Eucla

NULLARBOR   PLAIN

Ceduna

Port Augusta

FLINDERS RANGES

Broken Hill

Darling River

NEW   SOUTH   WALES

Moree

Armidale

GREAT DIVIDING RANGE

Hunter River

Newcastle

Bunbury

Esperance

GREAT   AUSTRALIAN   BIGHT

Clare

Port Lincoln

ADELAIDE

Mildura

Lachlan River

Murray River

CANBERRA A.C.T.

Goulburn

SYDNEY

Albany

Kangaroo Is.

Echuca

Bega

Mount Gambier

Horsham

VICTORIA

Geelong

MELBOURNE

King Is.

BASS STRAIT

Flinders Is.

Launceston

TASMANIA

HOBART

Pastoral landuse

THE FIRST EUROPEAN use of most land in Australia was the grazing of domestic livestock, mainly sheep, cattle and horses. This seems likely to remain the largest single landuse system for rural Australia, flourishing especially in the lower rainfall areas. The earliest market was for meat for domestic consumption, but by the 1830s wool had become Australia's most valuable export. Later, frozen meat, hides and more recently live animals (mainly sheep) were exported.

The whole pastoral enterprise has depended on relatively cheap land. The spread of pastoral occupation is the result of a complex process, depicted on the map on the preceding pages. Market prices, knowledge of grazing areas, labour, livestock, and the availability of capital all played their parts in the pastoral occupation of the continent. As the map shows, almost 75 per cent of land used for pasture in Australia had been taken up by 1900.

In eastern Australia, pastoral expansion began in the 1820s. Pastoralists, or squatters as they were called, illegally occupied crown land. In 1836 the government acquiesced in the squatters' occupation and introduced annual licences to regulate and tax it. In 1847, leases of up to 21 years were provided for. Similar provisions applied in South Australia and in Western Australia.

By 1850, livestock had spread from the main points of European settlement in southeastern Australia across the inland plains of New South Wales, Victoria and Tasmania. In South Australia, pastoral landuse had been established in the natural grasslands and open woodlands which, within the next 50 years, would be ploughed. Only the physically difficult country of the Flinders Ranges and the Great Dividing Range remained untouched. Western Australia lagged behind the eastern colonies. Limited water supplies, scarcity of labour, poisonous plants and a generally poor economy hampered the pastoral occupation of the colony, and the good grazing lands in the Murchison, Gascoyne and Kimberley districts had yet to be discovered.

By 1890 many pastoralists had begun to seek new grazing land in the tropical north and the dry interior. They followed the Mitchell grass plains across the Barkly Tableland into the Northern Territory and into the Kimberleys in Western Australia and the line of springs west of Lake Eyre to Alice Springs. They also began to tap the Great Artesian Basin and other underground water supplies in areas of very low rainfall. In Western Australia, the Gascoyne and Murchison districts were occupied.

After 1890, pastoral expansion was mainly limited to the arid interior of Western Australia and the Northern Territory. Very little new pastoral land came into production after the Great Depression of the 1930s. Marginal returns from remote properties, droughts, and the degrading of pastures by overstocking, made the pastoral frontier retreat to its present position.

Stock routes

Stock routes developed in Australia during the nineteenth century as a pragmatic response to contemporary needs. In the absence of more sophisticated forms of transport (for example, railways) animals were walked to their destination. As new country was opened up, stock was moved into it, and then back to markets. The routes followed the line of least resistance, where water was available and the terrain was relatively easy to cross. Where the supply of natural water was uncertain, colonial governments built dams and tanks and sank bores along the routes.

The earliest routes ran from Sydney to Bathurst and Goulburn but the first major routes were developed during the 1830s and 1840s as squatters occupied present-day Victoria, New England in New South Wales and the Darling Downs in Queensland. A less successful route was pioneered along the Murray River to Adelaide. Routes in South Australia and Western Australia had only just begun to push north from the capitals by 1850.

During the 1850s and 1860s most of Queensland was occupied as the pastoralists reached both the Channel Country and the Plains of Promise in the Gulf Country. By the 1880s the Murranji route to Wyndham and the western Kimberleys had been established, allowing the occupation of the region by pastoralists coming from the east. In Western Australia, a route had been pioneered from Perth to the Pilbara and then to the Kimberleys to link up with the occupation of the east Kimberleys from the seaward side.

Markets were concentrated in the capital cities and in the southeast of the continent and new stock routes were pioneered to supply them. The Victorian goldfields were the most important market during the 1850s and 1860s. Stock was driven south to Dubbo and then to Deniliquin via Wagga Wagga or Hay. From there, stock was moved into Victoria via Echuca. From the 1870s, routes were developed from the Gulf Country to southern markets via Longreach, Hungerford, Bourke, Wilcannia to Deniliquin. From there, they were driven either to Echuca or to Wodonga, the latter town acting as the major supplier of stock for southern markets. The Birdsville route was developed during the 1880s to allow pastoralists in the Channel Country to link up with the railway.

With one exception, all the major routes were established by the pastoralists and subsequently improved by colonial governments. The exception was the Canning route in Western Australia. It was surveyed and water supplied along its course by the government to provide a route from the eastern Kimberleys to the goldfields via Wiluna.

With the establishment of cattle stations in northern Australia, station owners quickly came to depend on Aboriginal stockmen both for station work and for droving. In many areas, Aboriginal stockmen were the industry's labour backbone. Until the late 1960s, their wages were substantially lower than those of their white counterparts and few held positions of responsibility. Photograph by Gunther Deichmann, 1980.
WELDON TRANNIES

Stock routes 1830-1900

Pre 1850

1850-1900

Scale 1 : 30 000 000

0   500   1000 Kilometres

Cattle and sheep

THE MAPS ON this and the next pages show the spread of the most commercially important grazing animals, cattle and sheep, between 1860 and 1980. To allow a comparison between the two, both within an area and from year to year, stock units have been used. Stock units have been calculated on the basis of seven sheep to one cattle beast unit: that is, the amount of land required to graze one cattle beast can support seven sheep.

There were markets for both meat and wool from 1860, giving pastoralists a choice between cattle and sheep. Cattle were usually preferred during the early stages of pastoral occupation. They are hardier than sheep, able to cope with coarser feed and a greater range of environmental conditions, particularly in the wetter areas where sheep are prone to footrot and catarrh. Cattle can range almost twice as far for water. They are better at defending themselves against attacks from dingoes, and they can be walked to market. But for an established pastoralist supplying both meat and wool, sheep offered better returns. Only in areas where environmental conditions were too harsh for sheep, such as the tropical north and the wetter areas, did cattle remain dominant.

The modern pastoralist, beneficiary of scientific breeding practices, would hardly recognise the animals that were grazed in 1860. By then, twenty million sheep and four million cattle grazed in Australia, most of them inland from the Grea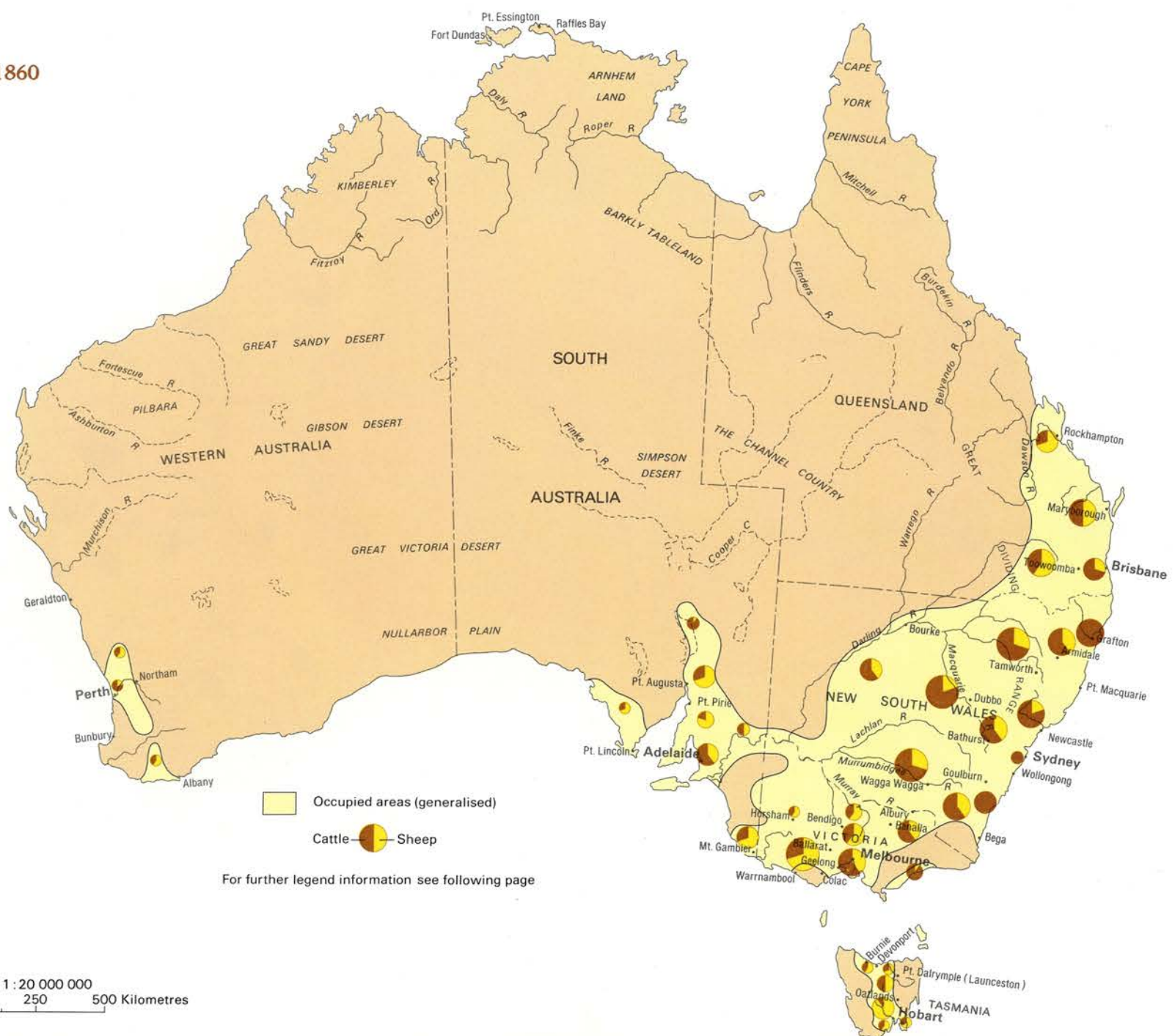t Divide. Sheep were being grazed as far into the interior as possible given the high cost of drays used to haul their wool back to ports, the extent of river navigation on the Murray-Darling system, and the arrangements for feeding stock on their way to market. Sheep were more numerous than cattle, except in such areas as Gippsland, where high rainfall discouraged their use, and in the lately settled north of South Australia.

In 1880 wool was booming. Sheep numbers had risen to 62 million and cattle to seven million. The

A shepherd and his dog watch over a flock of sheep on Koort Koort-nong homestead near Camperdown in Victoria in 1860. The squatting runs of western Victoria now dominated the wool trade and acted as a stock reservoir for opening up western New South Wales and Queensland. Oil painting by Eugène von Guérard, 1860.
NATIONAL LIBRARY

1860

Occupied areas (generalised)

Cattle — Sheep

For further legend information see following page

Scale 1 : 20 000 000
0   250   500 Kilometres

Murray-Darling navigation system was serving interior New South Wales and southwestern Queensland. Victoria had built railways to Echuca and Wodonga on the Murray to tap the river trade. New South Wales and Queensland were building railways towards the outback to service the frontier. The frontier nature of pastoral occupation in central and northern Queensland was clearly evident in the dominance of cattle in these regions.
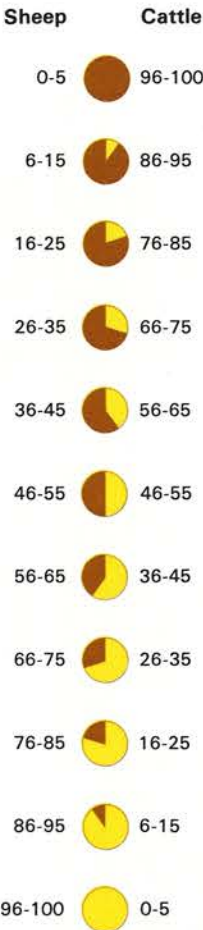
Between 1895 and 1902 eastern Australia suffered a devastating drought. Sheep numbers, 106 million in 1891, and cattle numbers, 12 million in 1894, were halved, and, as the map for 1900 shows, the environmental limits for grazing sheep had been recognised. Sheep still dominated the older pastoral lands of the southeast and southwest as well as the Murchison and Gascoyne districts in Western Australia. But in the tropics cattle were dominant.

By 1920 the pattern of pastoral landuse was consolidating. Cattle numbers were increasing in the north of the continent. In the older pastoral areas, sheep remained the predominant stock, and they had also been introduced in areas where conditions were less suitable, such as Gippsland, in response to a demand for wool boosted by World War I.

The consolidation already evident in the map for 1920 is clearly seen in the map for 1950. In the northern part of Australia and the more humid districts along the coast cattle were the standard stock. The improvement of stock breeds increased the adaptability of cattle to northern environments, and after World War II the demand for beef was strong. Fourteen million cattle were being grazed across the continent, and 112 million sheep. In the northeast, inland from the Great Divide and in much of South Australia, sheep predominated. Once again war had increased the demand for wool, but equally significant was the reconstruction of rural marginal lands which had begun in the late 1930s and which encouraged mixed sheep-wheat farming. Western Australia had cattle to the north, sheep to the north and west.

The map for 1980 shows the effects of the cattle boom of the 1970s and the development of a trade in live sheep with the Middle East and Southwest Asia. Overall, the distribution of animals remained similar to that of 1950 and 1920, though each region registered minor changes in the proportions of cattle and sheep. Cattle numbers had reached 26 million, sheep 136 million.

Cattle and sheep

1 livestock unit = 1 cattle beast = 7 sheep

Livestock units (in 10 000s)

| Less than 6 | 6-10 | 11-20 | 21-40 | 41-80 | 81-160 | 161-210 | Greater than 300 |

Values adjusted to 1950 statistical boundaries

Percentages of sheep and cattle

Sheep	Cattle
0-5	96-100
6-15	86-95
16-25	76-85
26-35	66-75
36-45	56-65
46-55	46-55
56-65	36-45
66-75	26-35
76-85	16-25
86-95	6-15
96-100	0-5

1880

Occupied areas (generalised)

1900

1920

Scale 1 : 20 000 000

0   250   500 Kilometres

Cattle and sheep
1950

Darwin

ARNHEM LAND

KIMBERLEY

Wyndham

Katherine

Roper R

Daly R

NORTHERN TERRITORY

BARKLY TABLELAND

CAPE YORK PENINSULA

Mitchell R

Cairns

Derby

Halls Creek

Fitzroy R

Ord R

Tennant Creek

Normanton

Townsville

Broome

Port Hedland

Fortescue R

PILBARA

GREAT SANDY DESERT

GIBSON DESERT

Alice Springs

SIMPSON DESERT

Mount Isa

Hughenden

Charters Towers

Mackay

Ashburton R

WESTERN AUSTRALIA

Finke R

THE CHANNEL COUNTRY

Georgina R

Diamantina R

QUEENSLAND

Burdekin R

Rockhampton

Carnarvon

Geraldton

Murchison R

Meekatharra

GREAT VICTORIA DESERT

SOUTH AUSTRALIA

Oodnadatta

L Eyre

Cooper C

Longreach

Emerald

Bundaberg

Fitzroy R

Maryborough

Kalgoorlie

Charleville

Roma

Brisbane

NULLARBOR PLAIN

Cunnamulla

St George

Toowoomba

Perth

Northam

Merredin

Norseman

Ceduna

Warrego R

Darling R

Broken Hill

Cobar

Bourke

Moree

Inverell

Grafton

Narrogin

Bunbury

Manjimup

Esperance

Port Augusta

Whyalla

Port Pirie

Macquarie R

Tamworth

Port Macquarie

Albany

Port Lincoln

Adelaide

Murray Bridge

Mildura

Swan Hill

NEW SOUTH WALES

Dubbo

Orange

Taree

Darling

Lachlan R

Griffith

Goulburn

NEWCASTLE

Sydney

WOLLONGONG

Murrumbidgee R

Wagga Wagga

Murray R

Albury

A.C.T.

Canberra

Horsham

Bendigo

Bega

VICTORIA

Ballarat

GEELONG

Melbourne

Sale

Mount Gambier

Warrnambool

Burnie

Devonport

Launceston

TASMANIA

Hobart

1980

Darwin

Nhulunbuy (Gove)

ARNHEM LAND

KIMBERLEY

Wyndham

Katherine

Roper R

Daly R

NORTHERN TERRITORY

BARKLY TABLELAND

CAPE YORK PENINSULA

Weipa

Mitchell R

Cairns

Derby

Halls Creek

Fitzroy R

Ord R

Tennant Creek

Normanton

Townsville

Broome

Dampier

Port Hedland

Fortescue R

PILBARA

Newman

GREAT SANDY DESERT

GIBSON DESERT

Alice Springs

SIMPSON DESERT

Mount Isa

Hughenden

Charters Towers

Mackay

Exmouth

Ashburton R

WESTERN AUSTRALIA

Finke R

THE CHANNEL COUNTRY

Georgina R

Diamantina R

QUEENSLAND

Burdekin R

Rockhampton

Carnarvon

Geraldton

Murchison R

Meekatharra

GREAT VICTORIA DESERT

SOUTH AUSTRALIA

Oodnadatta

L Eyre

Cooper C

Longreach

Emerald

Bundaberg

Fitzroy R

Maryborough

Kalgoorlie

Charleville

Roma

Brisbane

GOLD COAST

NULLARBOR PLAIN

Cunnamulla

St George

Toowoomba

Perth

Northam

Merredin

Norseman

Ceduna

Warrego R

Darling R

Broken Hill

Cobar

Bourke

Moree

Inverell

Grafton

Narrogin

Bunbury

Manjimup

Esperance

Port Augusta

Whyalla

Port Pirie

Macquarie R

Tamworth

Port Macquarie

Albany

Port Lincoln

Adelaide

Murray Bridge

Mildura

Swan Hill

NEW SOUTH WALES

Dubbo

Orange

Taree

Darling

Lachlan R

Griffith

Goulburn

NEWCASTLE

Sydney

WOLLONGONG

Murrumbidgee R

Wagga Wagga

Murray R

Albury

A.C.T.

Canberra

Horsham

Bendigo

Bega

VICTORIA

Ballarat

GEELONG

Melbourne

Sale

Mount Gambier

Warrnambool

Burnie

Devonport

Launceston

TASMANIA

Hobart

Occupied areas (generalised)

Cattle — Sheep

For further legend information see previous page
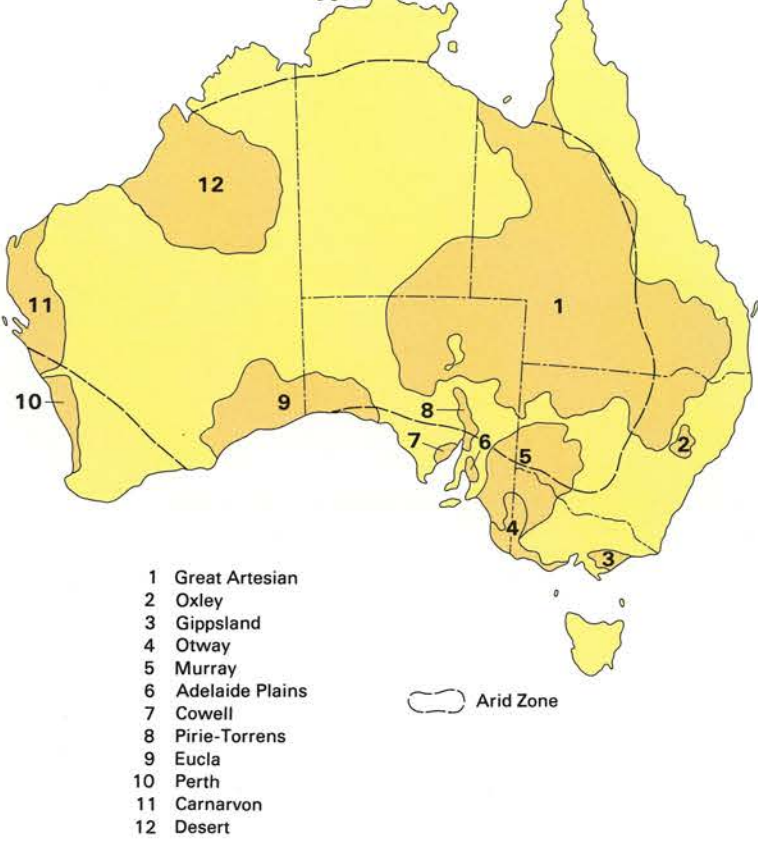
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Artesian water

ALTHOUGH AUSTRALIA is poorly endowed with surface water, approximately 60 per cent of its area is underlain by structural basins of sedimentary rocks that can yield a supply of water. Much of this water rises to the surface under pressure and is known as artesian water. It is obtained by sinking bores into water-bearing rocks (aquifers). Artesian groundwater varies in quality; some is suitable for town domestic use, while some is salty and contains large quantities of dissolved solids, which can limit its use to stock drinking water.

The Great Artesian Basin underlies an area of about 1.7 million square kilometres, approximately one-fifth of the continent and sustains the great sheep and cattle populations of arid New South Wales and Queensland. Drilling in the basin started in New South Wales in 1878, and by 1884 three further bores had been sunk in Queensland. Following the drilling of the first, at Blackall in 1885, the use of artesian water increased rapidly. By 1900, 600 bores had been sunk in Queensland, yielding just under 40 million cubic metres per year. By 1914 just over 1000 bores were yielding about 75 million cubic metres annually. From this peak, water flow decreased to an average annual yield of about 55 million cubic metres.

Since the 1920s many bores have ceased to flow. The need to pump water from the aquifer has also increased, and some supplies have become saltier. If the rate of removal of water from an aquifer exceeds the rate of replenishment, the aquifer is being exhausted rather than used as a natural storage. This has happened in the past, and together with natural losses from the artesian basin has resulted in a need for conservation measures. With present levels of use and annual recharge, and the maintenance of conservation practices, current yields should be sustainable.
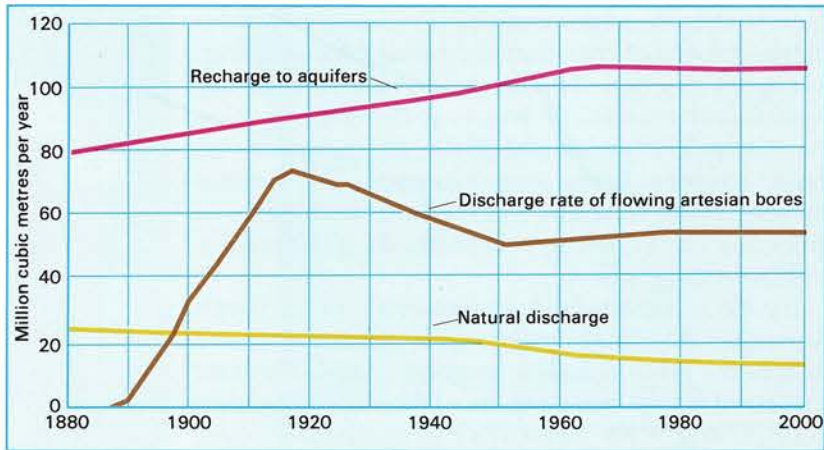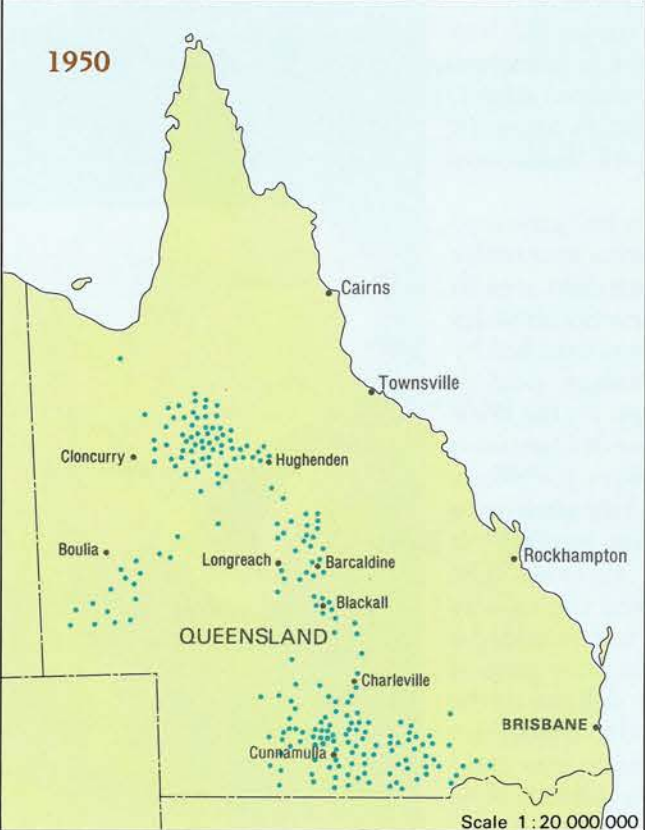
Artesian basins

1 Great Artesian
2 Oxley
3 Gippsland
4 Otway
5 Murray
6 Adelaide Plains
7 Cowell
8 Pirie-Torrens
9 Eucla
10 Perth
11 Carnarvon
12 Desert

Arid Zone

Artesian bores in Queensland 1884-1983
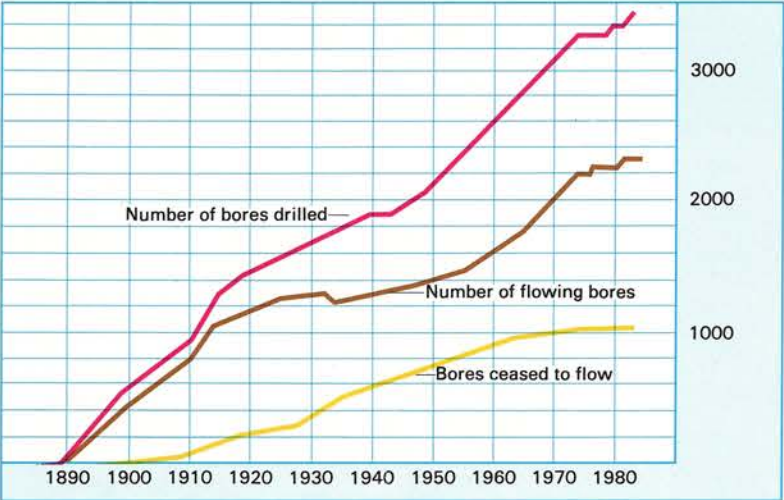
The Great Artesian Basin: discharge and recharge

Flow of artesian water

1910

mean flow of 4.5 megalitres (one million gallons) per day from bores in its vicinity

1950

Scale 1:20 000 000

These maps show diagrammatically the distribution of water flow from the Queensland portion of the Great Artesian Basin. The 1910 map shows the situation just before the years of peak yield. Three main areas can be identified: the southern area from Charleville to Cunnamulla, a central district from Longreach to Barcaldine, and a northern area from Hughenden to Cloncurry. In addition, large quantities of artesian bore water were obtained from the country southeast of Boulia between the Georgina and Diamantina rivers. The 1950 map shows that the flow had diminished. Less water was obtained from all areas with marked decreases in the Georgina area and in the central district. In the south an increasing proportion of artesian water was obtained from nearer the eastern edge of the basin, closer to the main recharge areas.
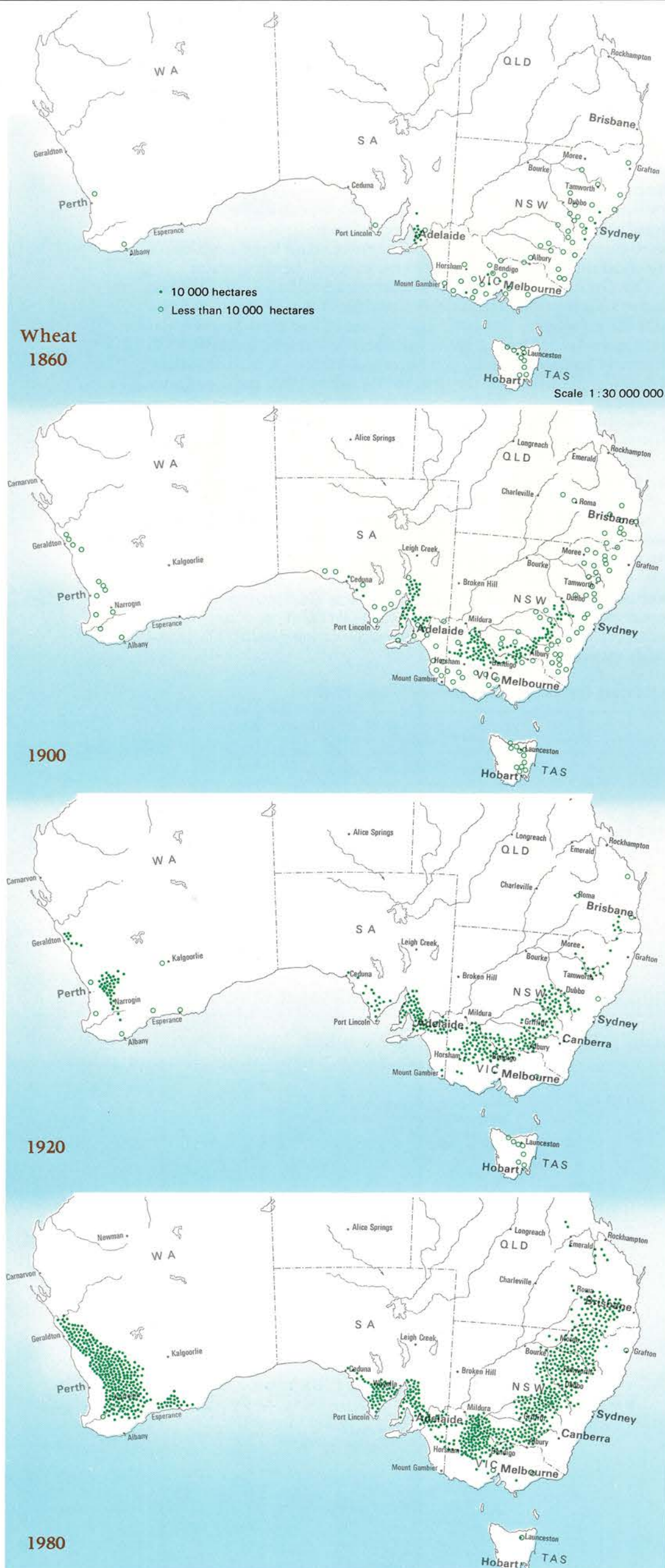
Wheat

ROM THE 1820s wheat has been Australia's most important crop. Although wool growing and, to a lesser extent, minerals, were the main generators of economic growth in Australia during the nineteenth century, after about 1860 wheat growing was seen as the best means of promoting closer settlement and as the mainstay of family farms. From a few thousand hectares in 1820, the area sown with wheat grew to nearly 11.9 million hectares in 1980. Because of the great extent of the Australian wheat belt, good or bad years are rarely experienced in every district in the same season. Periods of drought in the eastern states are frequently balanced by good seasons in Western Australia, and vice versa.

Wheat growing was initially a labour-intensive activity. The first crops were grown on smallholdings near Sydney, Hobart and Launceston soon after settlement was established. The humid summers of coastal New South Wales caused outbreaks of rust and the colony depended on imported wheat supplies, notably from Van Diemen's Land.

The map for 1860 reflects the beginnings of the development of a crescent-shaped wheat belt in southeastern Australia, although for the most part the dots represent islands of cultivation in a wide expanse of pastoral occupation. South Australia emerged as a strong wheat exporting region during the Victorian gold rushes of the 1850s. The plains north and south of Adelaide were easily cultivated and required little clearing and the climate was well suited to wheat cultivation. The plains were also close to the sea, which enabled the colony to use the cheapest form of transport then available, shipping, to export its grain. The invention of labour-saving agricultural machinery was first demonstrated on the Adelaide Plains in the 1840s, the horse-driven grain stripper being one example. For several decades South Australia was the Australian leader in inventing and adopting new methods of cultivation and harvesting wheat.

By 1863, half the land under wheat was in South Australia. Although yields were generally lower than in the other colonies, in good seasons the state harvested 50 per cent or more of the Australian crop until the late 1890s. Tasmania's wheat-growing area was at its largest in 1843 and had stabilised by the 1860s. The scattered development of wheat farming on the New South Wales tablelands and western slopes and in central western Victoria owed much to the growth of local markets during the gold rushes. Wheat growing in these colonies developed inland, leaving coastal farmers to concentrate on livestock rearing, maize growing in New South Wales, and hay and vegetable production.

By 1900 the area sown with wheat had grown to ten times the 1860 figure. The Victorian area under wheat first exceeded the South Australian area in 1897 and in turn was surpassed by New South Wales in 1911. The rapid expansion in area was matched by a fall in yields. In the 1860s the average yield of wheat per hectare was about 13 tonnes. By the 1890s it had fallen to about 7 tonnes because of expansion onto poorer land, poor farming practices, the effects of wheat diseases, especially rust, and the attempt to avoid these diseases by selecting less prolific but more rust-resistant early-maturing varieties. The expansion of wheat farming followed the railway networks in southeastern Australia but provided a stimulus to the building of railways in other parts of Australia. It was encouraged by the policies of the colonial governments in offering land to farmers on credit. The expansion of wheat farming was rapid between 1895 and 1905. Between 1898 and 1900 New South Wales became a net exporter of wheat. In Victoria

Wheat
1860

• 10 000 hectares
○ Less than 10 000 hectares

Scale 1 : 30 000 000

1900

1920

1980

and South Australia, farmers were cautiously moving onto the sandy soils of the mallee lands. Western Australia harvested little more than 1 per cent of the Australian wheat crop in 1900, but was on the threshold of expansion.

Between 1900 and 1920 the area under wheat increased by 60 per cent, with Western Australia accounting for 14 per cent of the Australian total by 1920. New South Wales kept its lead with 35 per cent, followed by Victoria and South Australia with about 25 per cent each. Between the late 1890s and the early 1920s, the Australian average wheat yield per hectare almost doubled, partly because of better seasons but chiefly because early-maturing wheat varieties had been adopted, superphosphate was more widely used, and more farmers practised fallowing in years between crops. At this time few livestock were kept on wheat farms, and fallowing, with frequent cultivation to keep down weeds, raised yields by encouraging the release of nitrogen through rapid breakdown of organic matter. However, by the 1930s this practice had so damaged the soil structure that erosion by wind drift, gullying and sheet wash was rampant.

By the 1950s a new system of mixed farming had emerged. Stimulated by high wool prices, sheep flocks and nitrogen-fixing legume pastures spread across the Australian wheat belts. They restored exhausted soils and by the 1960s had lifted their potential to produce meat, wool and grain to levels undreamed of by the nineteenth-century pioneers. Higher-yielding, more disease-resistant and better-quality wheat varieties were bred to take advantage of the higher fertility levels. During the 1930s financial and environmental stresses had resulted in farm aggregation which was hastened, after World War II, by agricultural mechanisation.
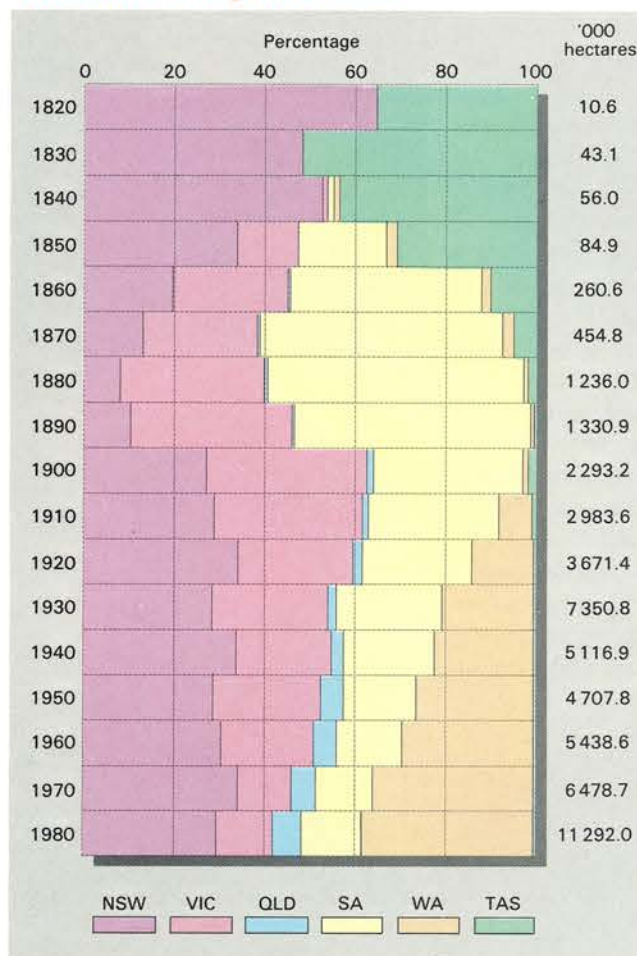
The map for 1980 depicts a wheat crop of 2.8 times the area grown in 1920, yielding 1.6 times as much per hectare and producing 4.6 times the 1920 tonnage. The most impressive recent change has been the displacement of New South Wales by Western Australia as the major wheat producer. Another important trend has been an expansion of the wheat belt in northern New South Wales and southeast Queensland, with Queensland accounting for about 7 per cent of the total area in recent years. In southeast Australia the boundaries of the wheat belt have undergone very little change in the past 60 years, except that even less wheat is now grown in the higher rainfall areas.

Until World War II, most Australian wheat exports went to the United Kingdom and Europe. In recent years export destinations have been diverse, with the largest shipments going to the USSR, Egypt, China, Japan and Indonesia. About 5 per cent of Australian wheat exported has been used as part of Australia's overseas aid which includes famine relief.

By the 1890s, the broad outline of southeastern Australia's present wheat belt had been established and new wheatlands were being developed in Queensland. This photograph, taken in 1894 on Canning Downs Station near Warwick in Queensland, shows the harvest in progress.
NATIONAL LIBRARY

Area under crop 1820–1980

Year	'000 hectares
1820	10.6
1830	43.1
1840	56.0
1850	84.9
1860	260.6
1870	454.8
1880	1 236.0
1890	1 330.9
1900	2 293.2
1910	2 983.6
1920	3 671.4
1930	7 350.8
1940	5 116.9
1950	4 707.8
1960	5 438.6
1970	6 478.7
1980	11 292.0

NSW   VIC   QLD   SA   WA   TAS

This graph shows the general pattern of declining yields from the 1860s, followed by increasing yields from the 1920s. It also shows that yields varied from state to state. This variance is partly explained by the movement into marginal areas at different times in each state and by the uneven pattern of good seasons and drought across Australia. Tasmania's consistently higher yields were due to the higher-yielding variety of wheat that can be grown there.

Wheat yields

Yields shown are five year averages

TASMANIA
QUEENSLAND
NEW SOUTH WALES
WESTERN AUSTRALIA
SOUTH AUSTRALIA
VICTORIA

Tonnes per hectare

1850-54 1855-59 1860-64 1865-69 1870-74 1875-79 1880-84 1885-89 1890-94 1895-99 1900-04 1905-09 1910-14 1915-19 1920-24 1925-29 1930-34 1935-39 1940-44 1945-49 1950-54 1955-59 1960-64 1965-69 1970-74 1975-79

Barley

ALTHOUGH BARLEY has been cultivated in Australia since the beginnings of European settlement, it was a minor crop until the 1960s, when improved international markets and the introduction of wheat quotas made it more attractive. Only in South Australia — briefly in the 1950s and since the mid-1970s — has the area under barley approached that under wheat. Before 1900 much barley was imported for brewing malt.
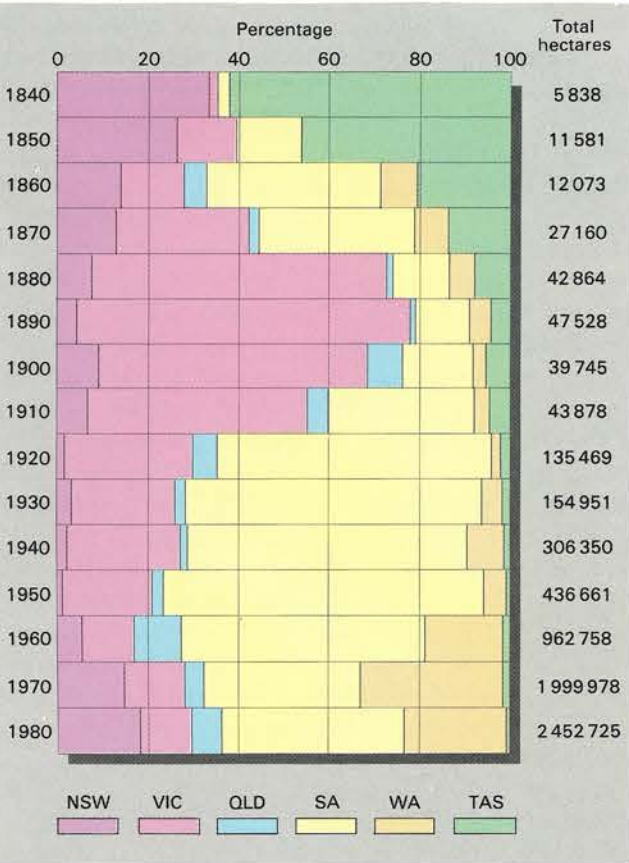
In 1860 Tasmania had the largest area under barley in Australia; South Australia then briefly took the lead, to be surpassed in turn by Victoria from the 1880s until the 1910s. South Australia has maintained its position in terms of area sown, although in some years Western Australia has produced slightly more. In 1980 South Australia had 40 per cent of the area sown under barley, Western Australia 21 per cent, followed in turn by New South Wales, Victoria and Queensland.

The 1980 distribution of barley was similar to the distribution of wheat, though barley grew better in the wet southern districts. Wheat was the pioneer crop; barley followed when markets and farm management practices were opportune.

The rapid expansion of barley cultivation since the late 1950s can be ascribed to a number of factors. Lower returns from sheep caused renewed interest in the coarse grains — oats, barley and grain sorghums — which was strengthened by the introduction of wheat quotas. Barley cultivation complements wheat growing: the same machinery can be used for both crops and barley can be left longer than wheat when ripe, thus spreading the harvest peak over a longer period. Financial returns from malting barley and from the new high-yielding feed-grain types often compare favourably with those of wheat.

Barley for malting, distilling and milling has more exacting quality requirements than that for feed grain. The grain must be capable of germinating quickly and evenly; it should be thin-skinned, starchy and have a low protein content. Production of this type of barley requires light-textured soils and a dependable, moderate rainfall with a ripening period prolonged by cool conditions and without hot drying winds. These conditions are best met on Yorke Peninsula in South Australia.
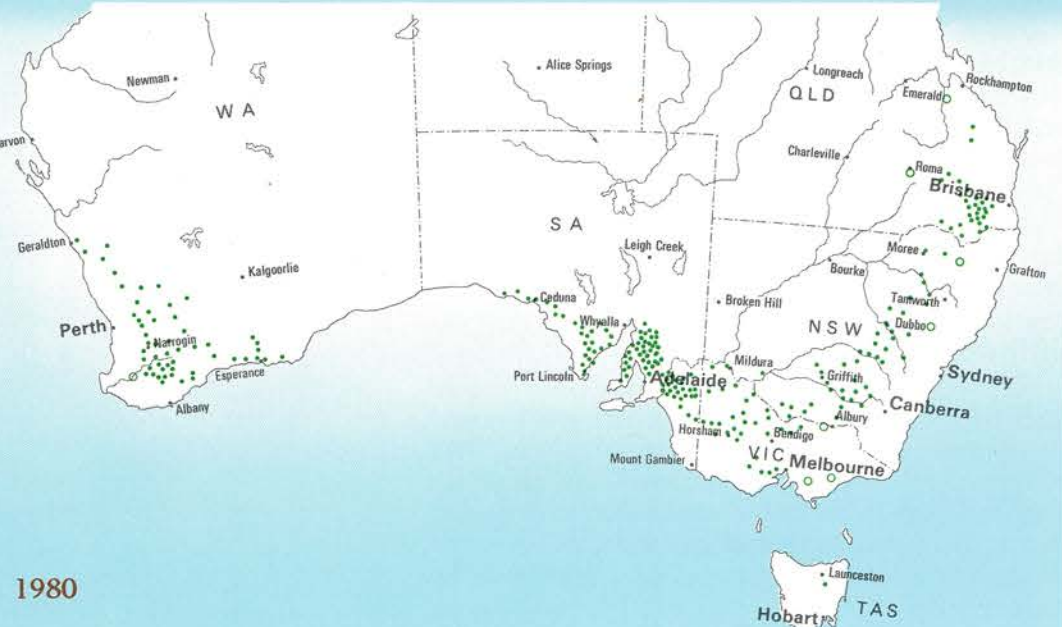
Area under crop 1840-1980

Year	Percentage	Total hectares
1840		5 838
1850		11 581
1860		12 073
1870		27 160
1880		42 864
1890		47 528
1900		39 745
1910		43 878
1920		135 469
1930		154 951
1940		306 350
1950		436 661
1960		962 758
1970		1 999 978
1980		2 452 725

NSW   VIC   QLD   SA   WA   TAS

Barley 1860

- ● 10 000 hectares
- ○ Less than 10 000 hectares

Scale 1 : 30 000 000

1920

1980

Barley has always been a subordinate crop in Australian grain production although its importance has increased since the 1950s. The two main types are malting barley and feed grain barley. Over a third of the barley crop today is grown in South Australia. Photograph by J. Burt, 1973.
AUSTRALIAN INFORMATION SERVICE

Fruit

A WIDE VARIETY OF FRUIT is grown in Australia, from bananas, pineapples, mangoes and pawpaws in the tropics to apples, pears, citrus and stone and berry fruits in temperate regions.

Orchards

In 1900 most orchards grew apples and pears and were located near the capital cities or in well-watered upland areas close to railways. By 1980, orchard production had shifted towards the irrigated districts of the Murray valley and Murrumbidgee Irrigation Area and the subtropical coast of Queensland. Citrus fruits, grown mainly under irrigation, account for almost half the area of orchards; apples and pears for almost 40 per cent. Stone fruits (peaches, apricots, plums) are concentrated in the Murray valley, pineapples almost exclusively in Queensland, and bananas in roughly equal proportions in Queensland and New South Wales.
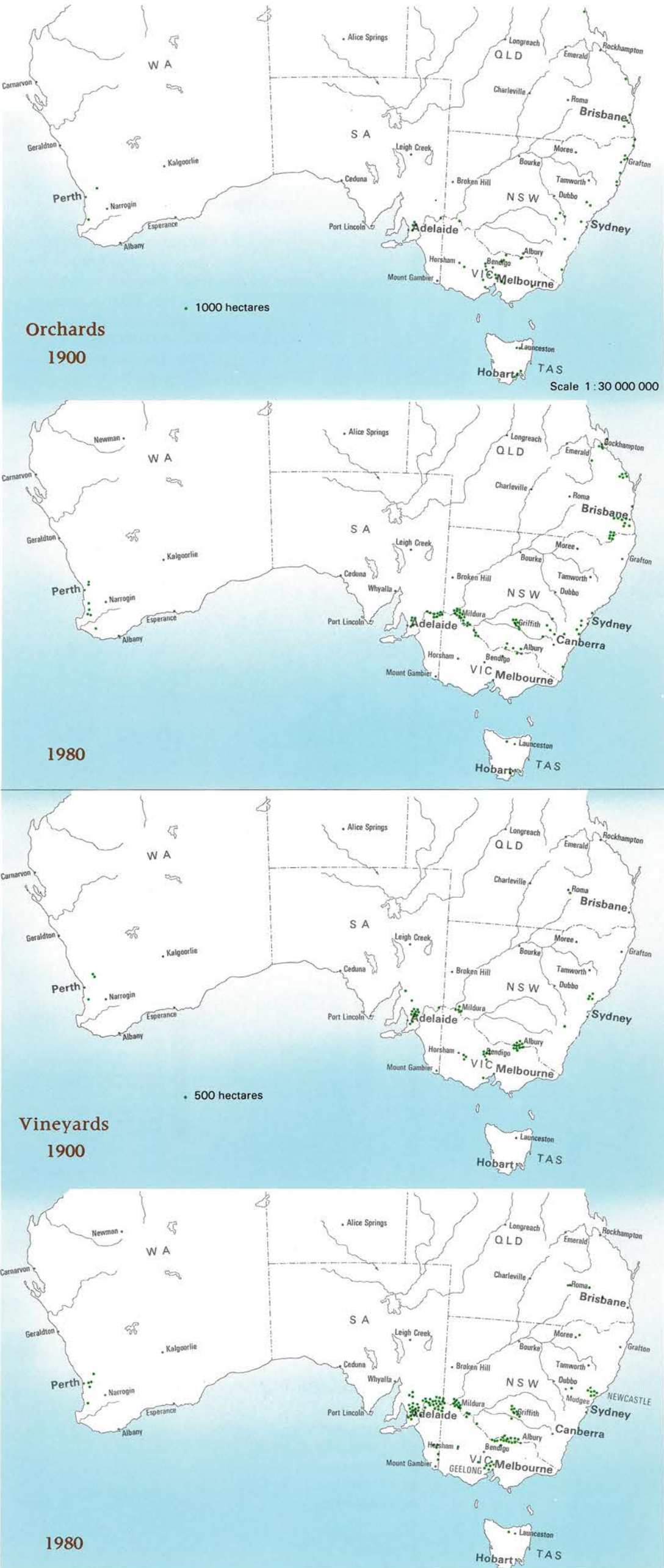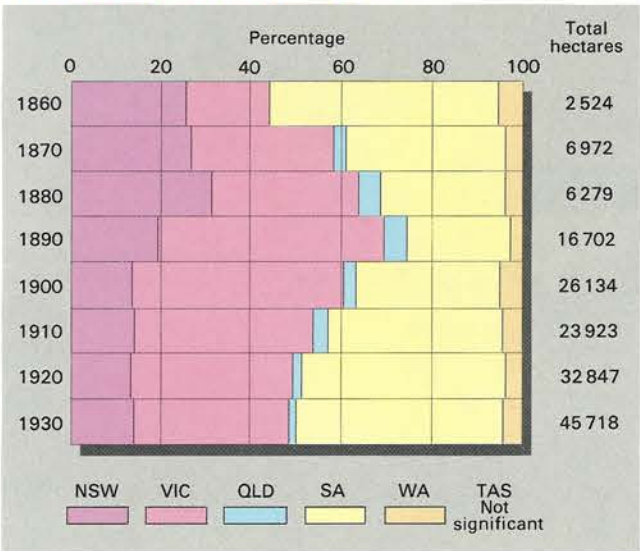
Vineyards

Australian vine growing began with 1.2 hectares of vines planted in 1791 by Captain Arthur Phillip at Government House on the Parramatta River near Sydney. James Busby established the Kirkton estate in the Hunter valley near Newcastle. Settlers in other colonies also exploited the vine-growing potential of the Australian climate.

The Victorian government offered subsidies for planting vineyards which expanded rapidly to 1890, when there were over 8000 hectares, more than twice the area of South Australia (3860 hectares) and New South Wales (3250 hectares). Significant areas to develop in the later nineteenth century were Forbes–Cowra in the central west of New South Wales, the Stawell–Ararat area in western Victoria and Rutherglen in northeastern Victoria.

A major disaster struck the infant wine industry in the late nineteenth century. *Phylloxera vastatrix* almost wiped out the vines in Victoria and the Forbes–Cowra area, but fortunately South Australia escaped. Some Victorian vineyards were eventually rehabilitated, but plantings in the Barossa valley expanded rapidly to fill the gap in the wine market. The greatest expansion of vineyards this century has been in the irrigation districts of the Murray and Murrumbidgee valleys.

Today about 60 per cent of the grapes grown in Australia are processed for the production of wine and brandy. Australian wine production grew more than sixfold between 1945 and 1980 and there has been a marked shift to table wines. Recent trends in the distribution of vineyards suggest an expansion into cooler districts producing premium table wines, such as the Adelaide hills, and Mudgee in New South Wales.

Area under Vines 1860-1930

	Percentage					Total hectares
	0 20 40 60 80 100					
1860						2 524
1870						6 972
1880						6 279
1890						16 702
1900						26 134
1910						23 923
1920						32 847
1930						45 718

NSW VIC QLD SA WA TAS Not significant

Orchards 1900

• 1000 hectares

Scale 1 : 30 000 000

1980

Vineyards 1900

• 500 hectares

1980

Irrigation

THE 1877–81 DROUGHT stimulated serious attempts to establish irrigation farming. In 1883, Victoria passed legislation to permit the construction of irrigation works, and in 1886 George and William Chaffey, irrigation engineers, quickly demonstrated that it was possible to settle the arid areas of the Murray valley permanently on the basis of groups of small irrigated holdings. By 1887, irrigation settlements had been established at Mildura and at Renmark. At the same time the Victorian government started construction on the Goulburn weir and the Laanecoorie weir. These two storages were to remain the only large purpose-built irrigation storages before 1900. Irrigation was organised by farmers themselves in irrigation trusts. Most of these trusts used water directly from rivers.

By 1900, 33 trusts had been established, but they were generally unsuccessful. The situation changed following the establishment by the Victorian government in 1905 of the State Rivers and Water Supply Commission. This commission was given wide powers over the use of water, charges for water and for river works. Similar legislation was enacted in New Sou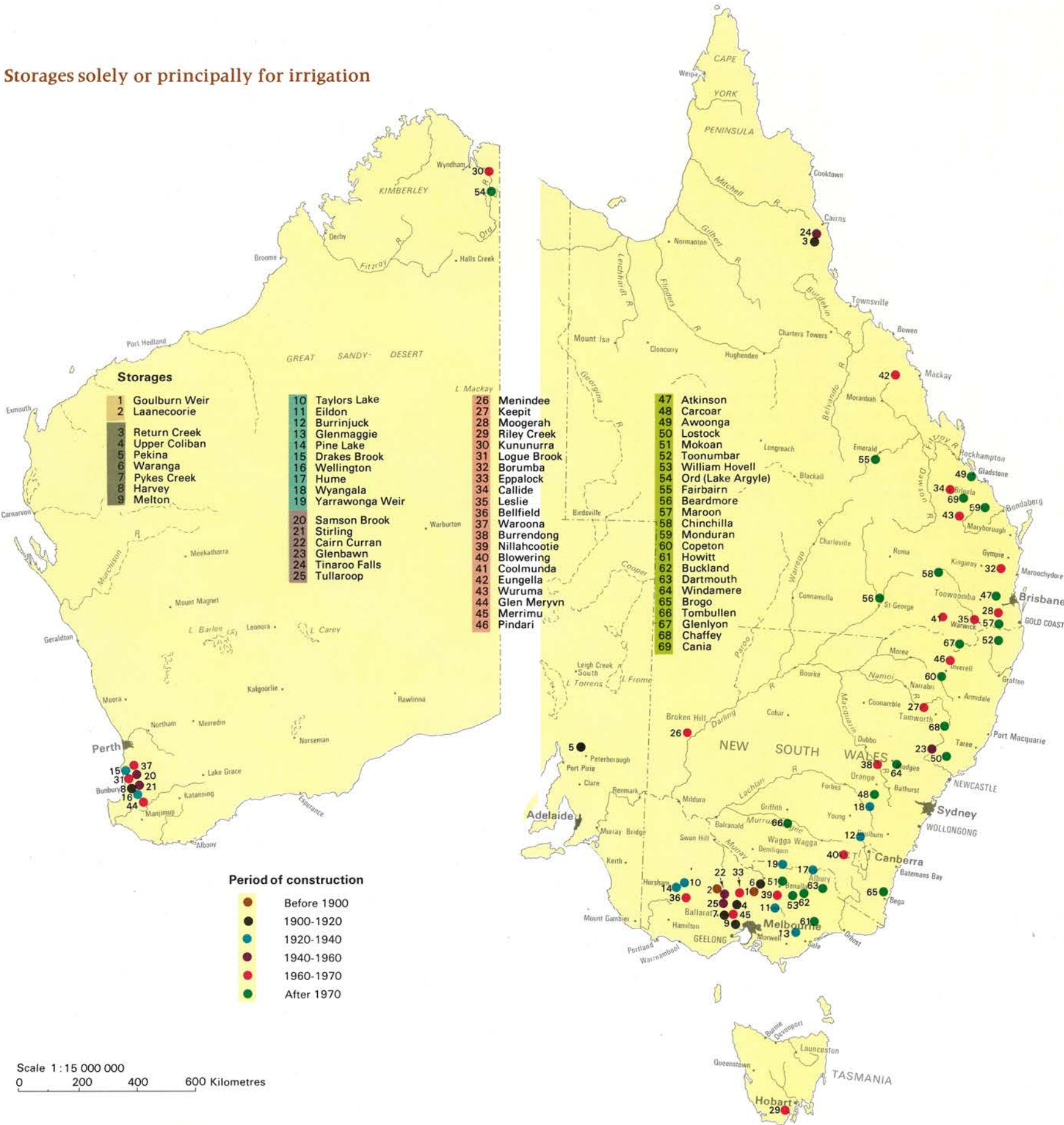th Wales in 1912 and work began on the Burrinjuck Dam on the Murrumbidgee River. In 1914 Victoria, New South Wales and South Australia agreed on a Murray River scheme and in Western Australia the Harvey Irrigation Area opened in 1916.

Expansion of irrigation took place between the world wars with major dams being built in Victoria, New South Wales and Western Australia. During the 1940s and 1950s only six major dams were built. The next 20 years brought rapid development and 41 new large storages were completed. These, unlike the early storages, were not confined to the south; major irrigation storages were also constructed in Queensland and in northern Western Australia.

The Ord scheme was built in the tropics in a remote and sparsely settled area of northern Western Australia. Its economic feasibility has been a matter of continuous debate. The project commenced in 1959. It was planned in four stages to provide water for 72 000 hectares of land. In 1963 the diversion dam (Kununurra) was completed and in 1971 the Ord River Dam, which stores 5.72 million cubic metres of water, as yet largely unused.

The use of irrigated land is shown on the map opposite. It shows the concentration of irrigation farming

Storages solely or principally for irrigation

Storages

1	Goulburn Weir	10	Taylors Lake	26	Menindee
2	Laanecoorie	11	Eildon	27	Keepit
		12	Burrinjuck	28	Moogerah
3	Return Creek	13	Glenmaggie	29	Riley Creek
4	Upper Coliban	14	Pine Lake	30	Kununurra
5	Pekina	15	Drakes Brook	31	Logue Brook
6	Waranga	16	Wellington	32	Borumba
7	Pykes Creek	17	Hume	33	Eppalock
8	Harvey	18	Wyangala	34	Callide
9	Melton	19	Yarrawonga Weir	35	Leslie
				36	Bellfield
		20	Samson Brook	37	Waroona
		21	Stirling	38	Burrendong
		22	Cairn Curran	39	Nillahcootie
		23	Glenbawn	40	Blowering
		24	Tinaroo Falls	41	Coolmunda
		25	Tullaroop	42	Eungella
				43	Wuruma
				44	Glen Meryvn
				45	Merrimu
				46	Pindari

47	Atkinson	58	Chinchilla
48	Carcoar	59	Monduran
49	Awoonga	60	Copeton
50	Lostock	61	Howitt
51	Mokoan	62	Buckland
52	Toonumbar	63	Dartmouth
53	William Hovell	64	Windamere
54	Ord (Lake Argyle)	65	Brogo
55	Fairbairn	66	Tombullen
56	Beardmore	67	Glenlyon
57	Maroon	68	Chaffey
		69	Cania

Period of construction

- Before 1900
- 1900-1920
- 1920-1940
- 1940-1960
- 1960-1970
- After 1970

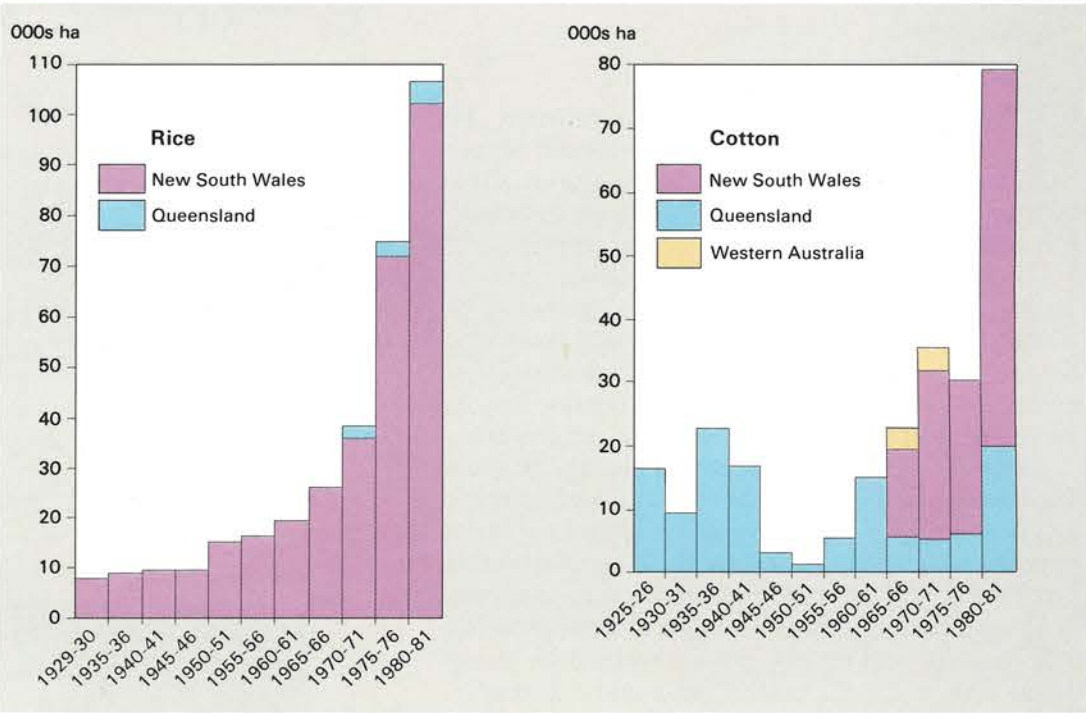Scale 1 : 15 000 000

0   200   400   600 Kilometres

in the Murray River system. The figures beside the graphs show the importance of irrigation in Victoria before 1950, and growth in New South Wales since 1930 and in Queensland since 1950. About two-thirds of the total area irrigated is sown pastures or fodder crops, most of which are used for prime lamb production or dairying. Fruits, vines and vegetables occupy proportions of each state's irrigated land. In Queensland sugar is a major irrigation crop.
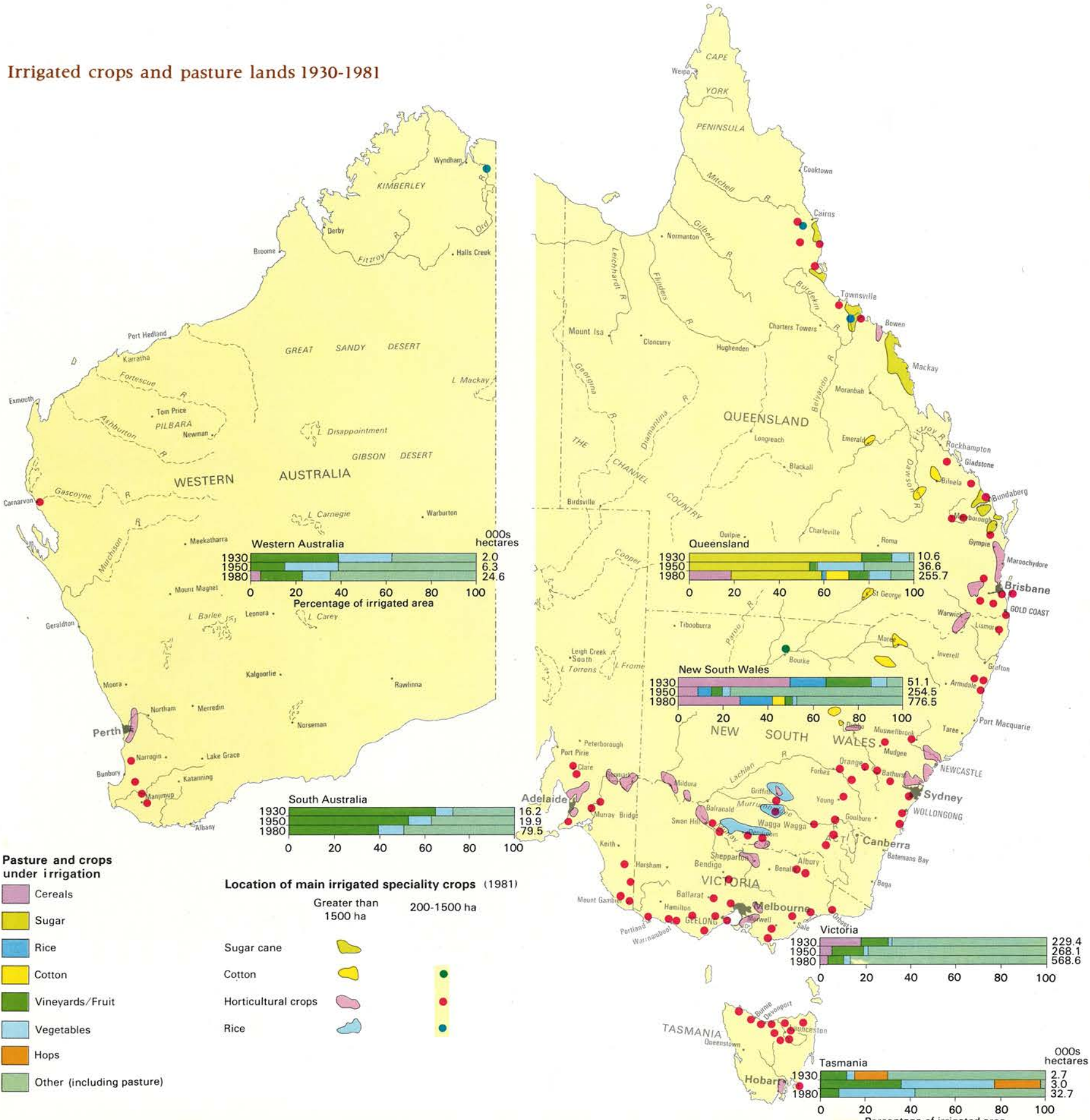
Rice is the only major cereal crop produced solely under irrigation. It was first grown near Griffith in 1922. The area cropped for rice had increased to 8000 hectares by 1930. Further progress was slow until the 1950s. In the 1960s rice cultivation rapidly expanded, spreading to northern Queensland.

The area sown to cotton also expanded rapidly after 1960. Irrigated cotton farming in the Namoi valley was a commercial success, and spread to the St George area in Queensland and the Macquarie valley in New South Wales. In 1962–63 cotton was grown at Kununurra in the Ord scheme. Supported by government subsidies, the industry survived until the mid-1970s. Irrigated cotton is now grown only in New South Wales and Queensland.

Rice and cotton cultivation

Rice
New South Wales
Queensland

Cotton
New South Wales
Queensland
Western Australia

Irrigated crops and pasture lands 1930-1981

Western Australia

	000s hectares
1930	2.0
1950	6.3
1980	24.6

Percentage of irrigated area

Queensland

	000s hectares
1930	10.6
1950	36.6
1980	255.7

New South Wales

1930	51.1
1950	254.5
1980	776.5

South Australia

1930	16.2
1950	19.9
1980	79.5

Victoria

1930	229.4
1950	268.1
1980	568.6

Tasmania

	000s hectares
1930	2.7
1950	3.0
1980	32.7

Percentage of irrigated area

Pasture and crops under irrigation

- Cereals
- Sugar
- Rice
- Cotton
- Vineyards/Fruit
- Vegetables
- Hops
- Other (including pasture)

Location of main irrigated speciality crops (1981)

Greater than 1500 ha   200-1500 ha

- Sugar cane
- Cotton
- Horticultural crops
- Rice

Sugar

THE SUGAR INDUSTRY is dominated by Queensland, which produces about 95 per cent of the total Australian output. One-quarter of a million hectares of cane are grown in this state. Most of Australia's sugar is exported.
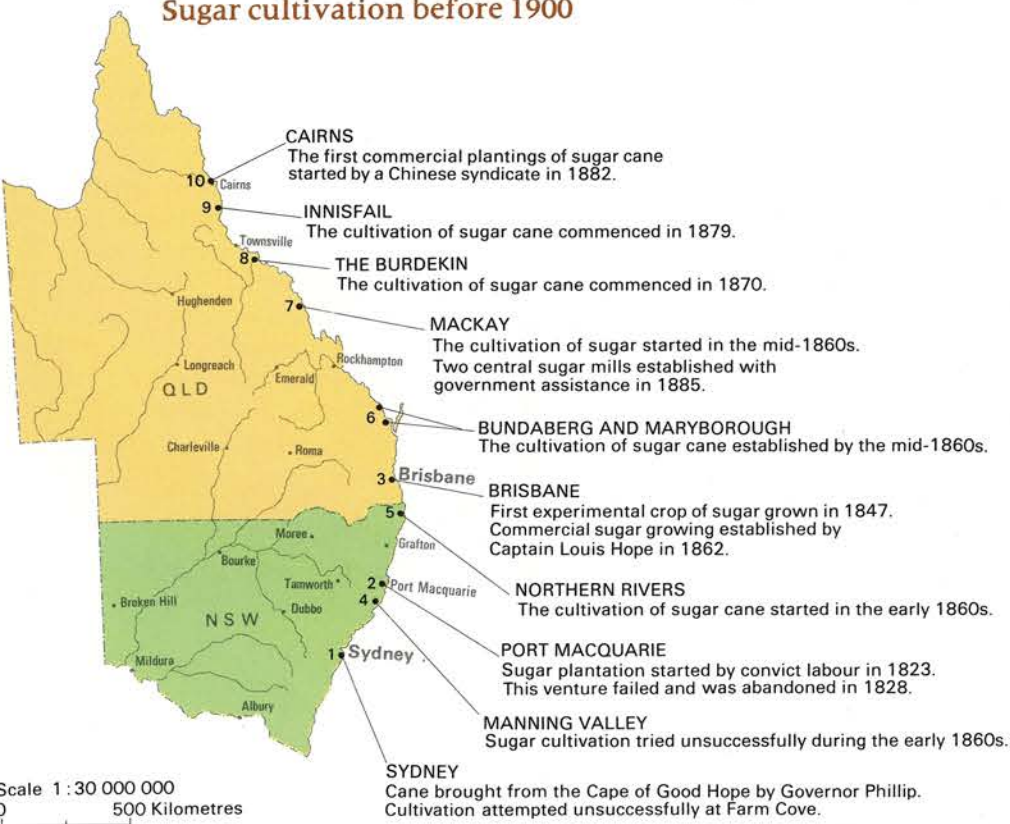
Climate and soil requirements and the need for easy transport largely restrict sugar growing to within 80 kilometres of the coast; even there it is limited to a series of favoured areas. Most sugar is grown on gently undulating or almost flat land in the major river valleys north of the Clarence valley.

The sugar-growing districts came into production during the second half of the nineteenth century. In New South Wales the pioneer phase of sugar growing was based on both small-scale growers and small mills, and plantations, each with its own mill. In Queensland the pioneer phase of cane growing was characterised by plantations worked by cheap island labour. By the end of the century, however, the sugar industry in both colonies was based on small intensive farms supplying central cane mills.

The area cut for cane has greatly increased since 1880 when only about 6500 hectares were cultivated. In the twenty years from 1960 to 1980 a very rapid expansion of sugar farming occurred, encouraged by government policy and favourable overseas markets. In this period the area cultivated for sugar more than doubled; by 1980 it was 288 259 hectares. By the mid-1980s the markets had collapsed and the industry faced an uncertain future.

In New South Wales sugar growing is confined to the Clarence and Richmond–Tweed areas. In 1980, 14 000 hectares of cane were cultivated in these districts. The sugar-growing districts of Queensland can be grouped into five main areas. The most important Queensland sugar regions since 1880 have been the Mackay district and the Far North district centred on Cairns. The Far North district increased its area of cane cut for crushing from less than 12 000 hectares in 1901 to 100 000 hectares in 1980. By 1980 the Mackay district cut between 70 000 and 80 000 hectares of cane each year and together with the Northern district and the Far North now produces over 80 per cent of Queensland cane. Their climate makes these the best cane growing districts.
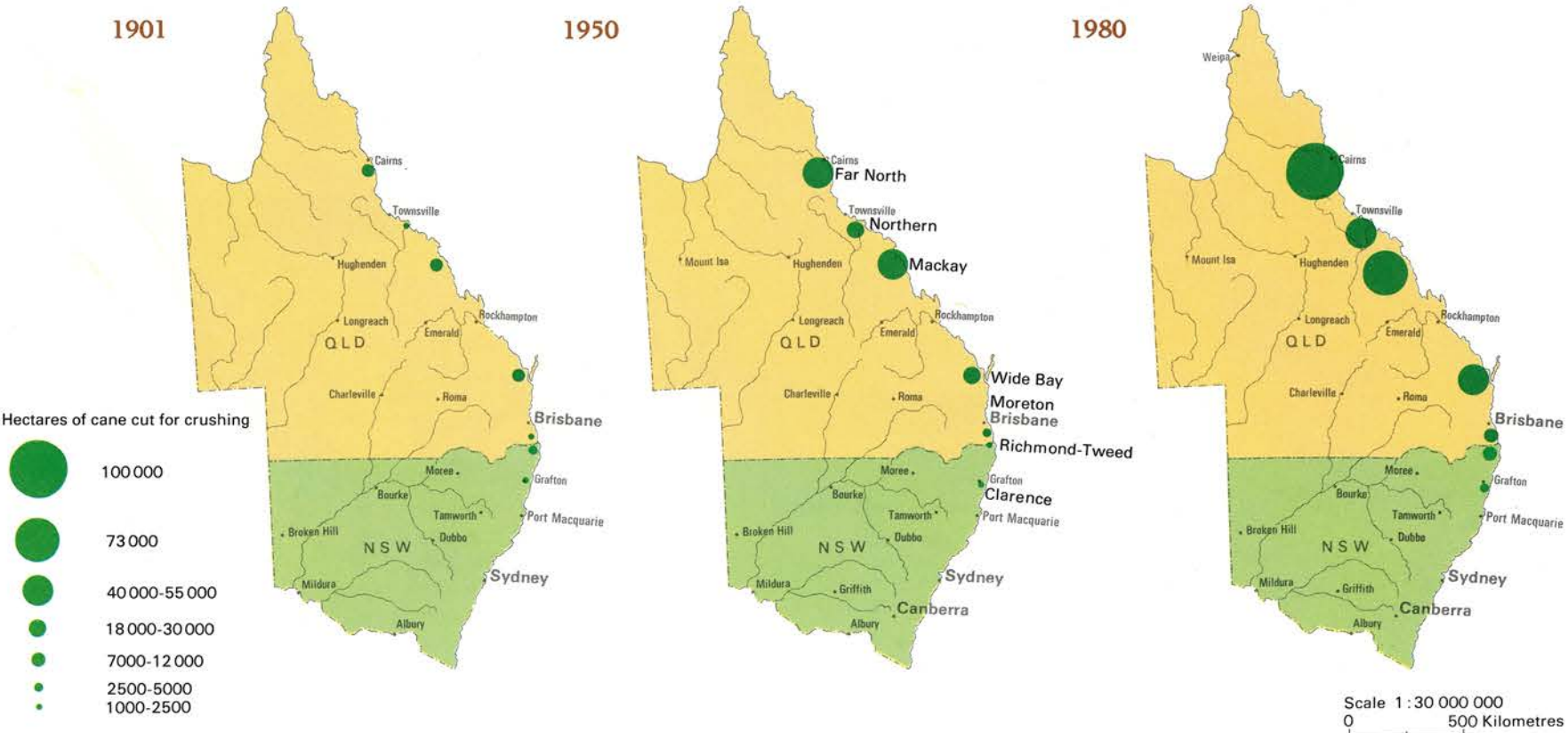
Sugar cultivation before 1900

CAIRNS
The first commercial plantings of sugar cane started by a Chinese syndicate in 1882.

INNISFAIL
The cultivation of sugar cane commenced in 1879.

THE BURDEKIN
The cultivation of sugar cane commenced in 1870.

MACKAY
The cultivation of sugar started in the mid-1860s. Two central sugar mills established with government assistance in 1885.

BUNDABERG AND MARYBOROUGH
The cultivation of sugar cane established by the mid-1860s.

BRISBANE
First experimental crop of sugar grown in 1847. Commercial sugar growing established by Captain Louis Hope in 1862.

NORTHERN RIVERS
The cultivation of sugar cane started in the early 1860s.

PORT MACQUARIE
Sugar plantation started by convict labour in 1823. This venture failed and was abandoned in 1828.

MANNING VALLEY
Sugar cultivation tried unsuccessfully during the early 1860s.

SYDNEY
Cane brought from the Cape of Good Hope by Governor Phillip. Cultivation attempted unsuccessfully at Farm Cove.

Scale 1 : 30 000 000
0   500 Kilometres

Hectares of cane cut for crushing 1880-1980

New South Wales
Queensland

	1880	1920	1960	1980
New South Wales	1488	2234	5768	14000
Queensland	5060	36090	132432	274 259

Sugar cultivation

1901

1950
Far North
Northern
Mackay
Wide Bay
Moreton
Brisbane
Richmond-Tweed
Clarence

1980

Hectares of cane cut for crushing

100 000

73 000

40 000-55 000

18 000-30 000

7000-12 000

2500-5000
1000-2500
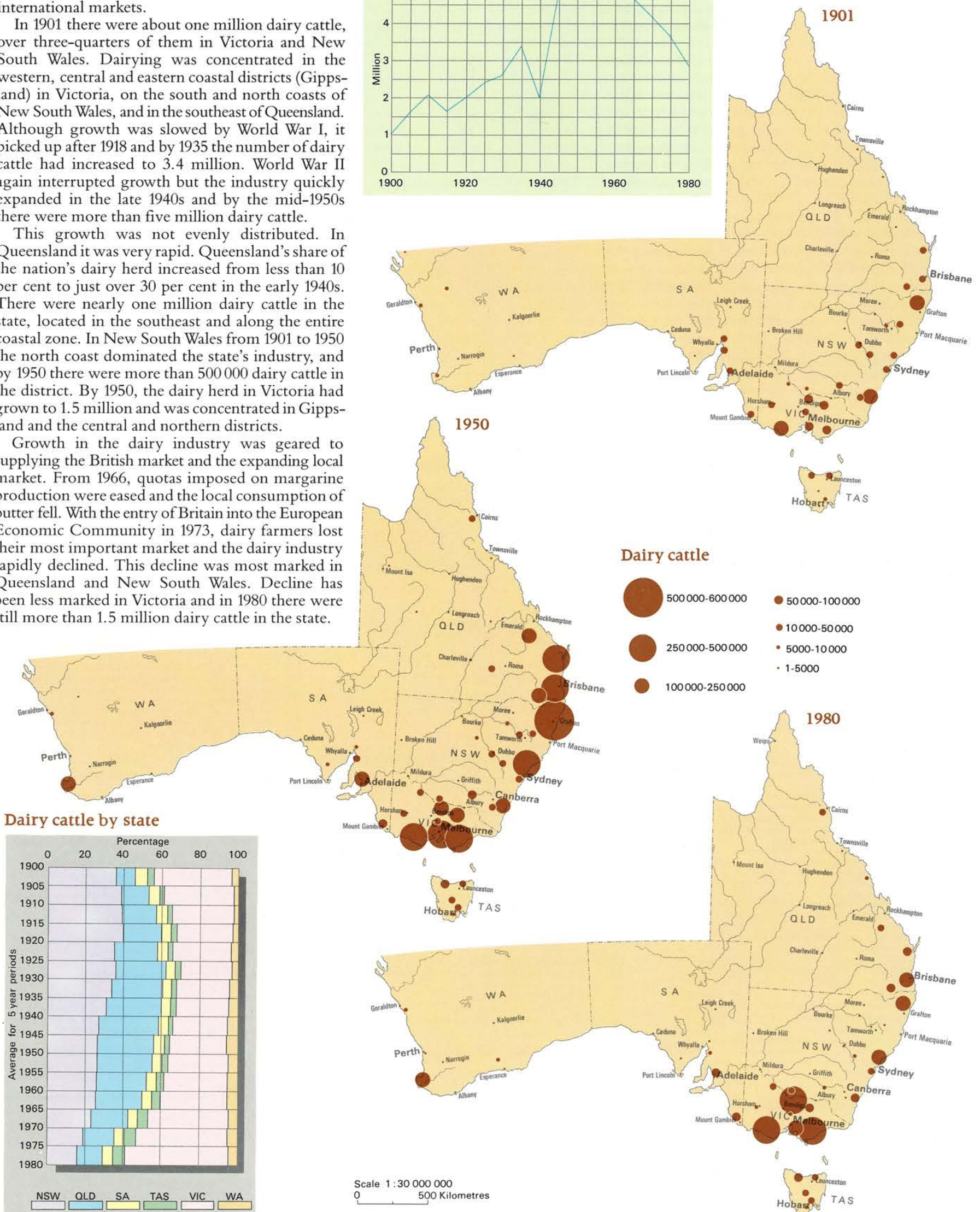
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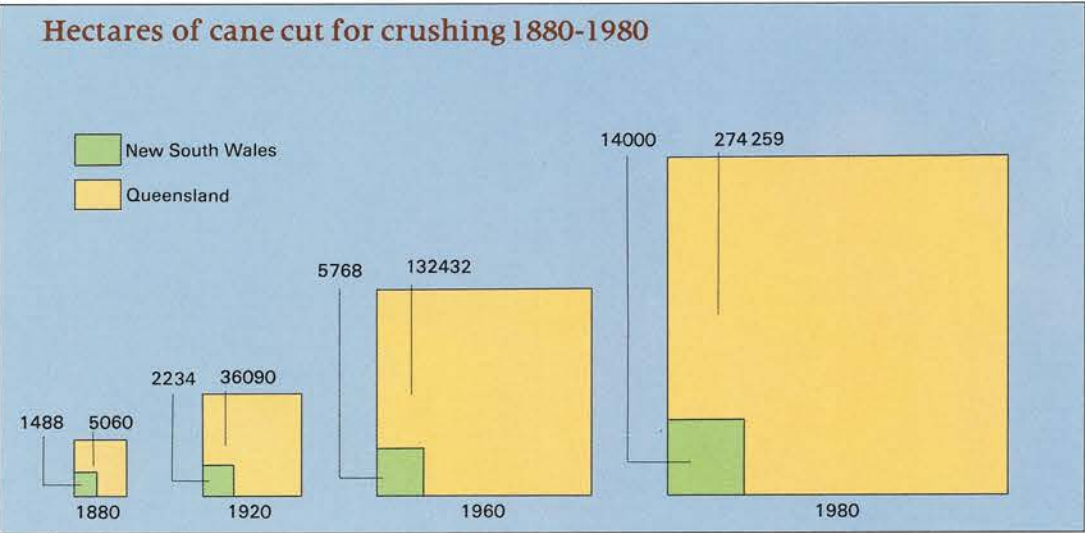
Dairying

AFTER 1880 the dairy industry was transformed by new technology, including refrigeration and mechanical cream separation, and by the introduction of the co-operative factory system. By 1900 dairying was supplying both domestic and international markets.

In 1901 there were about one million dairy cattle, over three-quarters of them in Victoria and New South Wales. Dairying was concentrated in the western, central and eastern coastal districts (Gippsland) in Victoria, on the south and north coasts of New South Wales, and in the southeast of Queensland. Although growth was slowed by World War I, it picked up after 1918 and by 1935 the number of dairy cattle had increased to 3.4 million. World War II again interrupted growth but the industry quickly expanded in the late 1940s and by the mid-1950s there were more than five million dairy cattle.

This growth was not evenly distributed. In Queensland it was very rapid. Queensland's share of the nation's dairy herd increased from less than 10 per cent to just over 30 per cent in the early 1940s. There were nearly one million dairy cattle in the state, located in the southeast and along the entire coastal zone. In New South Wales from 1901 to 1950 the north coast dominated the state's industry, and by 1950 there were more than 500 000 dairy cattle in the district. By 1950, the dairy herd in Victoria had grown to 1.5 million and was concentrated in Gippsland and the central and northern districts.

Growth in the dairy industry was geared to supplying the British market and the expanding local market. From 1966, quotas imposed on margarine production were eased and the local consumption of butter fell. With the entry of Britain into the European Economic Community in 1973, dairy farmers lost their most important market and the dairy industry rapidly declined. This decline was most marked in Queensland and New South Wales. Decline has been less marked in Victoria and in 1980 there were still more than 1.5 million dairy cattle in the state.

Total dairy cattle numbers

Dairy cattle by state

Dairy cattle

500 000-600 000
250 000-500 000
100 000-250 000
50 000-100 000
10 000-50 000
5000-10 000
1-5000

Scale 1 : 30 000 000
0   500 Kilometres

Progress and blunders

AUSTRALIAN AGRICULTURE began with the plants, animals, implements and technologies imported from the British Isles. Importations over two centuries have brought marked changes to the face of rural Australia, but there has also been a long history of local innovations and adaptations. Listed is a selection of the more significant events in Australia's agricultural history.

A few inventive farmers, pastoralists, artisans and engineers were responsible for most of the innovations and adaptations up to the early twentieth century. In an environment where yields per unit were low and prices for most products were set by markets on the other side of the world, farmers were compelled to minimise the cost of labour in clearing land, cultivating and harvesting crops and shearing.

Two centuries of agricultural innovations have brought better plants and animals for Australian conditions, produced more power for more efficient machinery and developed farm management practices to cope with climatic uncertainties and with soils that by world standards were of very low nutrient status.

Some plants and animals introduced to Australia became major problems. Prickly pear devastated large areas of northern Australia until the introduction of the cactoblastis insect, and donkeys, camels and wild horses also proved destructive.

Scale 1 : 30 000 000
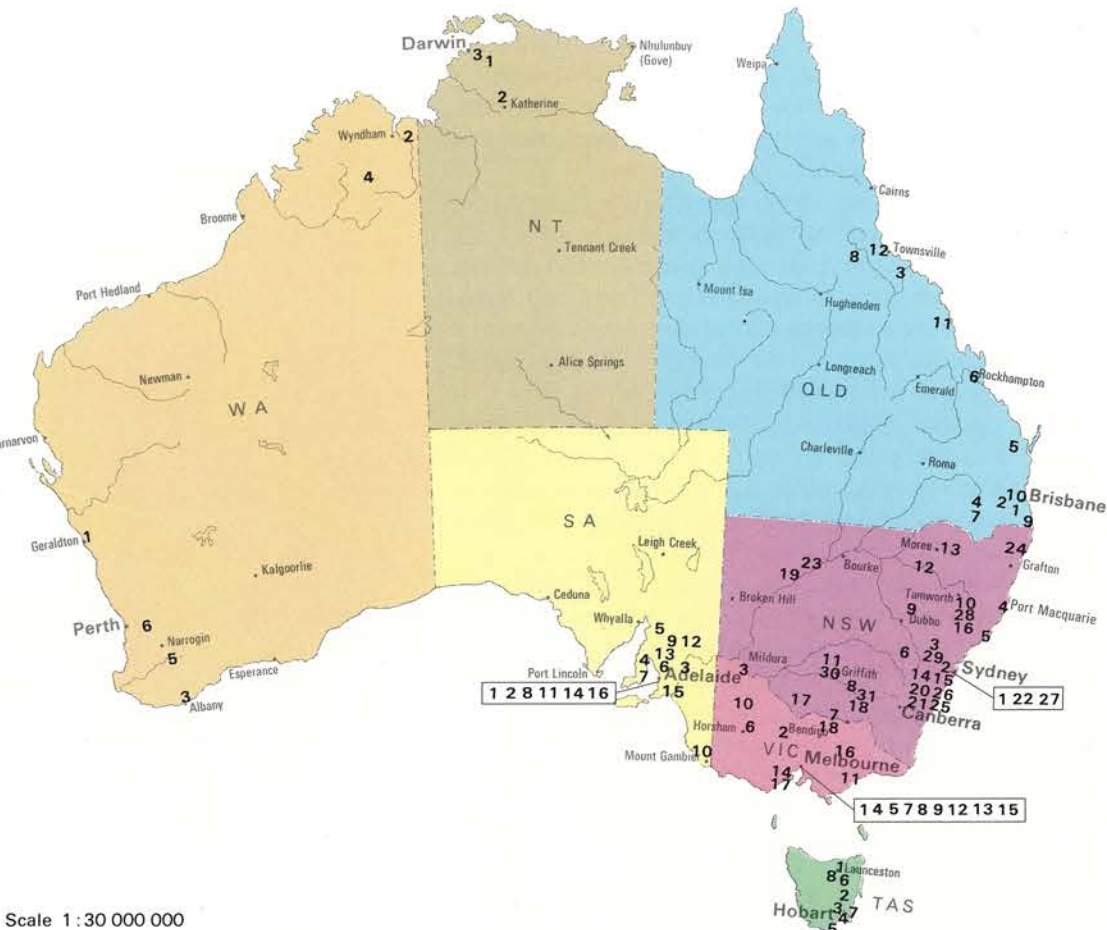
NEW SOUTH WALES
CROPS
1 1788 First farm established by Governor Phillip, site of present Botanic Gardens.
2 1790s Parramatta, cradle of agriculture. Emancipist Ruse first independent farmer, granted 12 hectares.
3 1816 First wheat grown inland, Bathurst.
4 1822 First sugar cane planted, harvest of 70 tonnes, Pt Macquarie.
5 1824 Wine industry established by Busby with French and Spanish cuttings, Hunter valley.
6 1886 Farrer began cross-breeding of wheat varieties at *Lambrigg*, later at Cowra. New variety, *Federation*, released 1901, early maturing, high yielding, short straw variety ideal for stripper harvester.
7 1911–1915 Header harvester to harvest storm damaged crops developed by Taylor, Henty.
8 1912 First Murray Irrigation Area blocks allocated, citrus trees planted.
9 1912–1920 rotary hoe developed by Howard at Gilgandra and Moss Vale.
10 1916 Spring tyne drill cultivator, (combining cultivation, seed and fertiliser drilling, and harrowing to bury uncovered grain) invented by Squire, Quirindi.
11 1924 First commercial production of rice, Murray Irrigation Area.
12 1961 Irrigated cotton first grown, Namoi valley.
13 1968 First commercial farming of pecan nuts, Moree.
LIVESTOCK AND PASTURES
14 1797 Macarthur, Marsden, Cox and Riley purchased first merino sheep from Cape of Good Hope. Marsden began selective cross breeding, Parramatta district.
15 1811 First commercial shipment of wool by Marsden.
16 1840 Blue Heeler cattle dog developed, Muswellbrook.
17 1858 Peppin merino flock established near Deniliquin.
18 1870-1876 Kelpie sheep dog developed by King brothers, *Wollonough* and *Hanging Rock* stations.
19 1879 First use of artesian water, *Kalara* station.
20 1881 Centrifugal cream separator first used, Mittagong.
21 1883 First co-operative butter factory established, Kiama.
22 1887–1913 rack and pinion wool presses developed by Koerstz and Mason, Sydney.
23 1888 Manager of *Dunlop* station installed 40 shearing machines, completed first machine shearing of entire station flock.
24 1891 Success of paspalum as pasture encouraged shift from sugar cultivation to dairying, Richmond and northern rivers.
25 1892 First milking machines, imported from Scotland, used on south coast.
26 1898 First Australian cattle breed, Illawarra short horns, developed.
EDUCATION
27 1910 First Faculty of Agriculture established, Sydney University.
PESTS AND PEST CONTROL
28 1839 Prickly Pear first grown, Scone.
29 1840s Bathurst Burr first identified, Bathurst district.
30 1870s Pattersons Curse (also known as Salvation Jane and Lady Campbell Weed) identified, Riverina.
31 1914 Skeleton Weed, worst of introduced species, identified, Wagga Wagga.

NORTHERN TERRITORY
CROPS
1 1958-1960 First commercial rice planted Humpty Doo; project failed.
LIVESTOCK AND PASTURE
2 1955 First cattle road trains introduced by Farrell brothers: assisted more rapid turn-off of stock.
PESTS AND PEST CONTROL
3 1872 Cattle tick introduced from Java, spread through northern Australia.

VICTORIA
CROPS
1 1857 von Mueller introduced *pinus radiata* from California, widespread distribution of seedlings followed.
2 1884 Stripper harvester, first machine to strip, thresh and bag wheat in one operation, demonstrated by McKay, Drummarton.
3 1886 Chaffey brothers signed agreement with Victorian government to develop first irrigation settlement, Mildura.
LIVESTOCK AND PASTURES
4 1858 Pleuropneumonia introduced from England, Melbourne; spread rapidly with heavy stock losses.
5 1865 Rack and pinion wool press first demonstrated, Melbourne.
6 1869 Ostriches imported for ostrich farming.
7 1880 First Victorian freezing works built, Maribyrnong.
8 1881 Paspalum introduced as pasture from South America.
9 1884 World's first commercial hand piece sheep shearing machine developed, Melbourne, field trials Walgett (NSW).
10 1919 Wimmera rye grass first identified: of Mediterranean origin, invaluable species in temporary pastures.
11 1940s Strain 19 introduced to control brucellosis in dairy cows.
EDUCATION
12 1872 First Department of Agriculture established Melbourne.
13 1909 First veterinary school established, Melbourne.
PESTS AND PEST CONTROL
14 1859 European wild rabbits introduced, Barwon Park.
15 1860s Acclimatisation society, Melbourne, leader in introduction of exotic flora and fauna including skylarks, blackbirds, thrushes, sparrows, myna birds and snails.
16 1870s St Johns Wort first grown near Bright.
17 1877 Phylloxera first detected near Geelong, by 1890 had devastated Victorian vineyards.
18 1950s First trial run testing myxomatosis to control rabbits, Murray valley.

TASMANIA
CROPS
1 1805 First hops planted, Tamar.
2 1830s Expansion of wheat farming, especially in north, made island a major wheat producer until 1850s.
3 1843 First recorded use of irrigation for crops, Redlands.
4 1884 First commercial export of apples from Tasmania to London.
5 1892 First fruit cannery established near Hobart, boosted berry fruit industry.
LIVESTOCK AND PASTURES
6 1820 Introduction of 300 Merinos, Tamar, established fine wool industry in Tasmania.
PESTS AND PEST CONTROL
7 1820s Scotch thistle introduced.
8 1840s Blackberries introduced, later acclimatised by von Mueller in Melbourne.

WESTERN AUSTRALIA
CROPS
1 1862 Cotton grown near Geraldton for export to England during American Civil War.
2 1967-1972 Construction of Ord River Scheme.
LIVESTOCK AND PASTURES
3 1832 First export of wool from Western Australia to London from Albany via Hobart.
4 1883-1885 Epic cattle drives from Queensland by Duracks and others to Kimberleys.
5 1927 Early maturing strain of subterranean clover commercialised by Forrest, Dwalganup; improved pastures in lower rainfall area.
PESTS AND PEST CONTROL
6 1840s Cape Tulip, from South Africa, noted.

QUEENSLAND
CROPS
1 1849 Attempt to grow cotton near Brisbane failed.
2 1864 First commercial raw sugar mill built on Ormiston plantation near Brisbane.
3 1877 First well for irrigated sugar crop sunk on *Pioneer* plantation.
4 1908 Hay press (an early hay baler powered by hand or horse) invented by Bishop, Toowoomba.
5 1924 Queensland's peanut industry established, Burnett River district.
LIVESTOCK AND PASTURES
6 1880 First freezing works established, Rockhampton.
7 1884 'Toowoomba' canary grass spread as important pasture in Darling Downs and New South Wales tablelands.
8 1910 Zebu cattle introduced northern Queensland, crossed with local stock to breed drought and tick resistant stock: systematic stock breeding from the 1930s.
PESTS AND PEST CONTROL
9 1890s Water hyacinth, from tropical America, identified in coastal rivers of Queensland and northern New South Wales.
10 1926 *Cactoblastis* released in Queensland to control Prickly Pear. Pear virtually eliminated within a decade.
11 1935 Giant cane toad introduced northern Queensland.
12 1960s CSIRO began releasing dung beetles between Townsville and Broome (WA) to control buffalo fly larvae.

SOUTH AUSTRALIA
CROPS
1 1838 First South Australian vineyard established by Reynell near Adelaide.
2 1843 Grain stripper invented by Bull and Ridley, Adelaide.
3 1868 Mullensing, a method of scrub clearance using an iron roller followed by scarifying and seeding with a spiked iron log, pioneered by Mullens near Gawler.
4 1876 Stump jump plough developed by Smith, Kalkabury.
5 1880s Wheat improvement by selection, Port Pirie district. Varieties selected for early maturity and drought resistance.
6 1882-1886 Superphosphate fertiliser applied experimentally to wheat crops by Custace, Roseworthy Agricultural College.
7 1892-1893 Combined drilling of seed and phosphate developed by Correll brothers and others, Yorke Peninsula.
8 1907 Clock spring principle adopted to stump jump plough by Shearer, Adelaide.
9 1915-1923 Mechanical wheat picklers for treating seed against smut developed by Hannaford, Riverton.
LIVESTOCK AND PASTURES
10 1874 Renewable shearing blades invented by Brown near Mount Gambier.
11 1889 Subterranean clover established as valuable winter pasture species in summer dry climates by Howard, Mount Barker.
12 1938 First commercial harvest of barrel medic, now extensively used pasture legume in Mallee lands, by Hannaford, Riverton.
EDUCATION
13 1883 First agricultural college opened, Roseworthy.
14 1888 Agricultural Bureau established to encourage regular meetings and exchanges of information by farmers: a model for other states.
15 1938 Riceman and Donald reported first evidence of trace element deficiencies as curb to pasture growth.
PESTS AND PEST CONTROL
16 1850s Stinkwort first identified.

'The grey tide'

RABBITS were brought to Australia with the first fleet. They were domestic breeds, highly prized by the early settlers. During the next 60 years, various domestic strains were released throughout southeastern Australia. They thrived on the Bass Strait islands and in Van Diemen's Land, but few of those released on the mainland survived.

In 1859, Thomas Austin imported 24 European wild rabbits as game for his property, Barwon Park, near Geelong in Victoria. Unlike the domestic breeds, the wild rabbits adapted quickly and prospered. By 1866, Austin and his guests were shooting more than 14 000 each year. The wild rabbits soon spread and by 1869 had reached plague proportions in the Geelong district. The 'grey tide' was ready to sweep across the grasslands of eastern Australia.

Austin was not the only person to introduce the wild rabbit to Australia. During the 1860s and early 1870s, rabbits were reported in parts of South Australia, central Victoria and New South Wales.

During the 1870s, the rabbits fanned out through western Victoria and moved north to the Murray River where they joined rabbits moving east from South Australia. During the 1880s, they moved rapidly along the inland river systems, reaching central New South Wales and southern Queensland in the 1890s. During the first decades of the twentieth century, they crossed the Great Divide to the coastal regions of southeastern Australia. In South Australia during the 1870s and 1880s, the rabbits

moved west to Eyre Peninsula and north to Lake Eyre. From Lake Eyre, they invaded Queensland's Channel country. Only the deserts of the interior and the subtropical north stopped them.

With a series of good seasons, no natural predators and an ideal environment, the rabbit population grew to staggering numbers. In the first six months of 1887, for example, more than 600 000 were killed in the Wilcannia district of New South Wales, and, in the same year, more than 10 million were destroyed in the state. A new occupation was born, the rabbiter, and a new trade was created, the export of frozen rabbits. In 1906, for example, 22 million frozen rabbits were exported, earning more than the export of frozen beef.

The impact of the rabbit on the environment was devastating, particularly in western New South Wales and northern South Australia. Large tracts of land had already been overgrazed in these regions. The rabbits ate them out completely, turning them into semidesert which they remain today.

Attempts to combat the rabbit plague were varied and largely ineffective. Farmers spread poisoned baits, ingenious traps were invented, ferrets and even cats were specially trained to hunt the pest, and biological controls were suggested by Louis Pasteur. Rabbit-proof fences of dense wire mesh were built in northern and Western Australia. The rabbit population was not brought under control until the introduction of the virus myxomatosis in the 1950s.

Rabbitproof fences 1901-1908
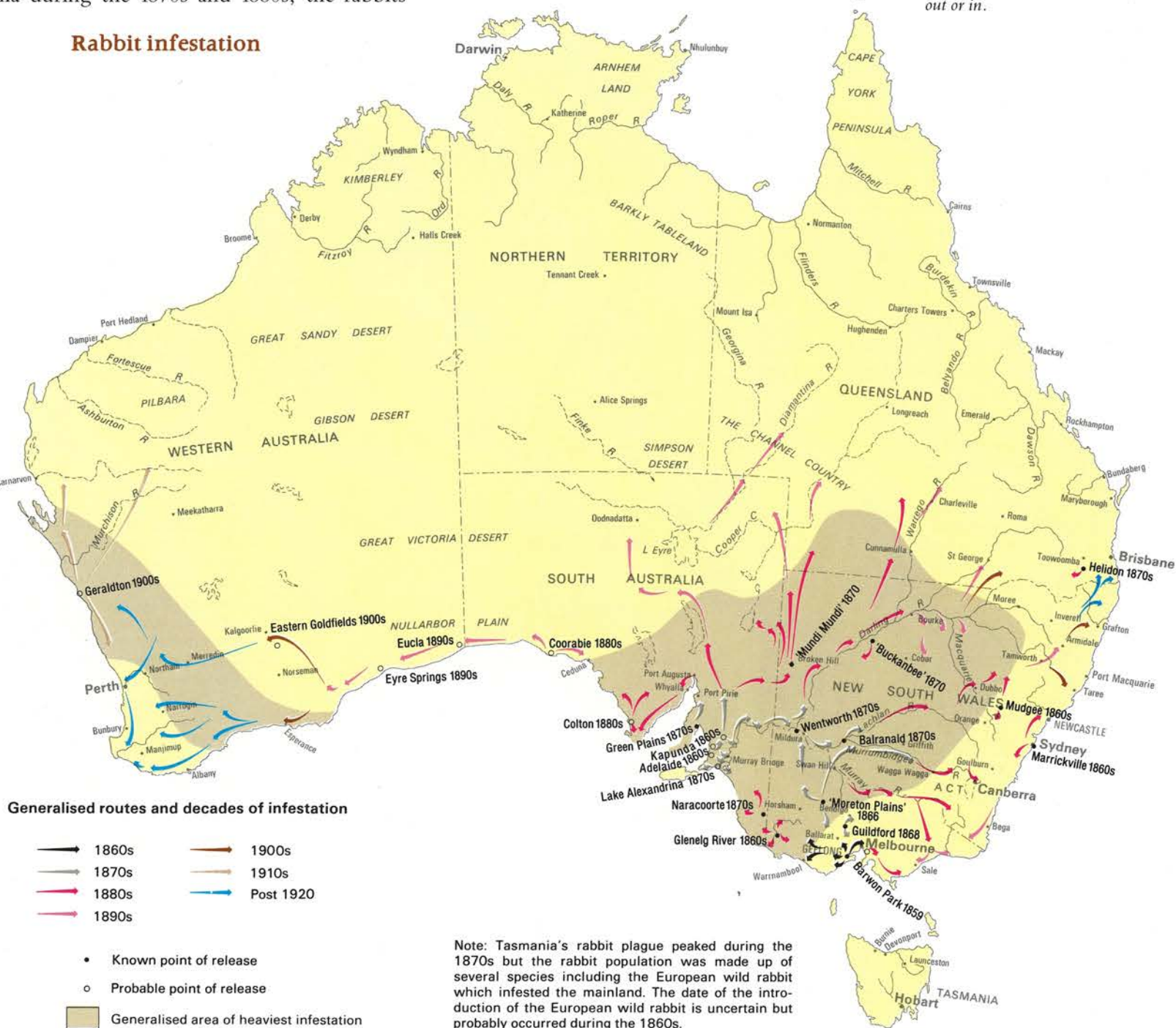
Fence No. 1 1902-1908 ----
Fence No. 2 1903-1907 ----
Fence No. 3 1904-1908 ----
Fence proposed by Commissioners, 1901 ----

Until the 1890s, Western Australia had watched, with some smugness, the devastation caused by rabbits in the east. No rabbits could cross the Nullarbor, it was argued. But they did.

Long before the recommended fence, from Starvation Harbour to Cape Bossut, had been completed, rabbits had moved beyond it. Two subsequent fences were built with similar results. Farmers were left wondering whether the fences had been built to keep the rabbits out or in.

Rabbit infestation

Generalised routes and decades of infestation

— 1860s   — 1900s
— 1870s   — 1910s
— 1880s   — Post 1920
— 1890s

• Known point of release
○ Probable point of release
▨ Generalised area of heaviest infestation

Note: Tasmania's rabbit plague peaked during the 1870s but the rabbit population was made up of several species including the European wild rabbit which infested the mainland. The date of the introduction of the European wild rabbit is uncertain but probably occurred during the 1860s.

Scale 1 : 20 000 000
0   250   500 Kilometres

German settlement, South Australia

GERMANS WERE THE FIRST non-English-speaking group to settle permanently in Australia. They left a unique imprint on the landscape.

The first permanent German settlers, a dissenting congregation of 'Old Lutherans' led by Pastor Kavel, came to South Australia in 1838. They were typical of German immigrants to South Australia throughout the nineteenth century, arriving as a community and remaining largely self-sufficient and self-contained. Most German immigrants came from eastern Germany, particularly Prussia. Most were farmers. On arrival they set up villages, with their own churches and German-language schools. The church reinforced links with the old country and helped sustain traditional culture.

The first arrivals settled at the village of Klemzig, which came to function as a staging camp for new arrivals. Hahndorf was the second village to be settled (1839). Other villages followed, the majority being established in the Barossa valley. The Germans tended to settle beyond established areas, maintaining an isolation from English colonial settlements. The time lag between German and English settlements is shown on the map.

The Germans made significant contributions to agricultural development in South Australia. They became Adelaide's chief supplier of vegetables and dairy produce, and pioneered new techniques of farming. They are probably best known for their contribution to the wine industry. Orlando and Seppelts, both founded by German vignerons, are still familiar trade names.

Villages

The layout of German villages and nearby farms was quite unlike the rectangular layout common across Australia. Most German villages were based on the *hufendorf* or farmlet village, familiar in Prussia. The hufendorf comprised a series of long, thin strips of land running behind farmhouses built facing the road. In this way a farming community could make up a village, with such amenities as church, school or store. The village could be as small as four households or as large as eighty.

The land was used for mixed farming, and the intensity of landuse declined with distance from the

German settlement in the Mount Lofty Ranges

Bethel (1856)   Kapunda
Steinfelde (1882)
Light River
Neukirch (1854)
Ebenezer (1852)   Stockwell (1856)
Greenock
Barossa   Nuriootpa
Langmeil (1843)   Tanunda
Schoenborn (1853-54) Valley   Bethanien (1842—now Bethany)
Rosenthal (1849 —now Rosedale)   Neu Mecklenburg (1853-54)
Buchfelde (1849)   River   Gawler
Gawler   Lyndoch   Hoffnungstal (1847-53)
Mount Pleasant
Torrens River
Blumberg (1848 —now Birdwood)
Gumeracha (1850s)
Klemzig (1838)   Mount Torrens (1850s)
ADELAIDE   Lobethal (1842)   Springhead (c. 1849)
Woodside (1850s)   Mannum
Grunthal (c. 1845 —now Verdun)   Oakbank (1850s)
Balhannah (1840s)
Hahndorf (1839)
Paechtown (1853) Mount Barker
Onkaparinga   MURRAY RIVER
Murray Bridge

🔥 German settlements
• Other settlements
Scale 1 : 700 000
0   5   10   15 Kilometres

Lobethal

Settled 1842, 1855 survey showing Hufendorf plan

St. Johns Lutheran Church
Original main street
Bullock route (now main street)
0   400
Metres

Bethany

Settled 1842, 1857 survey by C. Von Bertouch

Tanunda Creek
GOVERNMENT ROAD
(houses built along this road)
0   500
Metres
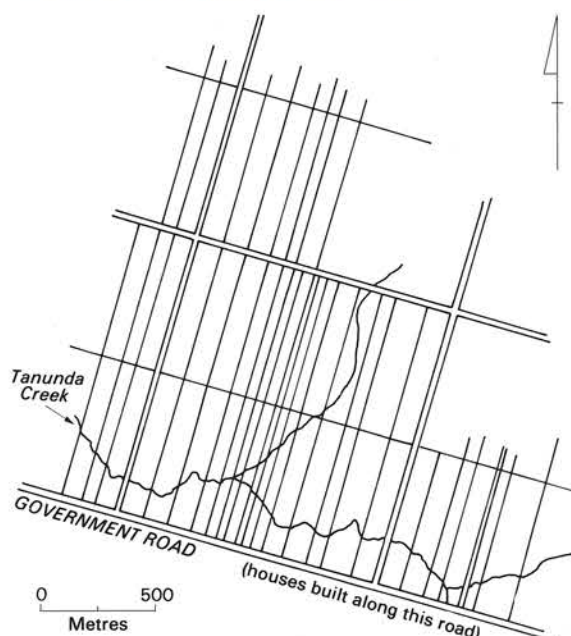
Although the sketch above presents an idealised version of a hufendorf settlement, the basic pattern of long strips of land is clearly apparent in the plans of Lobethal and Bethany. The use of long strips of land gave all farmers access to the same type of land. All farms contained arable land, pasture land and water. Farmhouses and outbuildings faced the road at the head of the strip. Hahndorf's layout, though slightly different, is still basically hufendorf in design. Its flattened U-shape was due to the need for the village to fit into 20-hectare blocks already surveyed by the government. In all cases farms were small, often less than 4 hectares in area. The hufendorf pattern was often disrupted by roads put through the strips of land by the government after the village had been established. The church was the community's spiritual, social and cultural centre. Often it was its geographical centre as well.

house. The sketch of a hufendorf village on the left shows this pattern. Around the house a vegetable garden and orchards were planted. Next came cultivated land, often planted with wheat or barley. At the back of the hufendorf strip was pasture for grazing and harvesting. Beyond the farm was common land, often woodland, not yet brought into use.

Buildings

Houses, barns and stables had high gables, which left extensive attic space that could be used for storage or as sleeping quarters. Gable ends, filled with wood or brick, had small casement windows or loft doors. Roofs were made of either straw or wooden shingles. Many houses also had cellars.

The most distinctive feature of many of the buildings was their half-timber construction of *fachwerk*, a traditional German form of building. Cultural background and tradition, the presence of German carpenters and the ease of access to timber as land was cleared encouraged the use of fachwerk in the early years of settlement. In the house, infill panels tended to be brick, and in the outbuildings wattle and daub. Half-timbered buildings were more common in the Hahndorf district than in the Barossa valley. Buildings that contained both people and animals under the one roof were rare.

Houses usually began as a one or two-roomed cottage. New rooms were added as required. In general, they were passage kitchen houses (*flur kuchenhaus*) with an entrance hall and through passage, with rooms branching off the passage, and a kitchen as either a separate room or a hearth facing the passage. Initially the kitchen was part of the house, the chimneys being used to cure or smoke meat. Later smoke-houses and bake-ovens were built away from the house.

An example of a German house in Paechtown is shown on the right. Note the high gables, dormer windows and thatched roof. The gable ends have been boarded up. The two elevations illustrate the fachwerk or half-timber construction. Section A-A shows the characteristically large attic area. The ground plan reflects many of the features associated with German houses. The house was built on a through passage plan running from the entrance hall (E) through to the kitchen or cooking hall (K). The general living areas, including a parlour (P) were located at the front, the bedroom (B) at the back.
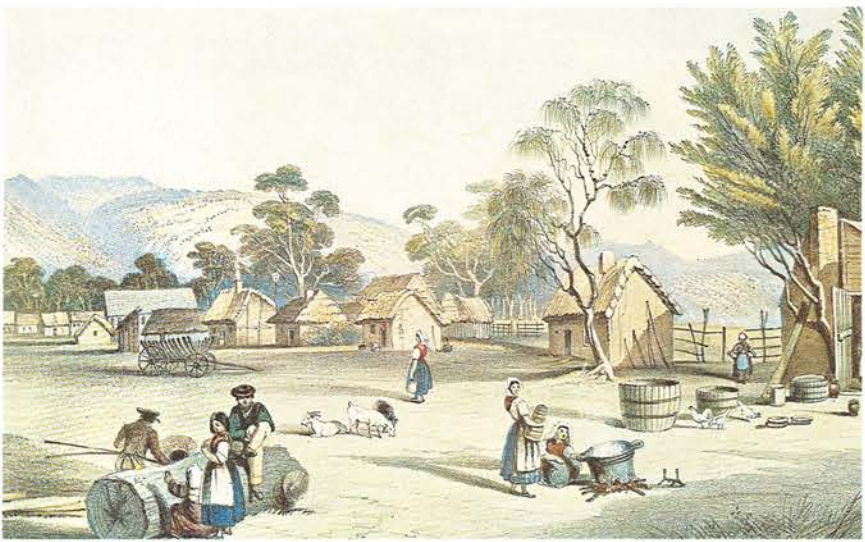
Bethany was the first German village established in the Barossa valley of South Australia. It was a farming village laid out using the hufendorf plan reproduced opposite. Hand coloured lithograph by George French Angas, 1847.
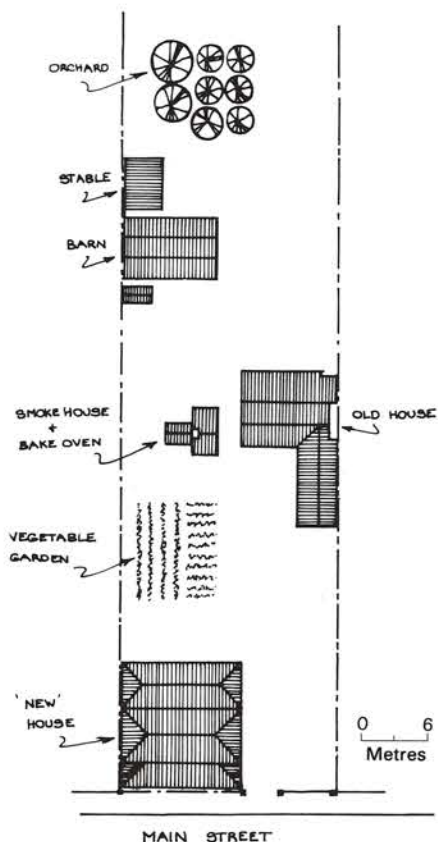SOUTH AUSTRALIAN STATE LIBRARY

PAECHTOWN - HOUSE 2
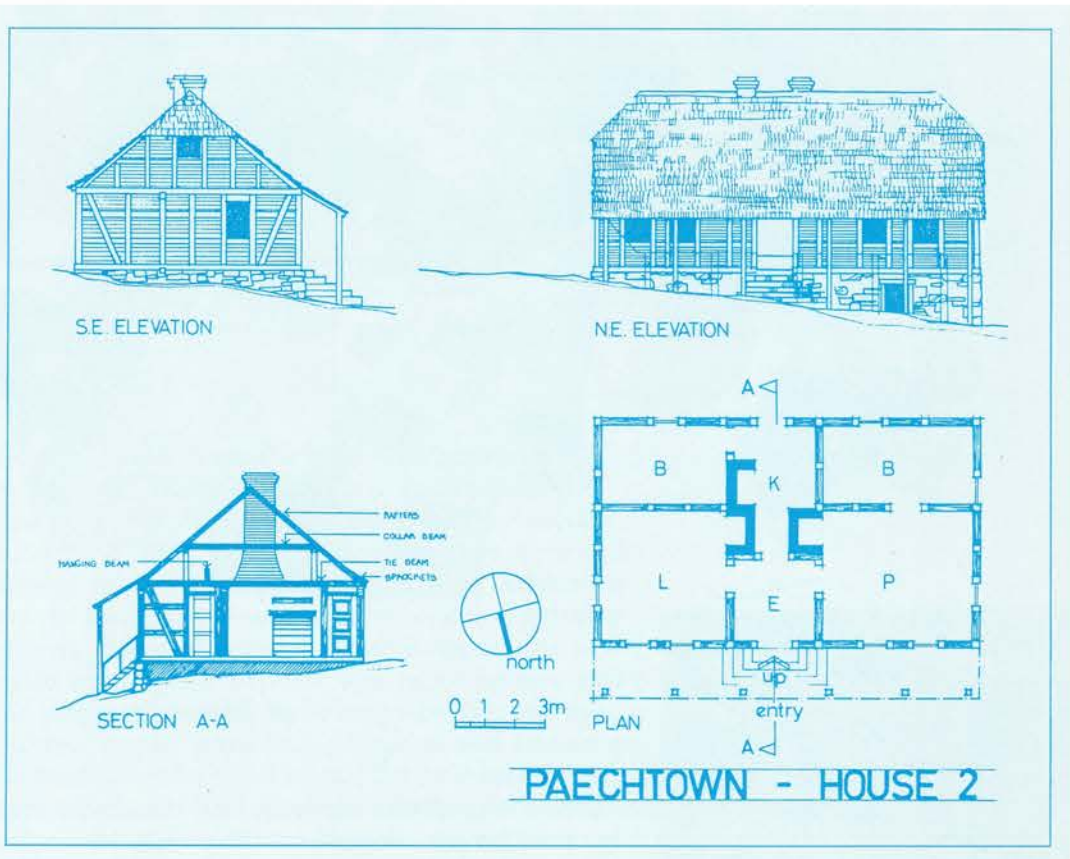
Hahndorf

Settled 1839 subdivision up to 1849

St Michaels Lutheran Church

MAIN STREET

0   200
Metres
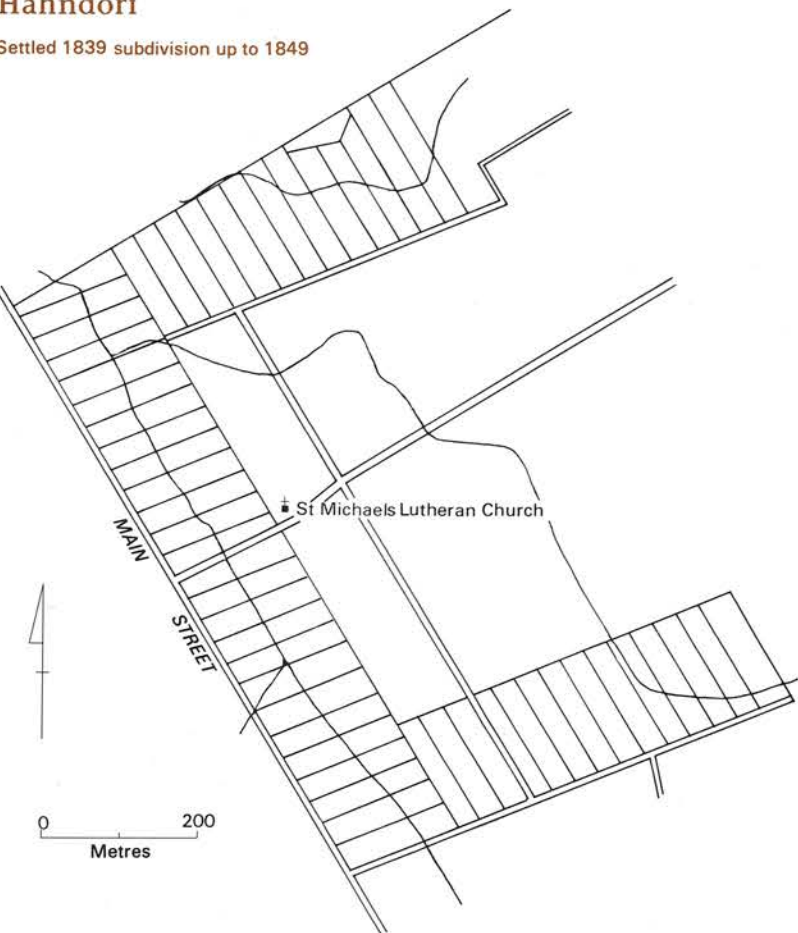
Farm layout

Rodert's Farm, lot No. 20 Main Street, Hahndorf

ORCHARD

STABLE

BARN

SMOKE HOUSE + BAKE OVEN

OLD HOUSE

VEGETABLE GARDEN

'NEW' HOUSE

MAIN STREET

0   6
Metres

This plan shows the front section of a hufendorf settlement farm. The block was narrow. The first house was usually built and then extended, a room at a time. Eventually a new house was built. Close to the house was a vegetable garden and an orchard which might have included vines. The smoke-house (used for curing meat) and the bake-oven were built away from the house as a precaution against fire. Barns and stables were built away from the house, a break with German tradition. Barns were generally larger than those built by the Germans' English neighbours.

Selection

Selection on Buckingbong and Brewarrena 1885

UNTIL 1861 most crown land in New South Wales was leased to squatters in the form of large pastoral runs or stations. The Robertson Land Acts of 1861 introduced selection, throwing open all crown lands for agricultural use by smallholders. The size of selections was limited to 320 acres (130 hectares). Conditions governing selection in New South Wales were similar to those in the other colonies. So too were the tactics used by squatters or lessees to retain control of their runs and frustrate selection.

To increase their acreages, squatters selected land in the names of family members or relatives. They also used 'dummies', people who selected land on their behalf. As well, legislation provided for the exemption of some land for public purposes (for example, water reserves, travelling stock reserves and forest reserves). The power to declare reserves lay with local surveyors who often proved amenable to squatters' demands. Large sections of a run could be protected by a network of reserves and the land could still be used by the squatter.

In this way, squatters were able to control the best land on their runs. This practice was called 'peacocking', or 'picking the eyes out of the land'. These and other tactics were so successful that in 1883 many runs were as large as they had been in 1861. To rectify the evident failure of the act of 1861, the Crown Lands Act of 1884 was passed. Lessees (or squatters) were required to divide their leases in half. The lessee kept one half, the Leasehold Area, in which crown lands were safe from selection for a number of years. The crown lands in the other half, called the Resumed Area, were thrown open to selection. The map shows how two adjacent runs, Buckingbong and Brewarrena, were defended by the squatters from selection promoted by the acts of 1861 and 1884.

In 1865 Buckingbong run was 90688 hectares in size. Only 65 hectares had been alienated. To frustrate selection, two tactics were used. Reserves were declared for water, timber, travelling stock, roads, quarries, minerals and even a botanic garden. By 1885 over 28500 hectares were protected in this way. The second tactic was the use of dummies: they included relatives, mortgagors, nearby townspeople and would-be selectors with large families who, having dummied two or three

blocks for the lessee, were rewarded with blocks of their own. Dummied blocks are shown as friendly selections on the map and their distribution shows how successful this tactic was. Selections not directly under the control of Buckingbong's lessee have been marked as hostile and are few and scattered. Most, however, belonged to a neighbouring squatter, probably with the agreement of Buckingbong's lessee. The defence of Buckingbong was successful. Almost all the run lay under reserves or friendly selection, or had been alienated by the lessee who had secured almost 90000 hectares, far in excess of the 130-hectare limit established by the act of 1861. What little available crown land remained was inaccessible to outsiders.*

Although the division of Buckingbong under the act of 1884 was one of the fairest in the district, the lessee surrendered very little. He kept the land that had been alienated and the friendly selections in his resumed area. And as the reserves were progressively revoked and thrown open for selection, he secured most of that land too.

Brewarrena's defence pivoted on its water reserves. Two days before the run was thrown open for selection, two water reserves forming a Y were declared. The lessee protected the northwest of his run by alienating the land between the tail of the Y and the reserve on Buckingbong. The tactic of peacocking may by seen in the scattered pattern of land alienated. But the lessee began losing the southeast of his run to hostile selectors, not all of them genuine. The majority were relatives and dummies of neighbouring squatters who had disputed control of the southeastern corner of Brewarrena since the 1840s. To block their encroachment along Old Man Creek, Brewarrena's lessee had a water reserve declared running back from the watercourse in 1874 (A). When hostile selections were made to the west to outflank the reserve, a second water reserve was declared (B) and further intrusion was blocked. Extensive dummying in the southwest tightened the lessee's control over the run. The division of Brewarrena under the 1884 act was not as straightforward as that for Buckingbong. The boundary between the leasehold and resumed areas followed a zigzag path, leaving the best land on the run with the lessee as part of his leasehold area.

Closer settlement

L AND IS THE forgotten dynamic of nineteenth-century history, but the question 'What is the best way to dispose of Australia's land?' was a fundamental one for the colonies. Land was their major source of wealth. From 1788, official policy ostensibly favoured a nation of small-holders, and the creation of small farms was seen as the best way to dispose of Australia's public lands. Yet, as the squatters had demonstrated during the 1830s and 1840s, large holdings and extensive pastoral landuse were often a more realistic and efficient use of the land. The conflict between ideology (the yeoman farmer) and the reality (the Australian environment) lasted well into the twentieth century.

Settling more people on smaller blocks of land was known as closer settlement. It took many forms during the nineteenth and twentieth centuries. One colony, South Australia, was founded on this principle. These pages look at three main examples: selection, closer settlement (as it officially became known), and soldier settlement. A case study of South Australia rounds out the theme.

Selection

Selection was the colloquial name given to the land acts of the 1860s and 1870s which allowed people to choose, or select, the crown land they wanted. It was introduced first in Tasmania in 1859. In 1860 Victoria followed as did Queensland in 1869. New South Wales introduced its selection legislation in 1861, South Australia in 1869 and Western Australia in 1872.

Legislation differed in detail from colony to colony but shared the same general characteristics. Men and single women over 18 could select land to be paid for using a time payment system. Selectors had to live on, cultivate and improve the land.

Selection was not the success its promoters had hoped it would be. Farms were too small, environmental conditions were often unsuitable for small-scale farming, many who took up land knew nothing of farming and many selectors were too far from markets. In the eastern colonies selectors also faced opposition from the squatters who evaded the law and built up large estates. The map of Buckingbong and Brewarrena opposite provide one example.

The level of success varied from colony to colony. Selection worked best in South Australia and, to a lesser extent, in Victoria where government supervision of the legislation was strict and where markets were closer. It was least successful in New South Wales and Queensland and it had little impact in Tasmania and Western Australia.

Although more sensible land policies were developed in all colonies in the 1880s (for example, in New South Wales it was conceded that the western third of the colony was best suited for pastoral landuse) closer settlement remained a living aspiration. The irrigation settlements established at Mildura in Victoria and Renmark in South Australia were two new closer settlement schemes. However, it became obvious to colonial governments that there was very little new arable land left. Marginal lands avoided during the selection decades were not suitable and alternative sources had to be found.

Closer settlement by repurchase

The legislation passed during the 1890s and amended up to the 1920s was complex, reflecting the settlement history of each colony, but its general characteristics were common to all. Land already alienated and seen as suitable for closer settlement was repurchased and then sold in small blocks to settlers. Legislation allowing repurchase was passed in Queensland in 1891, Western Australia

Repurchase of land for closer settlement 1894-1917
Total area of land repurchased shown in hectares

- Before 1901
- 1901-1905
- 1906-1910
- 1911-1917
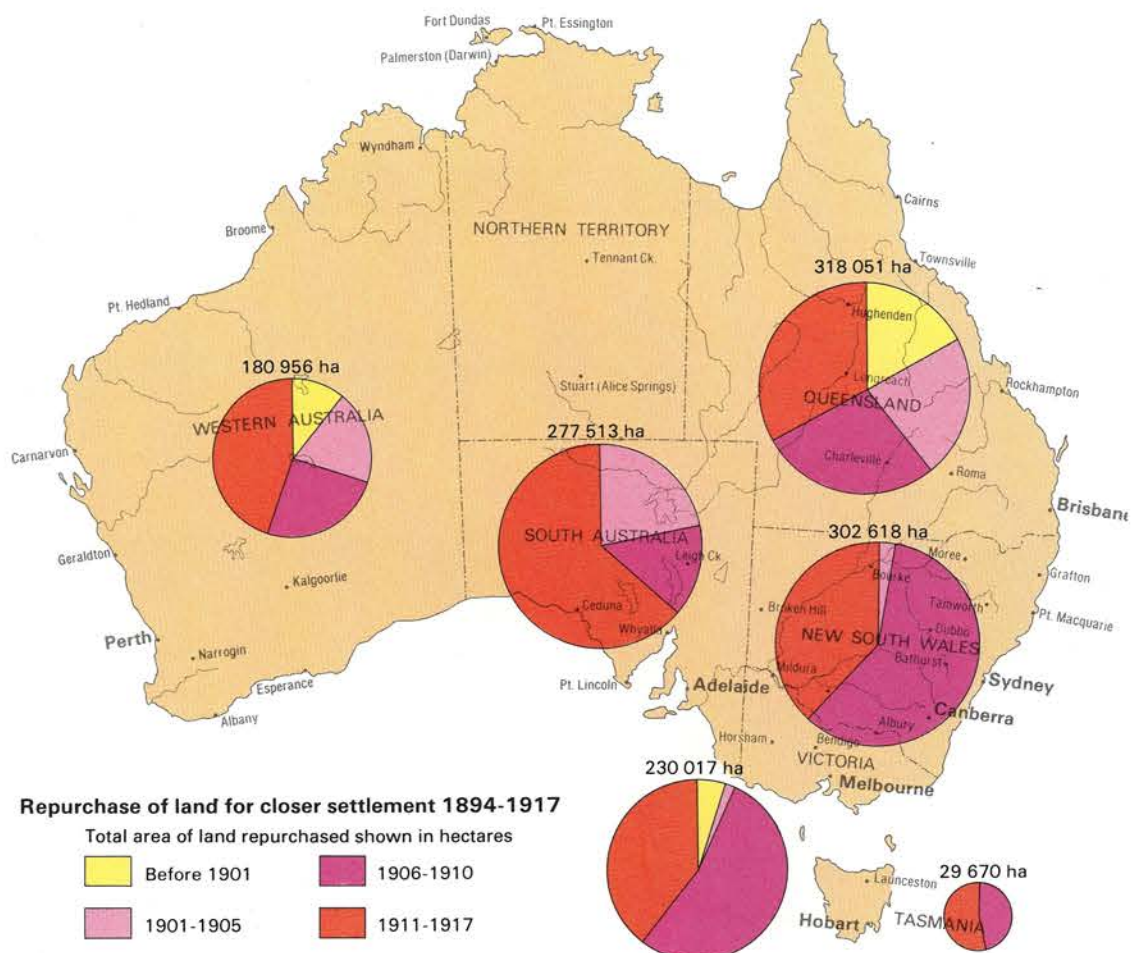
in 1896, South Australia in 1897, Victoria in 1898, New South Wales in 1901 and Tasmania in 1907. Except in South Australia and Western Australia, repurchase could be compulsory. Settlers were still subject to residence and improvement conditions and the land was still sold to them on a time payment system. But government supervision of this new phase of closer settlement was more pronounced and preparations were more extensive (for example, building roads, providing education and assessing the land's suitability). Finance for new settlers was also more readily available from government sources through agricultural banks, first introduced in Western Australia in 1896.

Landuse systems promoted under the closer settlement schemes of the late nineteenth and early twentieth centuries were diverse. Irrigation areas were extended in Victoria and South Australia and the Murrumbidgee Irrigation Area was established in New South Wales. Dairying, wheat farming, even horticulture were promoted by the acts. The legislation also allowed for an extraordinary variety of settlements. Although the majority of settlers took up land as individuals, co-operative communities were also established. In Western Australia, parcels of land were offered as workingmen's blocks.

This new phase of closer settlement reached its peak nationally between Federation and World War I. But, as the map illustrates, there were variations between the states.

Prior to 1901, only Queensland, Victoria and Western Australia had repurchased land for closer settlement. In South Australia, where repurchase was on a voluntary basis, it was not significant until after 1901.
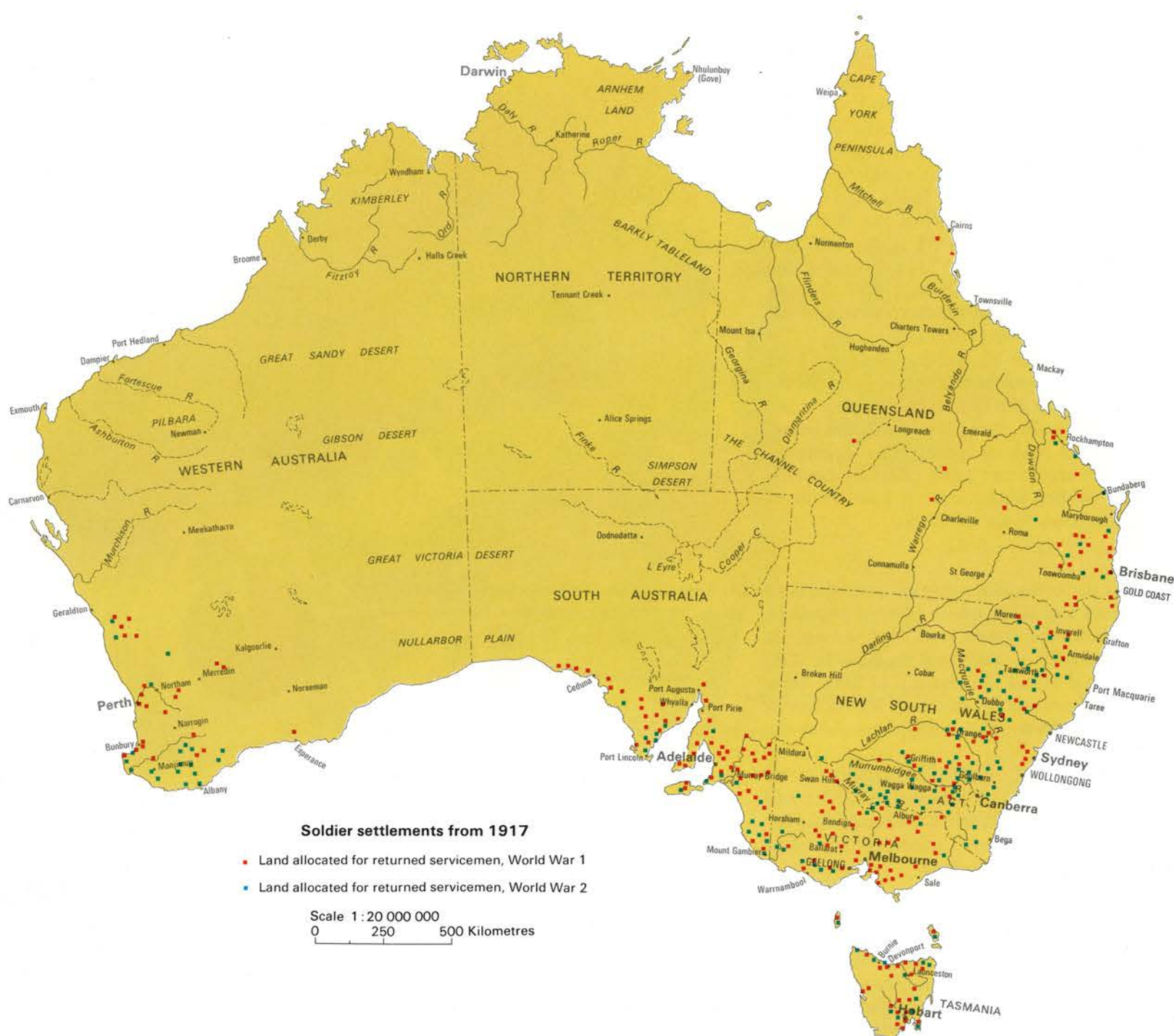
In New South Wales and Victoria, more than 50 per cent of land repurchased was acquired between 1906 and 1910. A further third was obtained between 1911 and 1917. In all other states, the greatest proportion of land was repurchased between 1911 and 1917. The most systematic approach to closer settlement was in Queensland where the amount of land repurchased rose steadily each year. The Queensland governments also repurchased more land (318 051 hectares) than any other state government.

Closer settlement schemes were established in all colonies after 1890. Designed to settle more people on the land and to break up large estates, they were vigorously promoted overseas. This poster was produced by the Queensland government in about 1900 for distribution in Britain to attract immigrants.
OXLEY LIBRARY

Soldier settlement

Soldier settlements from 1917

▪ Land allocated for returned servicemen, World War 1

▪ Land allocated for returned servicemen, World War 2

Scale 1 : 20 000 000

0   250   500 Kilometres

AFTER BOTH WORLD WARS, returning servicemen were offered the opportunity of taking up farming as part of an overall postwar rehabilitation program. These settlement schemes were funded jointly by the state and commonwealth governments.

As the map shows, land offered to returning servicemen after World War I was scattered across Australia. It consisted of repurchased land and crown lands. In New South Wales, Queensland and Western Australia, more than 80 per cent of land offered was crown land; in Victoria, Tasmania and South Australia, most was repurchased land. The types of farms offered included wheat farms (in Western Australia, New South Wales and Victoria), dairy farms (in all states), irrigation blocks (in New South Wales, Victoria and South Australia) and sugar farms (in Queensland). By 1939 more than 39 000 men had been settled on more than 11 million hectares allocated to soldier settlers.

Yet the schemes were not the success their planners had hoped. As early as 1929, one-quarter of soldier settlers had left their farms in New South Wales, Victoria, Western Australia and South Australia. Almost 40 per cent had left their farms in Queensland and 61 per cent in Tasmania. Their reasons varied. Falling prices for farm products during the 1920s affected many. No detailed surveys had been made of the suitability of land offered and often blocks were too small to make a living from. The settlers themselves frequently lacked farming experience. The cost of stock and equipment was high, and funding was a source of perpetual wrangling between state and commonwealth governments.

Soldier settlers after World War II fared better than their World War I counterparts. As in the schemes established after 1917, some of the land was repurchased and some was crown land. It was also scattered across each state, some close to schemes established in the 1920s. This time, however, surveys of the land's suitability were conducted, and the problems of financing soldier settlers and assessing their suitability

for farming received closer attention. The soldier settlers of World War II also benefited from better economic conditions. The 1950s were years of good demand and high prices for farm produce. By 1960, 8465 holdings had been allocated, totalling over five million hectares.

After World War II, a soldier settlement was established near Tumbarumba in New South Wales. It was named Willigobung. Perhaps the person who named it had had experience with the schemes established after World War I.

A World War II returned serviceman stands with his wife and child on their farm near Tumbarumba, NSW. Pix, 7 January 1950.
MAGAZINE PROMOTIONS

Closer settlement, South Australia

Three distinct programs of closer settlement were promoted by the South Australian government between the 1890s and 1950s. The governments of other states had similar schemes.
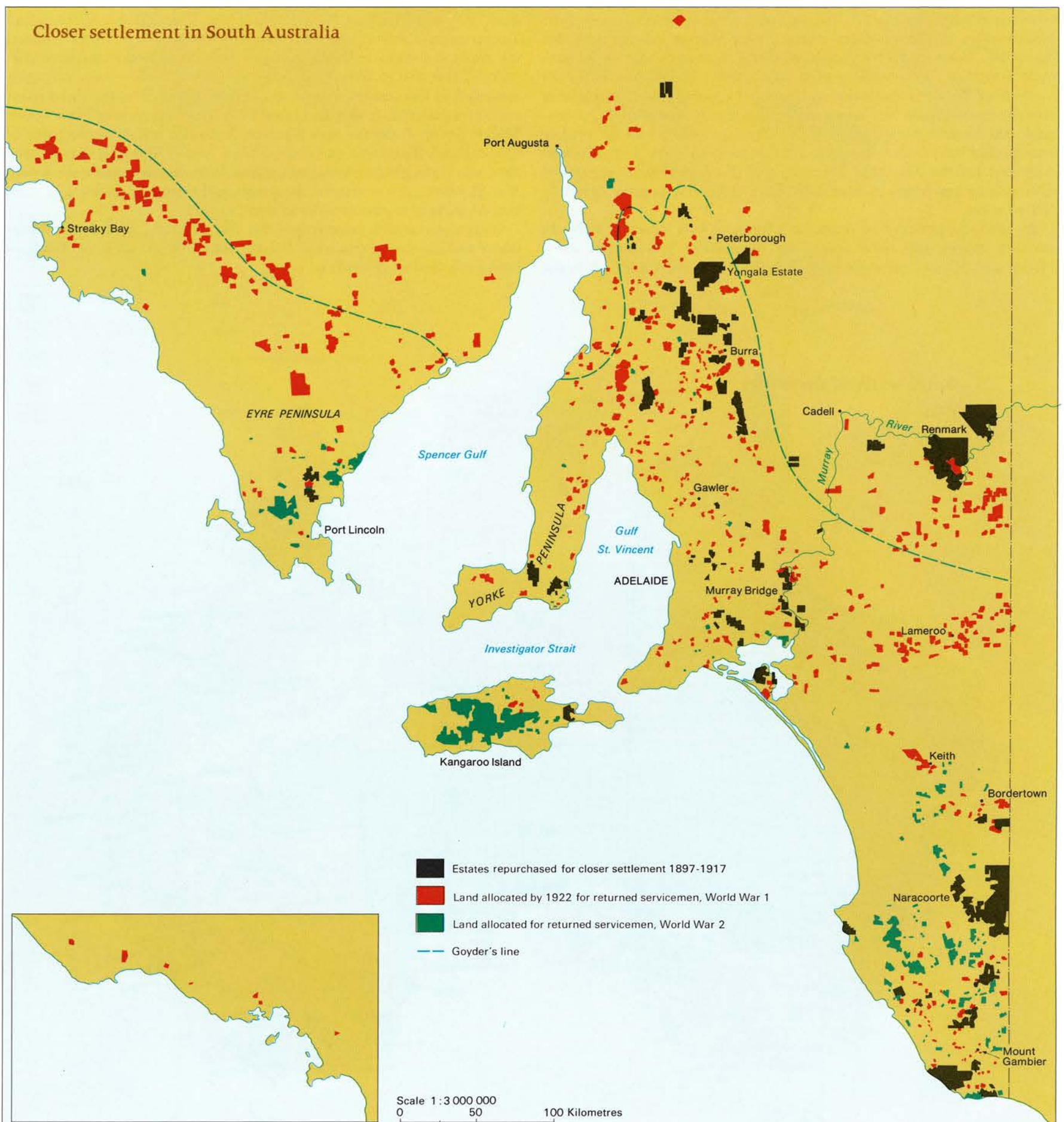
Although it was the first Australian colony to have a land repurchase bill brought before its parliament in 1891, South Australia did not have a closer settlement act until 1897. Government funds were used to purchase parts or the whole of large estates, initially by negotiation, though the government obtained powers of compulsory purchase in 1910. Purchases and subdivision were concentrated in the central hill country to the north of Adelaide and in the South East. These areas were mostly south of the Goyder's Line of rainfall and thus in the better-watered farmlands less subject to drought. They included some swamplands along the lower Murray River which were drained to become highly productive dairy farms.

By 1921 about 320 000 hectares had been purchased and sold or leased as family-sized wheat or livestock farms supporting some 5000 people and carrying 181 000 sheep and 10 000 cattle. Closer settlement was expensive, but redressed some errors of previous land policies when large estates were amassed in 'safe' country by a few pastoralists.

A more extensive program of lands reallocation was carried out under the discharged soldiers settlement acts during and after World War I. These were partially funded by the commonwealth government. The program involved three types of land: existing 'dry land' farms scattered throughout the settled districts, areas of scrub-covered crown land on the margins of Eyre Peninsula and the Murray Mallee and newly developed fruit farming settlements on the Murray near Renmark. By 1921, some 421 000 hectares had been repurchased or released from crown holdings and 2250 discharged soldiers settled.

By 1929, the scheme had resulted in some costly failures. One-third had left their land and many more left during the Great Depression.

After World War II, settlement was concentrated in two areas. Around Loxton, some 3300 hectares were developed for irrigated orchards and vineyards. The other focus was in the southern coastal areas of high and reliable rainfall, where soils had been previously considered infertile. Large areas could be made into productive pastures with the addition of trace elements. In contrast to the earlier schemes the government acted as a land developer rather than as a repurchaser. By 1965 some 250 000 hectares had been allocated, and ex-servicemen were established on about 680 farm holdings.

Closer settlement in South Australia

Estates repurchased for closer settlement 1897-1917

Land allocated by 1922 for returned servicemen, World War 1

Land allocated for returned servicemen, World War 2

Goyder's line

Scale 1 : 3 000 000
0   50   100 Kilometres

Building materials

DWELLINGS HAVE BEEN built of a variety of materials in different parts of Australia and in each region there have been changes over time. The earliest change occurred when there was a transition from temporary to permanent settlement. The first European settlers lived in tents and drays, then rough buildings constructed from locally available materials (for example, wattle and daub). Later they built with milled timber (weatherboard), stone or brick. The maps provide a detailed picture from 1901 of building materials used in each region. They show both the most common (dominant) and the second most important (sub-dominant) building materials used.

Wood was the most extensively used material in Australia in 1901. It was most common in New South Wales, the Northern Territory and Queensland. In Victoria and Tasmania census enumerators grouped wood with lath and plaster. Although the maps do not show the capital cities as separate areas, brick or stone were the most common materials in the capital cities except in Brisbane and in major provincial cities in the southern states. Stone was dominant in South Australia. Tents, used by people working in remote mining or pastoral activities, were widely used in northern South Australia, the interior of Western Australia and parts of Queensland. Canvas was also the second most important material in much of southern Queensland and central New South Wales. Iron, which could be readily transported to remote, treeless areas, was used widely in Western Australia and the Northern Territory and to a lesser extent in parts of Queensland and South Australia. It was particularly popular in newly settled areas.
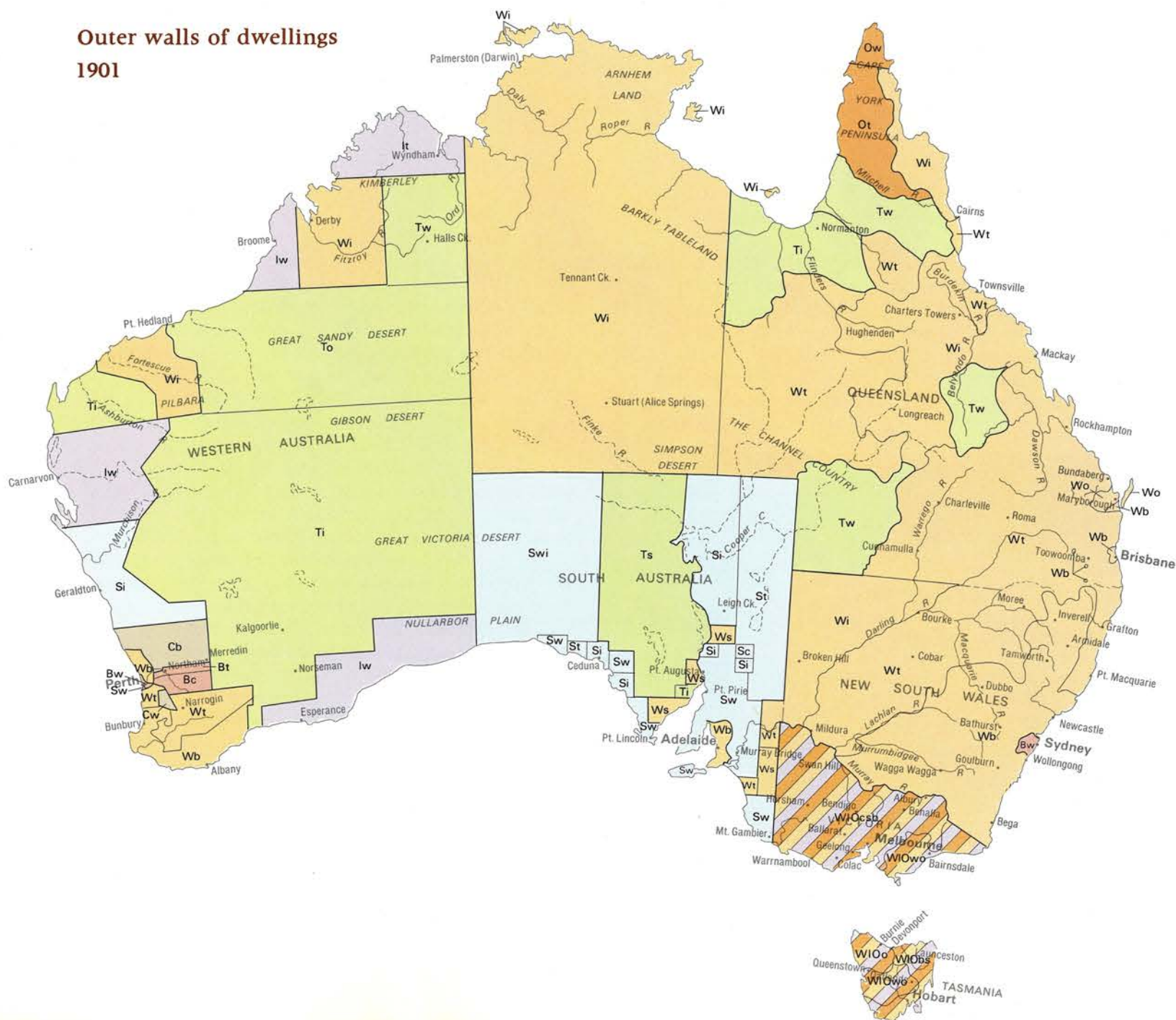
In 1933, 52 per cent of Australia's housing had wooden walls. In country towns and rural areas, the proportion was 60 per cent. Nationally 31 per cent were built of brick but in the capital cities the proportion reached 70 per cent. Iron and stone each averaged 5 per cent, though up to 10 per cent of rural dwellings were made of iron and it was the dominant building material in much of the north and interior of the continent. Stone was still the major building material in rural South Australia, where 75 per cent of the continent's stone houses were located. It was also dominant in the Gascoyne and Murchison areas of Western Australia. Although nationally the use of tents had dropped to 2.6 per cent, they were still prominent in some of Western Australia's mining areas. They were also common in some parts of Victoria, New South Wales and Queensland, where there were many itinerant workers during the Great Depression.
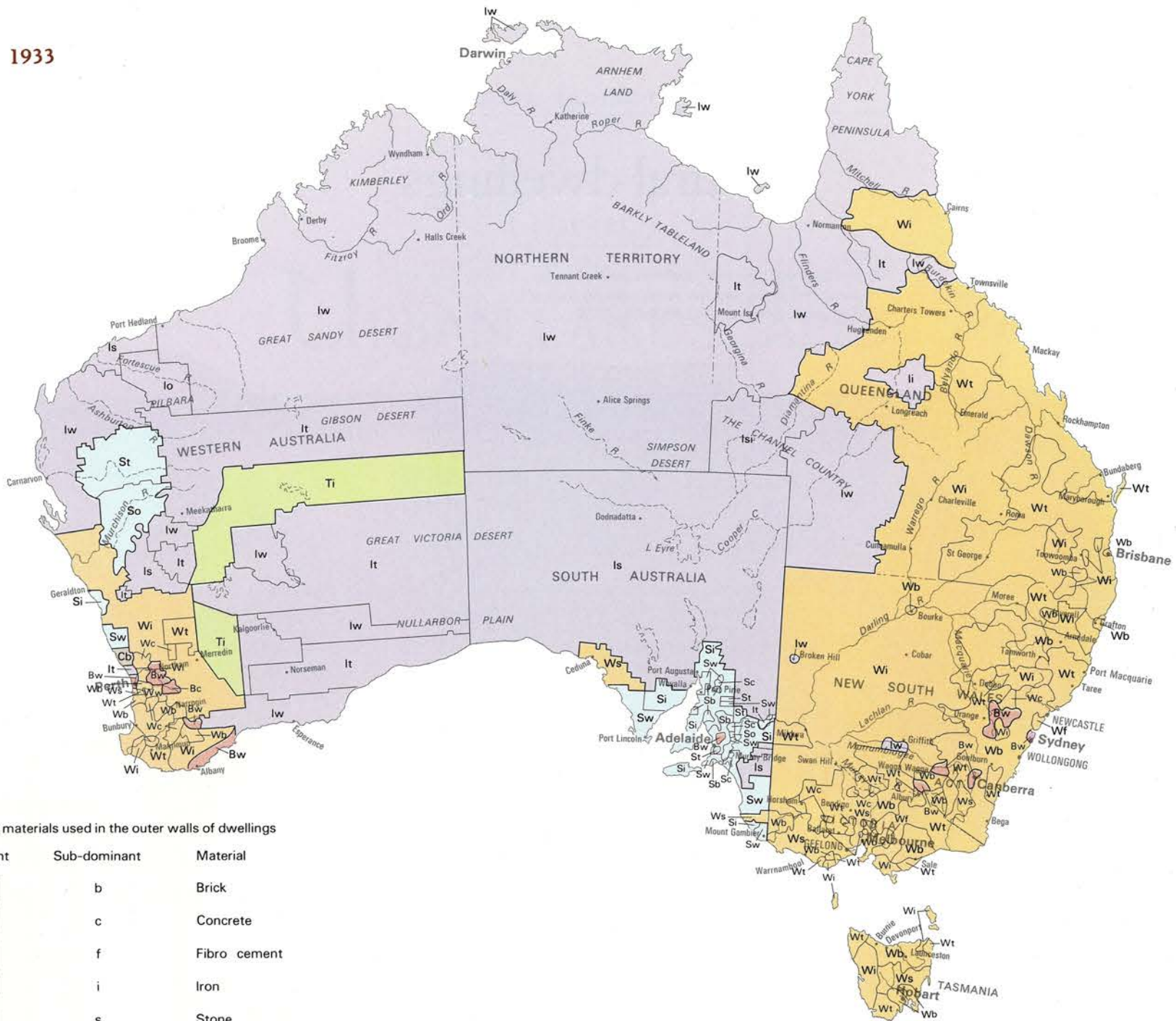
By 1976, 50 per cent of Australia's houses had brick or brick veneer walls. Brick was especially common in the capital cities and larger provincial cities. The emergence of brick as the dominant building material in central Australia testified to the growth of Alice Springs during the 1960s and 1970s. Traditional wooden housing was still predominant in non-metropolitan New South Wales, Queensland, Victoria and Tasmania, and stone in South Australia's rural districts. Iron remained the most common building material only in remoter northern districts. Tents had so dwindled in significance that they were not even recorded in the census. Fibrocement had emerged as the third most common material. It was dominant in the pastoral areas of New South Wales, South Australia and Western Australia and in some parts of Queensland, Tasmania and coastal New South Wales. It was significant also throughout the eastern states. Its increasing use after World War II reflected its relative cheapness and transportability at a time when building materials were in short supply.

Increasing wealth encouraged the use of brick, as did its permanence and insulating qualities. By the late 1970s, 80 per cent of houses built each year were made of brick.
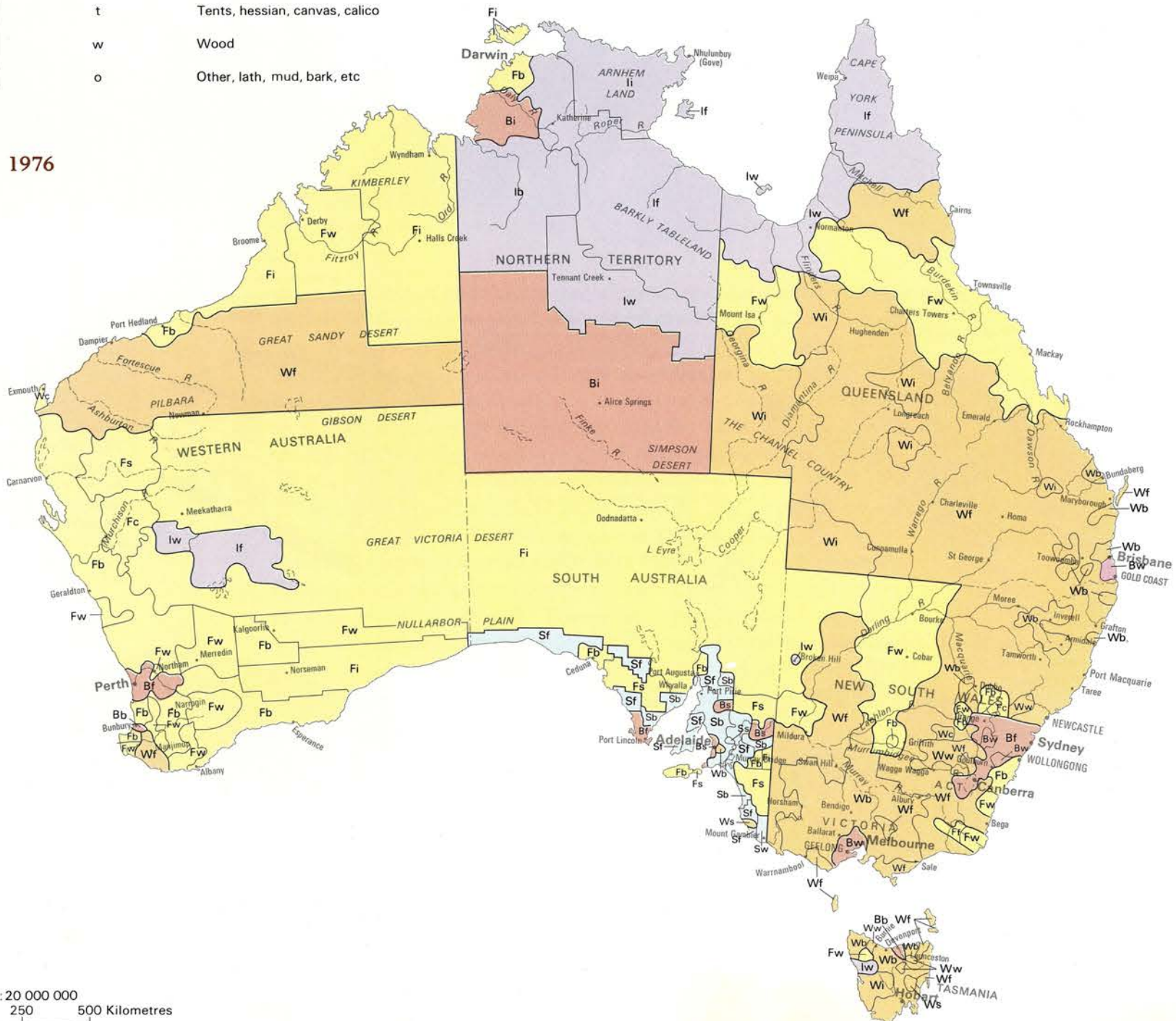

**Outer walls of dwellings
1901**

1933

Darwin

ARNHEM
LAND

KIMBERLEY

NORTHERN TERRITORY

BARKLY TABLELAND

CAPE
YORK
PENINSULA

Cairns

Townsville

QUEENSLAND

WESTERN AUSTRALIA

GREAT SANDY DESERT

GIBSON DESERT

SIMPSON
DESERT

THE CHANNEL COUNTRY

Mackay

Rockhampton

Bundaberg

GREAT VICTORIA DESERT

SOUTH AUSTRALIA

Brisbane

NULLARBOR PLAIN

NEW SOUTH WALES

NEWCASTLE

Sydney

WOLLONGONG

Canberra

Adelaide

Melbourne

VICTORIA

Hobart

TASMANIA

Building materials used in the outer walls of dwellings

Dominant	Sub-dominant	Material
B	b	Brick
C	c	Concrete
F	f	Fibro cement
I	i	Iron
S	s	Stone
T	t	Tents, hessian, canvas, calico
W	w	Wood
O	o	Other, lath, mud, bark, etc

1976

Darwin

ARNHEM LAND

KIMBERLEY

NORTHERN TERRITORY

BARKLY TABLELAND

CAPE
YORK
PENINSULA

Weipa

Cairns

Townsville

WESTERN AUSTRALIA

GREAT SANDY DESERT

GIBSON DESERT

PILBARA

QUEENSLAND

THE CHANNEL COUNTRY

Mackay

Rockhampton

Bundaberg

GREAT VICTORIA DESERT

SOUTH AUSTRALIA

Brisbane

GOLD COAST

NULLARBOR PLAIN

NEW SOUTH WALES

NEWCASTLE

Sydney

WOLLONGONG

Canberra

Perth

Adelaide

Melbourne

VICTORIA

GEELONG

Hobart

TASMANIA

Scale 1 : 20 000 000

0   250   500 Kilometres

Rural dwellings

A (left)
The first dwellings were crude shelters with bark roofs. This form of temporary structure was common in areas of initial settlement from the late 1790s to the 1920s.
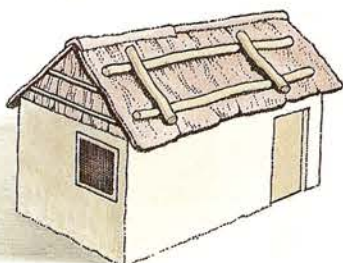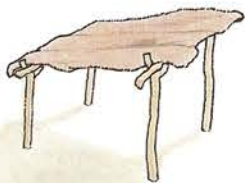
B
The vertical slab hut with a bark roof was usually the first substantial dwelling to be built by settlers, and was common from the early 1800s until the 1880s. This example is taken from Kings Plains, New South Wales.
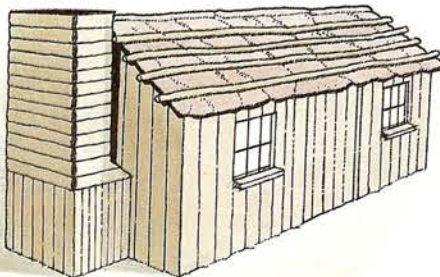
C
Horizontal slab huts with thatched roofs are a regional variation of vertical slabs. Thatch was used because it was available locally and was a more efficient cooling roof material. This example comes from the Darling River area.

D
Wattle and daub huts with the roofs held down by poles were built before the 1850s and were particularly popular on the goldfields because they could be constructed quickly.

E
This simple English style house made of sawn timber with a shingle roof and a dressed stone chimney was a sign of early permanent settlement in the 1800s. Note the framed windows. This example is taken from Baden in Tasmania.
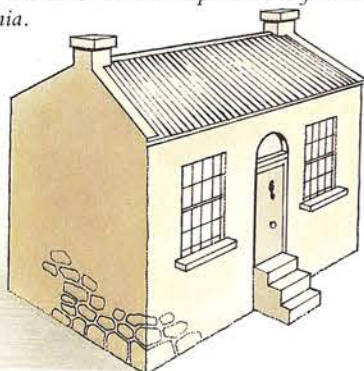
F
Houses built of notched logs plugged with clay, with bark roofs held by poles and pegs were essentially variations of B, C and D and were built in newly settled areas, particularly forests (for example, eastern Australia).
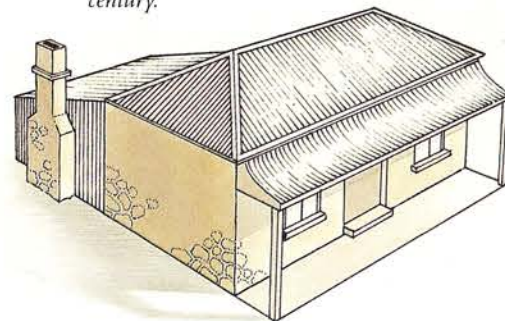
G
Portable iron houses with two, four or six rooms, were popular in many parts of northern Australia where timber was scarce. They were particularly prevalent in the late nineteenth century.

H
The Georgian cottage built of field stone with an iron roof was common throughout much of southeastern Australia and Tasmania until the 1850s. This example is taken from Port Fairy in Victoria.

I
The Georgian house in semidressed stone is a more sophisticated version of the cottage. This example comes from Cambridge in Tasmania and dates from the 1820s.

J
Houses built of field stone with iron roofs and lean-tos attached to the rear for extra space or a new kitchen were common in South Australia. Many examples survive.
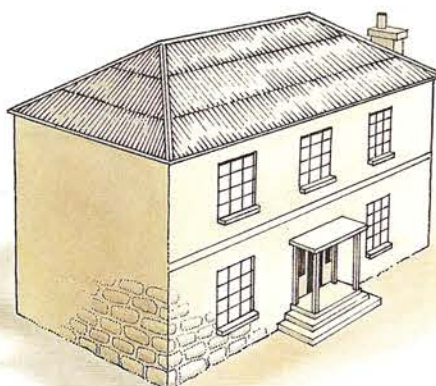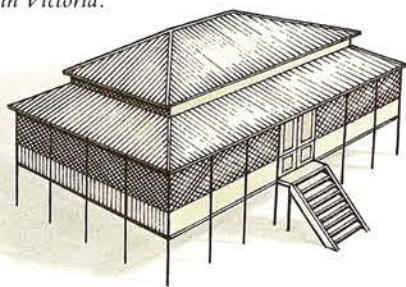
K (left)
In Queensland, houses were built on stilts to provide ventilation, and verandahs were enclosed with lattice work. This example is typical of houses built between 1880 and 1900.
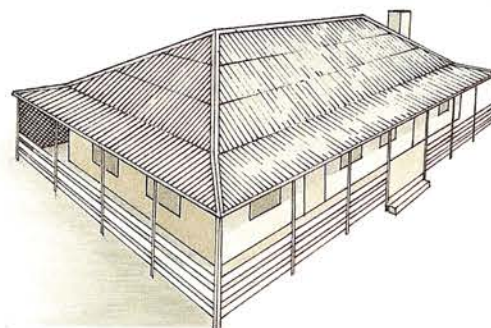
L (left)
The rural mansions associated with pastoral Australia are represented here by a South Australian example. The dwelling is made of semidressed stone with an iron roof and was built in the 1880s.

M (below)
In the 1920s houses in Queensland were still being built on stilts for ventilation, but the lattice work enclosing the verandahs had gone.
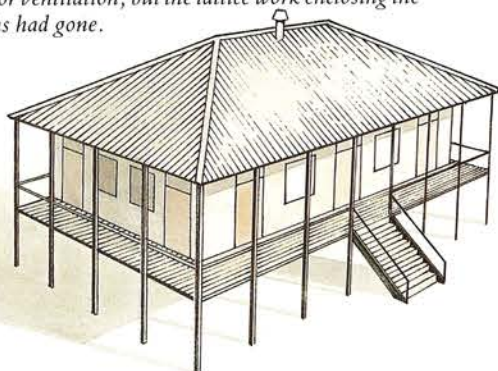
N (right)
The Indian bungalow was adapted for Australian use in the late nineteenth century. The high-hipped roof and verandah provided shelter from the heat. Doors and windows provided ventilation. This type of dwelling was found in all colonies. This example comes from Clarencetown in New South Wales.