



WESTERN AUSTRALIAN  
**YEAR  
BOOK**



**1990**



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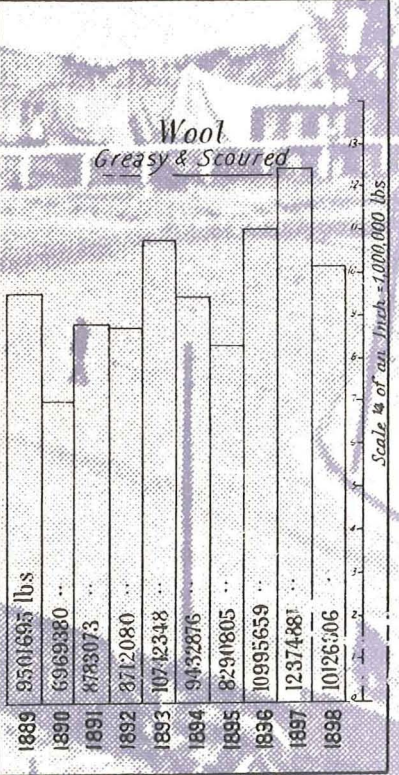
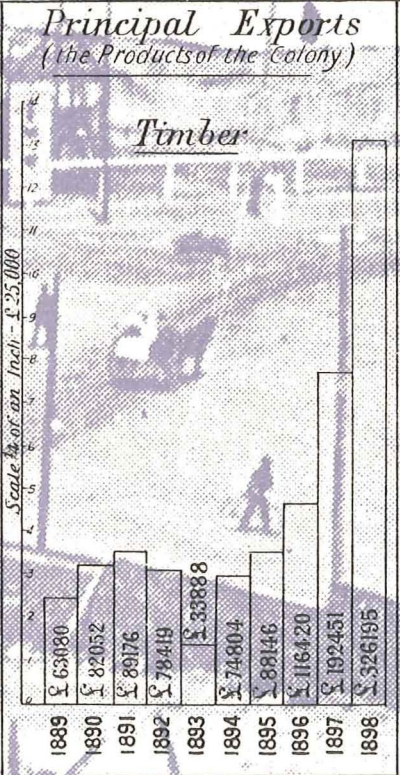
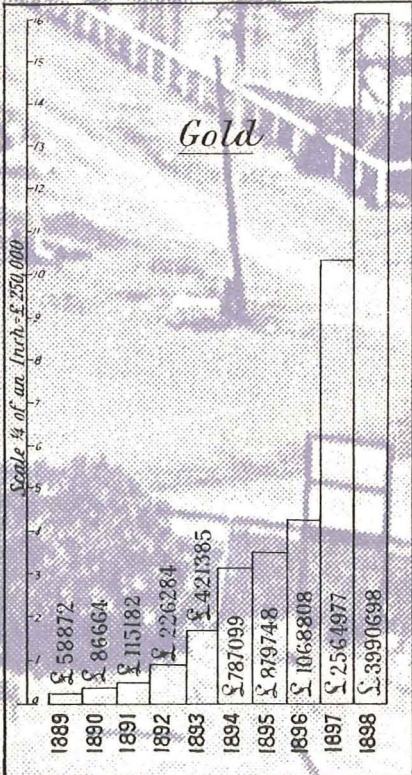
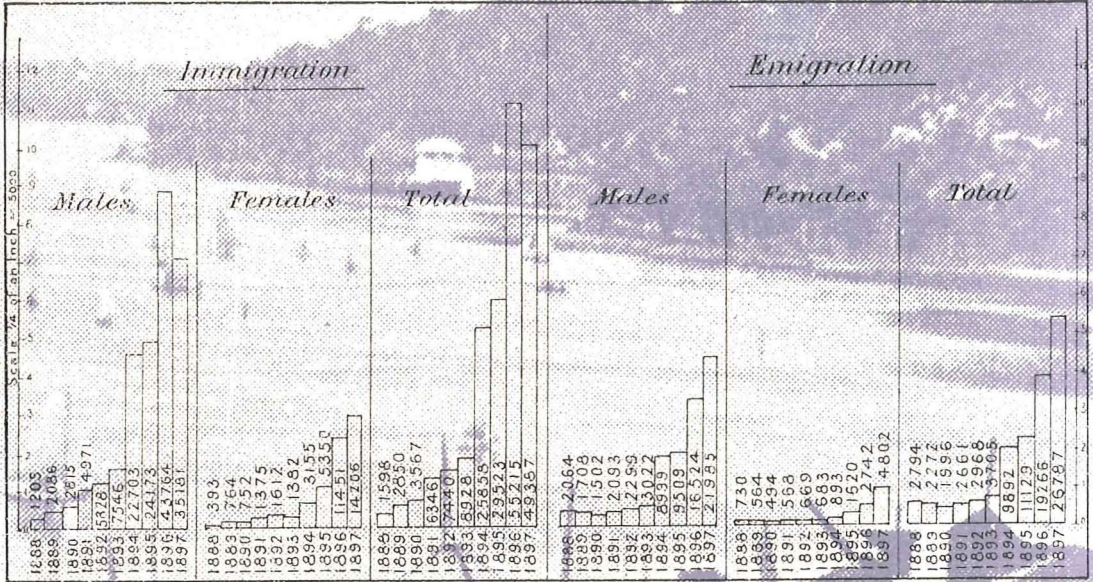
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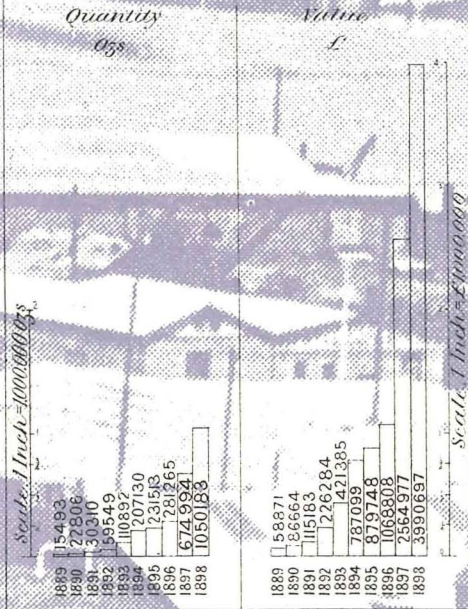
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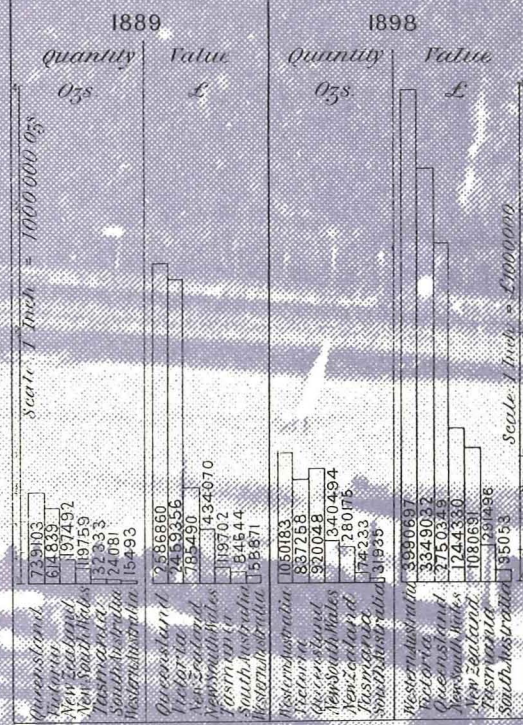




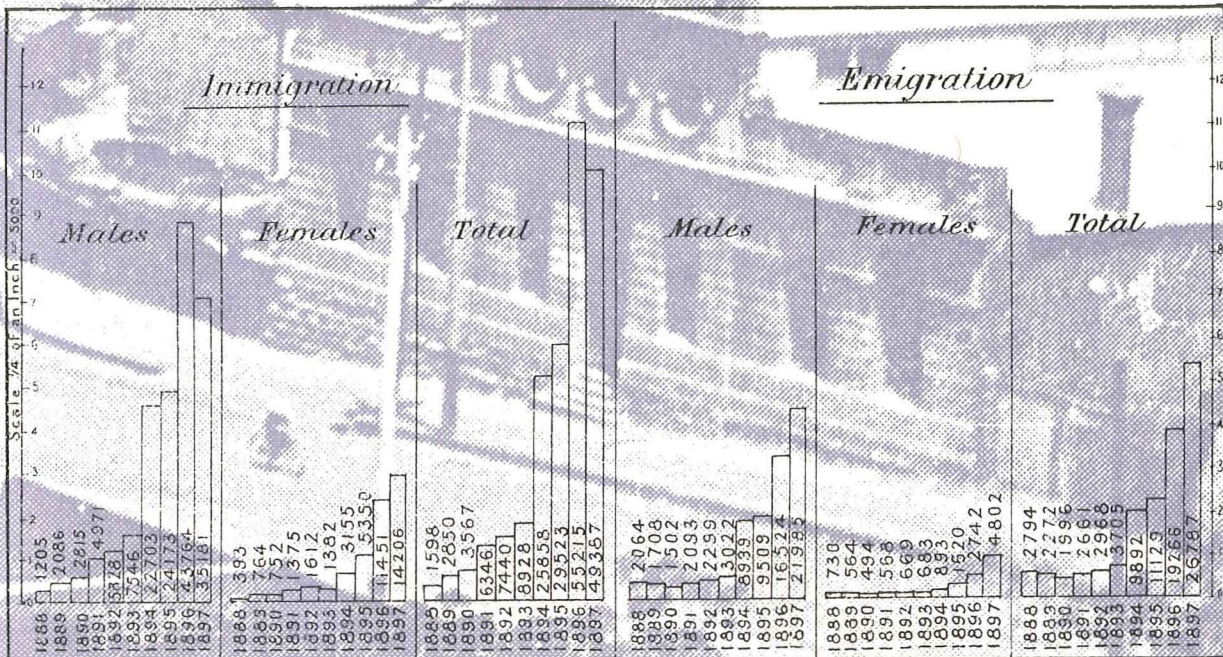
## GOLD YIELD OF WESTERN AUSTRALIA (1889 to 1898)



## GOLD YIELD OF AUSTRALASIA



The official valuations per ounce of gold for the Colonies are as follows  
 W.A. VIC. Q. N.S.W. N.Z. TAS. S.A.  
 1889 £3 16s 7d, £3 10s ; £3 12s 6d, £3 19s 6d, £3 14s 0d, £3 10s 3d.  
 1898 £3 16s 7d, £2 19s 2d, £3 13s 1d, £3 17s 9d, £3 18s 6d, £2 19s 6d.





3 Maps at the back pocket  
[Statistical Areas of W.A.]



WESTERN AUSTRALIAN YEAR BOOK

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Cover: The Hamersley Range, Pilbara region

*Photograph: Richard Woldendorp, Photo Index*

Frontispiece: The Monastery at New Norcia, in the Midland region.  
Founded by Rosendo Salvado in 1846

*Photograph: Richard Woldendorp, Photo Index*



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## GENERAL INFORMATION

### Symbols

The following symbols mean:

ABS	Australian Bureau of Statistics
n.a.	not available
n.e.c.	not elsewhere classified
n.e.i.	not elsewhere included
n.e.s.	not elsewhere specified
n.p.	not available for separate publication (but included in totals where applicable)
n.y.a.	not yet available
p	preliminary—figure or series subject to revision
r	figures or series revised since previous issue
..	not applicable
*	subject to sampling variability too high for most practical uses
—	nil or rounded to zero
———	break in continuity of series (where drawn between two consecutive figures or columns)

### Other forms of usage

*Rounding.* Where figures have been rounded, discrepancies may occur between sums of the component items and totals.

### Services available from the ABS

A comprehensive list of all statistical products and services provided by the ABS is contained in the *Catalogue of Publications and Products, Australia* (1101.0), which is available from any ABS Office.

For economic reasons the ABS does not publish all of its available statistics. A wide range of statistics is available on request.

In addition to its many printed and electronic products the Western Australian Office of the ABS provides an Information Consultancy Service which offers a professional level of service to meet more complex and detailed information needs.

Information Services is located at Level 1, Hyatt Centre, 30 Terrace Road, East Perth, WA 6004. Office hours are 9.00 a.m. to 4.30 p.m., Mondays to Fridays. Telephone (09) 323 5140 or facsimile (09) 221 2374.

## PREFACE

The *Western Australian Year Book* is a general reference work on Western Australia and includes authoritative information on almost every aspect of life in the State. Together with chapters on the social, demographic and economic structure of the State, the Year Book includes information on history, geography, climate, vegetation and fauna, and government. Each chapter contains the latest information available at the time of manuscript preparation.

Constraints of time and space mean that the Year Book can only be illustrative of the wide range of data available from the ABS in over 1,500 publications, or on microfiche, magnetic tape, floppy disk, CD—ROM, or electronically through DISCOVERY or AUSSTATS. The publications of the Western Australian Office are listed in the Appendix.

Outside contributors, officers in subject matter areas of the Bureau and the staff of the Department of Services, State Printing Division have all contributed significantly to this Year Book, and I express my appreciation for their efforts. The coordination of this effort and editing of the Year Book has been the task of the Bureau's Publishing Section. Jeff Carlton, Manager of the Publishing Section and Ann Soutar, Assistant Editor, have had excellent support from Larry Dunning and Marlene Greenhalgh in preparing the 1990 Year Book, especially in improving its timeliness.

The wide range of statistics presented in this book would not be possible without the continued cooperation of individuals, businesses, government agencies and other organisations who provide the basic information from which ABS statistics are produced. Their assistance is gratefully acknowledged.

July 1990

**B.N. PINK**  
Deputy Commonwealth Statistician  
and Government Statistician



# Chapter 1

## HISTORY OF WESTERN AUSTRALIA

*Contributed by Dr Lenore Layman, Murdoch University*

### ABORIGINAL PREHISTORY

Aboriginal tradition records that Aboriginal people have always lived in Australia. Prehistorians now date their occupancy, at a minimum, from 40,000 years before the present (BP). Upper Swan Bridge near Perth, with a radiocarbon date of 38,000 years BP, is the oldest Aboriginal site yet found in Australia. The present state of archeological knowledge of Western Australian sites is represented in Table 1.1.

TABLE 1.1 – SIGNIFICANT ARCHEOLOGICAL SITES

Site	Location	Date BP
Upper Swan Bridge	Swan Valley, South-West	38,000
Devil's Lair	Margaret River, South-West	28,000
Rock Shelter	Mount Newman, Pilbara	26,000
Caves, N145 Koonalda	Nullarbor Plain	20,000
Miriwun	Ord River, Kimberley	18,000

When the British first established settlements at King George Sound in 1826 and Swan River in 1829, Aboriginal people lived throughout Western Australia, the population estimated conservatively at around 60,000. Their societies, based on a hunter-gatherer economy, were structured by the relationship of the clan or patrilineal descent group to particular country. Land was not owned, was not simply an economic resource; it was the basis of identity. The relationship was (and remains) fundamentally a spiritual one. Because of this prior occupancy historians name nineteenth

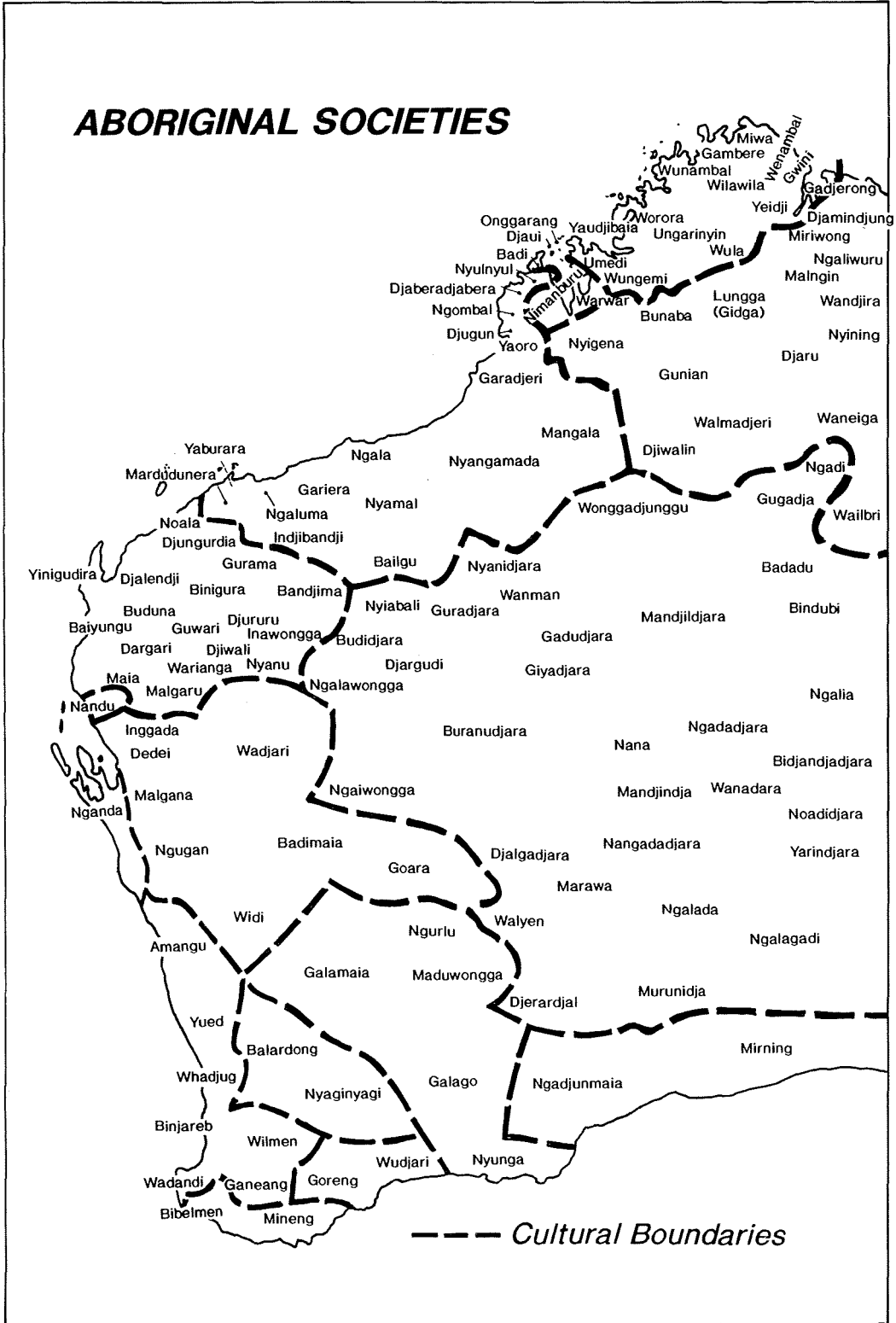
century British occupation as invasion. Diagram 1.1 shows the groupings among Aboriginal people at this time and indicates their spread across all of Western Australia.

### EUROPEAN DISCOVERY

Others knew of, and showed an interest in, the Western Australian coast from at least the seventeenth century. By the eighteenth century the Makassans regularly traded with Kimberley Aboriginal people. The Dutch en route to the East Indies made frequent contacts, Dirk Hartog being the first recorded; at Shark Bay in 1616. Many unplanned encounters as well as voyages of exploration followed, most notable among the explorers Able Tasman who charted the northern and north-western coastline in 1644 and named the western half of the continent New Holland. Also of note was Willem de Vlamingh who explored Rottneest and the Swan River in 1696 while searching for one of the many Dutch ships which went missing off the Western Australian coast. The Dutch saw nothing on these visits to tempt them to claim territory.

French interest in Terra Australis resulted in 1772 in the explorer Saint Allouarn claiming the country at Shark Bay as a French possession. No settlement followed this annexation but the French continued to explore: in 1792 D'Entrecasteaux surveyed the southern coast and Baudin led a scientific expedition along the west coast in 1801-03. Then plans for a penal settlement in the south-west were pre-empted by the posting of a British garrison to King George Sound in 1826, and French interest moved away from Western Australia.

DIAGRAM 1.1





The Englishman William Dampier visited the coast first in 1688 and returned in 1699 to explore the north-west coast. He was unimpressed and it was not until a century later that another Englishman, George Vancouver, explored further, this time along the southern coast. At King George Sound in 1791 he claimed the land for Britain. In 1801 Matthew Flinders extended Vancouver's surveying work in the area while Phillip Parker King in 1818-22 charted most of the west coast.

Over two centuries the ships of these European nations came and went leaving the Aboriginal societies they encountered virtually unaffected. All this changed in the early nineteenth century.

### BRITISH OCCUPATION

The small military garrison and convict outpost sent under Major Lockyer from New South Wales to King George Sound (Albany) in 1826 established a continuing British presence in Western Australia. However it was not until 2 May 1829 that Captain Fremantle, preparing the way for Lieutenant Governor Stirling and the Swan River colonists, formally took possession for Britain of 'all that part of New Holland which is not included within the territory of New South Wales'. All of Australia was now British territory and the Swan River Colony its Western Australian expression.

Western Australia retained its colonial status, governed from Britain through the person of the Governor, until 1890 when responsible government enabled Western Australians to govern themselves.<sup>1</sup> Then the federation referendum decision in 1900 took Western Australia into the Commonwealth of Australia as a State with the new federal system. The political framework of contemporary Western Australia was thus established. What shape has the society taken within this framework in the period from 1829? Some of its major characteristics are outlined below.

### MIGRATION AND ETHNICITY

The Aboriginal population (Table 1.2) was decimated by frontier conflict and disease, the spread of British settlement in the nineteenth century dispossessing Aboriginal societies of their country, from the Swan River in the 1830s to the

Kimberley in the 1890s. Aboriginal people were effectively excluded from Australian society until the 1960s, the decision that they should be counted in censuses being emblematic of policy changes which in turn have assisted the beginnings of a population increase.

The decision that Western Australia's population would be white and homogeneous had been taken before the close of the nineteenth century. Rural labour shortages from the colony's beginnings encouraged the importation of Asian 'coolie' labour, particularly for the pastoral and pearling industries, but these people were never treated as migrants: they were temporary residents whose contracts specified that they be returned to their places of recruitment. Furthermore, Chinese were barred from holding Miner's Rights on Western Australian goldfields in order to discourage their entry to the colony. In the early twentieth century Broome's pearling industry was made an exception to 'White Australia' because it was dependent for survival on the skilled labour of Japanese divers and South East Asian lugger crews. Nevertheless, while this concession explains the multicultural character of the north-west port, it had very little impact on the composition of the State's population because the men were still recruited on contract for specific periods with no provision for family migration. The permanent settlement of Asian people in Western Australia has occurred since the mid 1960s with policy changes at the Commonwealth level signalling the end of 'White Australia'.

TABLE 1.2 - ESTIMATED MINIMUM POPULATION OF ABORIGINAL DESCENT

Source: *Australians: Historical Statistics*

1788	62,000	1933	17,500
1861	44,500	1947	18,250
1871	40,000	1954	20,000
1881	35,500	1961	19,572
1891	31,000	1966	22,370
1901	26,500	1971	25,501
1911	22,498	1976	28,648
1921	19,547	1981	31,347

Western Australia's European population has grown enormously since 1829, assisted very significantly by immigration. The beginning was

<sup>1</sup> Black D., *One hundred years of Responsible Government in Western Australia*, Chapter 5.

uncertain as the Swan River Colony struggled to survive the reality of the Western Australian environment. Unrealistic expectations produced dashed hopes and adverse reports in Britain. Immigration dropped away and the colony stagnated. (Table 1.3).

**TABLE 1.3 – NEW PRIVATE IMMIGRATION**  
Source: Statham P., 'Swan River Colony 1829-1850' in Stannage C.T. (ed.) *A New History of Western Australia*

1829	+669	1835	+1
1830	+1,050	1836	-25
1831	+44	1837	+1
1832	-41	1838	+62
1833	+60	1839	+94
1834	+127		

**TABLE 1.4 – CONVICT ARRIVALS**  
Source: *Australians: Historical Statistics*

1851-60	5,270
1861-68	4,198
<b>Total</b>	<b>9,468</b>

The transportation of nearly 10,000 British convict males (Tables 1.4) in the eighteen years after 1850 boosted the population but, more importantly, brought greatly increased British government spending to the colony. The cessation of transportation in 1868 severely reduced immigration as can be seen in Table 1.5. Gold discoveries in the 1890s caused an influx of immigrants, mostly from the eastern colonies and particularly from Victoria. In 1901 almost as many Victorian-born (21.5 per cent) as Western Australian-born (28.7 per cent) were resident in the State. The net migration figures of the 1890s were not repeated until the 1960s when another mineral boom drew people into the State.

**TABLE 1.5 – NET MIGRATION**  
Source: *Australians: Historical Statistics*

1860-69	5,987	1920-29	49,668
1870-79	-11	1930-39	615
1880-89	9,887	1940-49	9,734
1890-99	111,523	1950-59	67,267
1900-09	53,181	1960-69	137,161
1910-19	10,137	1970-79	121,804

The original Swan River colonists were overwhelmingly English by birth (80.9 per cent in 1832), Irish and Scottish settlers being disproportionately few in comparison with the populations of the eastern colonies. In 1861 the

numbers of English-born in the colony still exceeded those of the Australian-born. The integration of Western Australia's population into that of the rest of Australia came with the gold rushes, such that by 1901 40 per cent of residents had been born in the eastern colonies. (Table 1.6). In the 1980s Western Australia's overseas-born remained principally British although post-war migration had slightly increased the proportion of eastern European-born people (particularly Yugoslavs) and southern European-born people (particularly Italians).

**TABLE 1.6 – BIRTHPLACES**  
Source: *Australians: Historical Statistics*

	1901	1947	1981
	per cent	per cent	per cent
Western Australia	28.7	67.6	} 72.3
Other Australia	40.4	14.2	
New Zealand	1.5	0.4	1.5
Britain, including Ireland	22.7	13.9	14.8
Northern Europe	1.9	0.4	2.0
Eastern Europe, including Yugoslavia	0.5	0.9	1.7
Southern Europe	1.0	1.6	3.0
West Asia	0.02	} 0.7	} 0.2
South Asia	0.6		
East and South East Asia	2.0		
Other	0.8	0.3	1.7

## POPULATION

**TABLE 1.7 – POPULATION (a)**

1829	1,003
1850	5,886
1900	179,987
1950	572,649
1988	1,544,806

By 1947 Western Australia's population (excluding Aboriginal people) had reached only half a million, a total which grew to one million by 1970 and to one and a half million by 1987. (Table 1.7) Population increases in the nineteenth century had been slow, reflecting the Colony's struggle for prosperity. However the largest proportionate increase (371 per cent) of any decade in Western Australia's history occurred in the 1890s. Even in absolute numbers it was not exceeded until the 1950s. The 1890s were also marked by the population's increased masculinity as gold diggers left families behind to seek their fortunes (Table 1.8). While this masculinity was particularly evident in the 1890s it has always

been a characteristic of Western Australia's population, making it the most disproportionately male of the States (but not, of course, equalling that of the Northern Territory).

TABLE 1.8 - MALES PER 100 FEMALES (a)

1861	171	1947	106
1871	148	1954	107
1881	135	1961	104
1891	149	1966	104
1901	158	1971	105
1911	134	1976	104
1921	114	1981	102
1933	114	1986	102

(a) Prior to 1961 excludes persons of predominantly Aboriginal descent.

Demographic research enables something to be said about nineteenth century Western Australian families. (Margaret Grellier, 'The Family' in Stannage (ed.) *A New History of Western Australia*, Ch. 15) In mid nineteenth century women married at an average age of 20, earlier than they did in Britain; while men married later at an average age of 27. Not surprisingly, given the colony's sex ratio, women were more likely than men to marry. Almost all women married: in 1881 as few as 3 per cent aged 45-49 years had never married (in contrast to 43.5 per cent of men of the same age group). Fertility was high. Over half of these married women had produced their first child in their first year of marriage and child-bearing had continued on average every 2-2 1/2 years. In completed families, where husband and wife survived and remained together until the end of the wife's child-bearing years, the average number of children was 8.7, a much higher fertility than at the same time in Britain. The median length of child-bearing among these families was twenty years and wives' median age at last birth 41. Miscarriages and stillbirths added further to these women's reproductive experience. From the second half of the nineteenth century until the present the trend has been towards smaller families. In the same period infant mortality has fallen sharply. (Table 1.9).

TABLE 1.9 - INFANT MORTALITY RATE  
(Number of deaths per thousand live births)

1886	154.8	1961	19.7
1901	128.9	1981	8.8
1921	78.3	1986	8.8
1941	35.3		

## WORK AND THE ECONOMY

Child-bearing, child-rearing and keeping house have not been officially regarded as work. For instance, the 1848 census in classifying occupations listed all women (with the Colony's children) in the non-productive category of 'residue', a forerunner to the post-1890 category of 'dependent'. (Table 1.10). The biggest area of male employment in 1848 was in agricultural labouring, an occupation originally filled by indentured servants, then by workers employed under colonial contracts to be paid by piece rates, and—after 1850—by ticket-of-leave convicts. Many farmers—176 in 1848—could not afford paid labour and relied instead on family, especially children's, labour to make their farms viable.

TABLE 1.10 - OCCUPATIONS  
Census of Western Australia, 10 October 1848

Occupation	Persons (a)
Agriculture—	
Occupiers employing labourers	124
Occupiers not employing labourers	176
Agricultural labourers, including gardeners	476
Grazing—	
In care of sheep	121
In care of cattle	24
Trade—	
Shopkeepers and other retail dealers, and their assistants	64
Bricklayers and masons	32
Smiths	22
Carpenters and joiners, painters and glaziers	98
Tailors and shoemakers	39
Sawyers and splitters	49
Capitalists, bankers, professional and other educated men, their clerks and assistants	44
Civil officers, their clerks and assistants	69
Labourers employed in labour not agricultural	241
Domestic servants (males)	55
Military men	103
All other males above 14 not included above	183
Residue—	
Women and children	2,702
<b>Total</b>	<b>4,622</b>

(a) Excludes Aborigines.

Early in the Colony's existence wool proved its most valuable export (Table 1.11) and the Avon Valley its most prosperous pastoral district. Supplying the Asian market with sandalwood was also a significant export earner in the mid nineteenth century as were the products of the whaling industry. By the turn of the century gold was contributing half the value of the State's exports but this percentage fell rapidly as the



industry began a slow decline after 1903 (the year of peak production). Government policy of agricultural expansion, initiated by Premier Forrest and pursued by his successors, in particular Mitchell, opened up the wheat belt and made wheat an important export commodity. With wool, the latter was the largest earner until 1970 when iron ore assumed preeminence. (Table 1.12).

TABLE 1.11 – EXPORTS, 1850  
Source: *Blue Book of Western Australia, 1850*

Commodity	pounds	Value Per cent
Wool	15,482	69.9
Whale oil and bone	2,306	10.4
Sandalwood	1,220	5.5
Timber	1,048	4.7
Livestock	626	2.8
Hides, skins	329	1.5
Salted fish	190	0.9
Hay and fodder	108	0.5
Potatoes	96	0.4
Tallow	95	0.4
Lead ore	55	0.3
Miscellaneous	580	2.6
<b>Total</b>	<b>22,135</b>	<b>100.00</b>

TABLE 1.12 – MAJOR EXPORTS, 1900 AND 1985

Commodity	1900		1985	
	\$'000	Per cent	\$'000	Per cent
Wheat and flour	814	6.0	850,966	11.3
Wool	523	3.9	523,304	6.9
Timber	164	1.2	7,173	0.09
Gold	7,589	56.2	308,424	4.1
Iron ore	-	-	1,796,578	23.8
<b>Total</b>	<b>13,496</b>	<b>..</b>	<b>7,535,850</b>	<b>..</b>

Despite the greatly increased importance of mineral production since the 1960s Western Australia's mining workforce has remained proportionately small, only 4 per cent of total in 1971, for instance. The capital intensive nature of open cut production contrasts with early twentieth century mining which involved 20 per cent of the State's workforce in 1901.

State Government policy of fostering agricultural development kept many people engaged in primary industry until the 1940s. First, the wheat belt was developed to create family farms and then, after the Great War, the Group Settlement Scheme was intended to establish a flourishing dairy industry in the south-west. However the bulk

of hopeful group settlers failed to achieve an adequate livelihood and eventually abandoned their holdings in the face of environmental constraints, inadequate capital, low product prices and, consequently, varying periods of grinding poverty.

TABLE 1.13 – TRADE UNION UNEMPLOYMENT, 1927-1942

Source: Snooks G.D., 'Development in Adversity' in Stannage C.T.(ed.) *A New History of Western Australia*

	Per cent		Per cent
1927-28	6.7	1935-36	11.0
1928-29	9.1	1936-37	6.0
1929-30	13.8	1937-38	5.4
1930-31	24.1	1938-39	6.5
1931-32	28.7	1939-40	6.8
1932-33	28.0	1940-41	4.4
1933-34	21.0	1941-42	1.9
1934-35	15.7		

The depression of the 1930s proved the final blow to many group settlers who had struggled to overcome the initial difficulties inherent in new settlements, particularly ones as misguided as the 1920s scheme. The depression brought great suffering to most—but not all—Western Australians. Unemployment was high (Table 1.13) and men sought relief and sustenance work, provided by the government, to sustain themselves and their families. Many farmers endured stark poverty, a large number being forced to abandon their properties. Recovery from the depression was not complete until World War II.

TABLE 1.14 – WORKFORCE DISTRIBUTION, 1901-1976

	Primary	Secondary	Tertiary
	Per cent	Per cent	Per cent
1901	35	16	49
1933	32	12	56
1947	23	18	59
1961	18	18	64
1971	13	15	72
1976	13	14	73

Manufacturing remained limited in Western Australia and the secondary sector workforce relatively small. (Table 1.14). Post-World War State governments fostered industrial development, the most important element of which was the

heavy industrial complex at Kwinana established in the early 1950s. Kwinana provided employment for many men and brought skilled tradesmen from Europe, especially from Britain. However, government plans for an integrated iron and steel industry and a petrochemical industry as the linchpins of a major industrial area did not eventuate. Instead the resource development of the 1960s was centred on extractive mining activity. An increasing majority of the postwar workforce has been engaged in the provision of services, both tangible and intangible.

Throughout Western Australia's history labour shortages have recurred in rural labouring, public works construction and maintenance, factory process work and domestic service. These jobs have been taken disproportionately by recent migrants. The young Italian, Yugoslav and other continental European men who migrated in the early twentieth century worked on the woodlines supplying wood to fuel the gold mines, in south-west timber camps and on new farms clearing and fencing (the last of these also an area of substantial Aboriginal labour). The eastern and central European displaced persons of the 1947-1953 period fulfilled their two-year government contracts working, if they were male, at railway repair, timber milling and farm labouring; while female displaced persons were usually contracted as domestic servants in private homes or hotels. Migrant women's labour has also been important in factory work, particularly in the food processing and clothing industries. With average annual earnings well below those of male employees, in fact below half in the years to 1940, female labour was cheap indeed. (Table 1.15).

TABLE 1.15 - AVERAGE ANNUAL EARNINGS IN MANUFACTURING, BY SEX  
Source: *Australians: Historical Statistics*

	Male	Female
1915	284	107
1925	455	192
1935	421	175
1945	623	286
1955	1,596	868
1965	2,337	1,228

In recent years Western Australia has been one of the more rapidly developing States, in 1987-88 its rate of population increase being 2.9 per cent compared with 1.7 per cent for Australia as a

whole. Manufacturing employment has remained low and export earnings high; with 9.3 per cent of Australia's population, the State contributed 17.9 per cent of export earnings in 1987-88.

## SOCIAL CHANGE

For most Western Australians living through the experiences, the two wars—1914-18 and 1939-45—seemed to be times of cataclysmic change and destruction. And there is no doubt that the death and injury they caused meant that the lives of many people would never be the same again. At a personal level these wars (like the Vietnam conflict) transformed the lives of the men who fought and, in turn, influenced the lives of those close to the servicemen. Their consequences for the wider society are less self-evident. Certainly most Western Australians supported Australia's involvement in the Great War even to the extent of strongly supporting conscription for overseas military service, Western Australia being the only State which voted overwhelmingly for conscription in both the referendums of 1916-17. However the major social impact of the Great War was to divide Western Australians, often bitterly: between pro-conscriptionists and the minority of anti-conscriptionists, between people of German and Austrian ethnicity and the rest, between working class radicals and middle class conservatives, between those who enlisted and who did not. The World War proved less divisive as Western Australians faced imminent Japanese invasion. Nevertheless the State's Italian community suffered harsh discrimination. The failure of British power and the inability of the Commonwealth to provide an adequate defence for the west coast etched themselves vividly on Western Australian minds. The American submariners provided a reassuring presence without the overwhelming U.S. numbers which produced major social conflict in Queensland. Both wars drew Western Australians back to their European origins at the same time as strengthening their sense of separateness and difference.

Many of the men who enlisted in the First AIF came from the bush or from country towns for more than half of Western Australia's population at this time lived outside Perth. In 1901 about 36 per cent of people lived in Perth, approximately the same percentage as in 1848. In the twentieth century this percentage has risen and Western Australians have become increasingly metropolitan dwellers, drawn by both employment and lifestyle to Perth. At present approximately three in four Western Australian live in the metropolitan area. (Table 1.16).

Successive governments have tried to arrest this trend, opening up more and more land for agricultural development. It was the government's proud boast in the 1960s that one million acres of new land was released for agriculture every year. These new farmers struggled to survive, as new farmers had done earlier in the century, but now on more marginal and light land. Many of these families retreated in defeat to the city: 'get big or get out' seemed the only sound advice. Then those who sought to 'get big' by borrowing to acquire more land have found themselves facing crippling debt levels and have sometimes been forced off the land.

TABLE 1.16 – PERTH  
METROPOLITAN AREA:  
PERCENTAGE OF STATE'S  
POPULATION

	<i>Per cent</i>
1921	46.6
1947	54.2
1961	56.3
1971	68.2
1976	70.7
1981	70.9
1986	72.0

Western Australia's north remains remote despite improvements in transport and communications. Pastoralism moved north in the 1860s with the establishment of sheep stations in the north-west. Then in the 1880s and 1890s the Kimberley region was occupied by pastoralists, the west Kimberley settled from the south and the east Kimberley by overlanders from Queensland and the Northern Territory. The pastoral industry was hampered by isolation and high costs, stock disease and the greed of some men who overstocked and degraded the land. It prospered, however, on Aboriginal labour as Aboriginal people were drawn in to work stock on leases which were close to or part of their own country. For most of these white settlers the north was a place of temporary residence to secure the financial wherewithal in order to move south permanently. Similarly, most workers in the Pilbara iron ore industry of the last three decades, as well as in other mining ventures, stayed for only a limited time before moving south again. The diversity of employment and educational opportunities, of mass entertainment and leisure activities, of government services and of goods and services for purchase has ensured the increasing attraction of the metropolitan region.

TABLE 1.17 – MOTOR CARS ON  
REGISTER

1920	3,404
1930	31,130
1940	38,907
1950	48,632
1960	130,476
1970	301,000
1980	535,613
1989	708,253

In the twentieth century new technologies have transformed the material conditions of most Western Australians' existence. Electricity and gas; household appliances; canned, frozen and fast foods; cinema; radio, the telephone; television and video: the list could be extended without difficulty. Among the most important of the new products in changing people's lives has been the motor vehicle. (Table 1.17). Private motor cars and motor cycles have provided Western Australians with a new mobility in both employment and their private lives. In so doing, cars have allowed Perth to become the sprawling city of today. These new technologies have provided Western Australians with a more comfortable existence than was mostly the case in the past, in many ways an existence little different from that of people in comparable European and 'new world' societies. As a small offshoot of the nineteenth century's greatest imperial power, Western Australia has, since 1829, shared the benefits (along with the problems) of the Western industrial world.

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## Chapter 2

### PHYSICAL FEATURES AND GEOLOGY

#### The Geomorphological Framework of Western Australia

*Contributed by K-H. Wyrwoll M.Sc., PH.D., Department of Geography, University of Western Australia*

Western Australia covers some one-third of the Australian landmass. Its overall geomorphological development is closely tied to the long-term geological evolution of this part of the Australian continent. This becomes most apparent when the continental-scale geomorphology of the State is considered, and questions asked such as: 'How did the coastal outline of Western Australia develop?'. The major continental-scale geomorphological divisions of the State largely correspond to the major tectonic diversions. But the control of geology on geomorphology is equally evident in more regional-scale considerations, and this is the result of long periods of relatively uninterrupted sub-aerial weathering. A selection of relevant references are given at the end of this Chapter.

In addition to the tectonic and lithological controls, the geomorphology of Western Australia, has been strongly influenced by its climatic history, and especially the global and regional climatic changes of the Cenozoic. The climates of the Cenozoic have left a strong imprint on the landscape, as witnessed by widespread eolian, fluvial and marine depositional sequences and landforms. These sequences include the extensive areas of desert dunes, such as in the Great Sandy Desert, widespread river deposition and floodplain formation, such as along the Gascoyne and Fitzroy rivers, and Quaternary coastal deposits which dominate the geomorphology of the Swan Coastal Plain and the Shark Bay region.

#### MORPHOTECTONIC DEVELOPMENT AND GEOMORPHOLOGICAL REGIONS

The general correspondence between the continental-scale geomorphology and geology, and their link to the development of Western Australia as a landmass is expressed in the major morphotectonic divisions of the State (Diagram

2.1 and Table 2.1). The regional-scale geomorphology is most conveniently considered in terms of 'landform regions' (Diagrams 2.2 and Table 2.2), which frequently show some correspondence to regional-scale geological divisions.

A major geomorphological difference between Western Australia and other continental masses is the lack of Phanerozoic orogeny, and particularly Late Phanerozoic orogeny. In fact, large parts of Western Australia have been relatively stable for over 1,000 million years (1 Ga). However, little remains of the original landsurfaces, and the regions have been so reduced in their relief as to lose much of the erosional potential.

The antiquity of the landsurface of Western Australia is exemplified by the Yilgarn Block, which with the Pilbara and Kimberley Blocks, formed the geological framework of Western Australia, and controlled much of the long-term and broad-scale geomorphological evolution of the State.

DIAGRAM 2.1

Modified National Oceanic and Atmospheric Administration (NOAA) satellite image showing the general morphotectonic-geological divisions of Western Australia. The numbers refer to Table 2.2 where the subdivisions are named (modified from Geological Survey of Western Australia, Memoir 2). NOAA image courtesy of Remote Sensing Application Centre, Department of Land Administration.

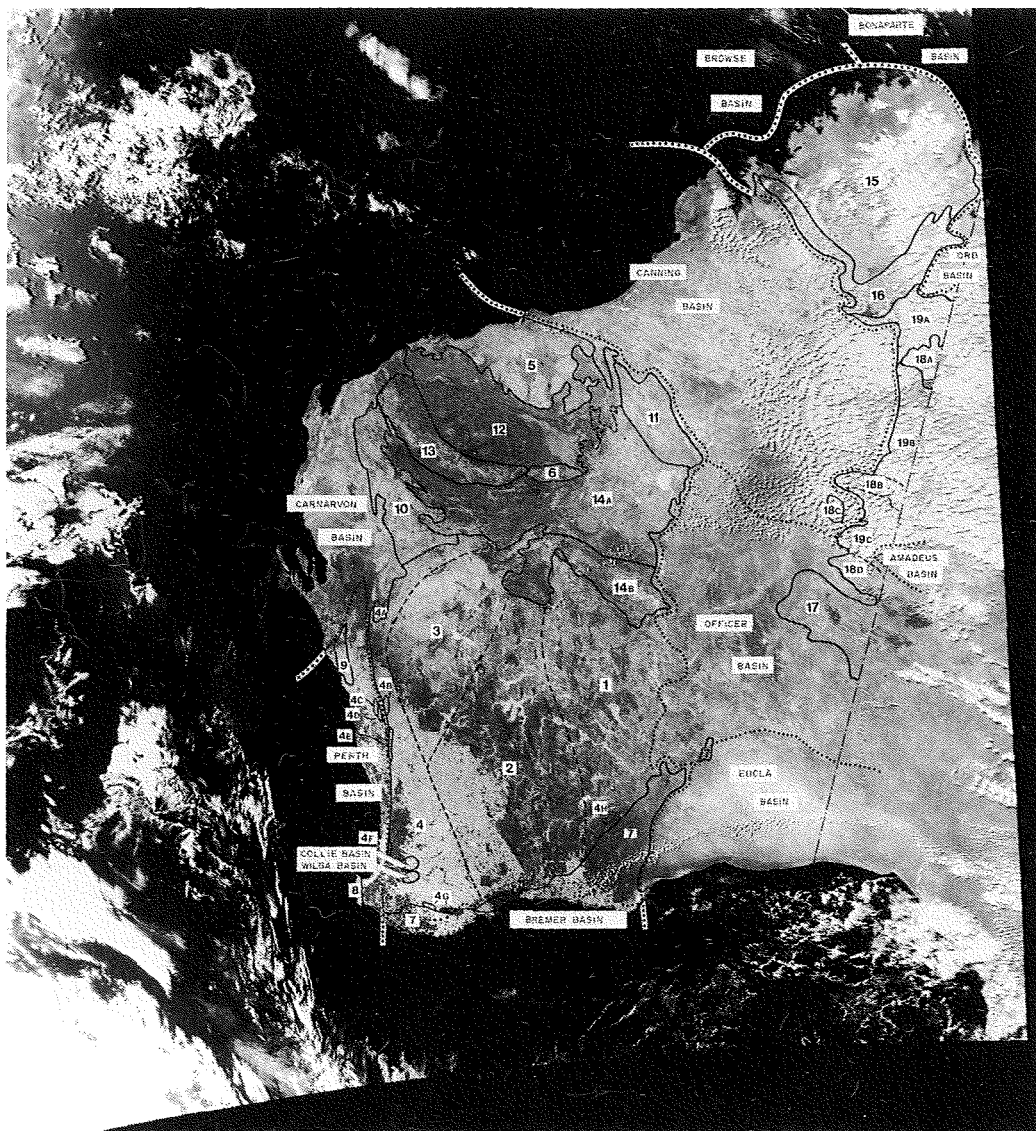


TABLE 2.1 – MORPHOTECTONIC DIVISIONS OF WESTERN AUSTRALIA  
(To be used in conjunction with diagram 2.1)

<i>Area</i>	<i>Division</i>	<i>Subdivision</i>	<i>Diagram reference</i>
Western Shield	Yilgarn Block	Eastern Goldfields Province	1
		Southern Cross Province	2
		Murchison Province	3
		Western Gneiss Terrain	4
		Proterozoic rocks on or adjoining the Yilgarn Block	4 A-H
	Pilbara Block	Not subdivided	5
	Archaean inliers between the Yilgarn and Pilbara Blocks	Not subdivided	6
	Main areas of Proterozoic metamorphic and igneous rocks	Albany-Fraser Province	7
		Leeuwin Block	8
		Northampton Block	9
		Gascoyne Province	10
		Paterson Province	11
	Main areas of Proterozoic sedimentary rocks	Hammersley Basin	12
		Ashburton Trough	13
Bangemall Basin		14A	
Nabberu Basin		14B	
Remaining Precambrian areas	Kimberley region	Kimberley Basin	15
		Halls Creek Province	16
	Musgrave Block	Not subdivided	17
	Areas between region and the Kimberley Musgrave Block	Areas of Proterozoic metamorphic and igneous rocks	18 A-D
		Proterozoic basins	19 A-C
	Phanerozoic areas	Sedimentary basins indicated on Diagram 2.1	



TABLE 2.2 - THE MAJOR GEOMORPHOLOGICAL DIVISIONS OF WESTERN AUSTRALIA

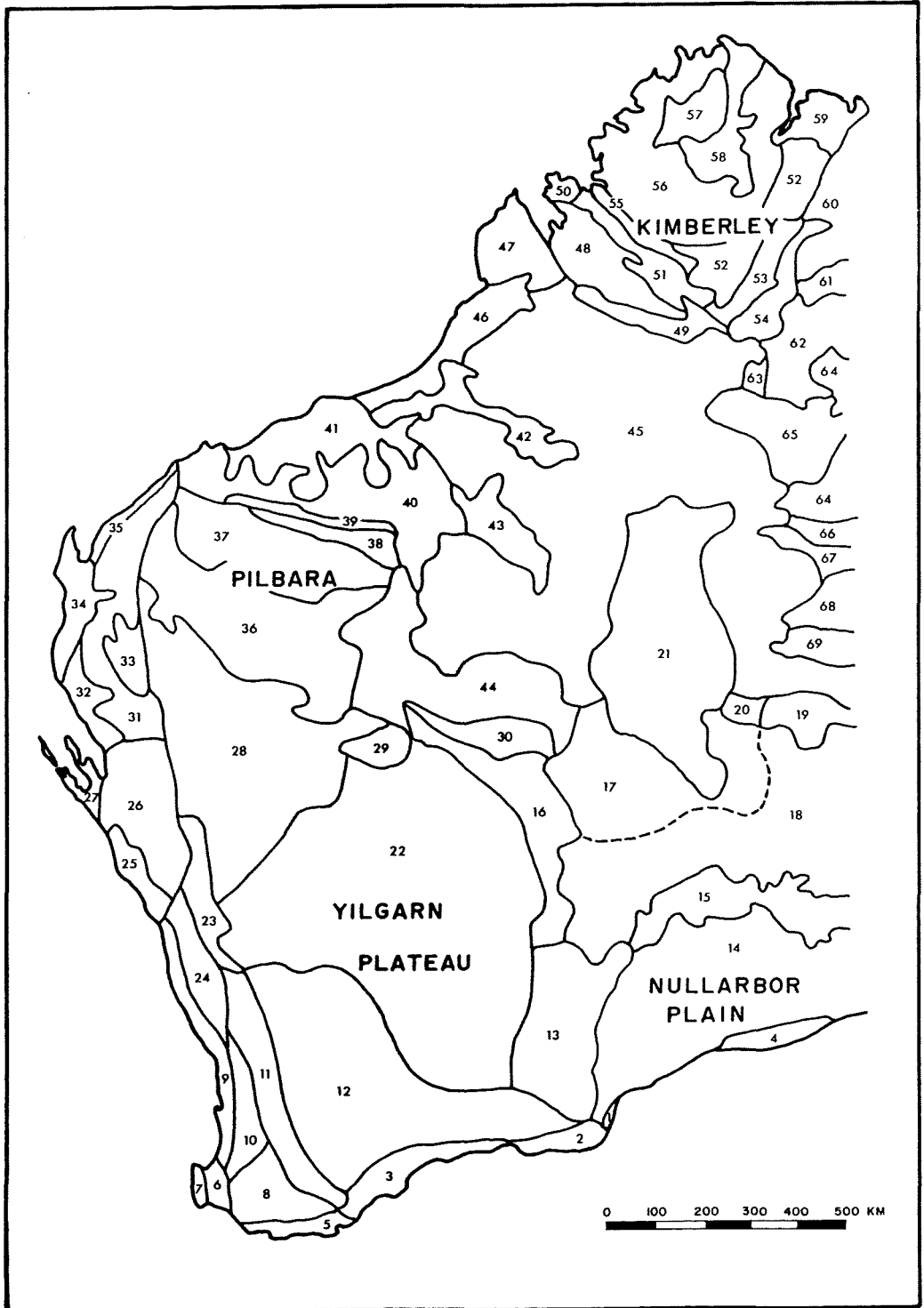
Reference	Division and Description	Reference	Division and Description
1	Israelite Plain— Narrow coastal plain with extensive dunes	19	Musgrave Ranges— Granitic ranges and rounded high hills
2	Esperance Hills— Low granite hills and plains extending as headlands and inlets	20	Warburton Ranges— Ranges and hills of basic volcanic rocks and granite
3	Stirling and Mt. Barren Hills— Hills and low ranges of granite and metamorphic rocks with intervening plains and moderately incised southerly valleys	21	Gibson Desert Plains— Sandy or stony lateritic plains
4	Roe Plain— Coastal plain with extensive dunes	22	Yilgarn Plateau— Sandplains and laterite breakaways; granitic and alluvial plains; ridges of metamorphic rocks and granitic hills and rises; calcretes, large salt lakes and dunes along valleys
5	Albany Headlands and Inlets— Granitic headlands and inlets with lagoons	23	Woodramung Hills— Low rounded ridges of folded metamorphics
6	Donnybrook Lowland— Lowland on down-faulted weak sedimentary rocks	24	Dandaragan Tablelands— Dissected plateaus and hills of sedimentary rocks, with minor laterite cappings and dry valleys; extensive sand cover in lower parts
7	Leeuwin Peninsula— Narrow granitic horst ridge with extensive cover of calcareous dune sands	25	Greenough Hills— Dissected plateaus and hills of sandstone and shale, with extensive sand cover in lower parts
8	Collie-Kalgan Slopes— Gently sloping dissected edge of plateau on granite and gneiss with laterite cappings	26	Yaringa Sandplain— Sandplain with minor dunes
9	Swan Plain— Dune ridges, mainly of limestone, and inner alluvial plain	27	Shark Bay Peninsulas— Peninsulas and islands formed by indurated limestone dunes
10	Darling Range— High plateau rim with steep western fall; remnant laterite cappings and deeply incised valleys of oceanward drainage	28	Murchison Plateau— Mainly granitic plains with out-going drainage, broken by ridges of metamorphic rocks
11	Northam Plateau— Flat-floored valleys of moderately incised oceanward drainage; older laterite remnants with breakaways on divides in east; shallow younger laterites on valley sides in west	29	Glengarry Hills— Sandstone plateau sloping north to low hills of basic volcanic rocks
12	Narrogin-Ongerup Plateau— Sandplains and laterite cappings with breakaways on divides; stripped granitic plains on valley sides; small salt lakes and bordering dunes along shallow valley floors	30	Carnegie Hills— Sandstone tablelands, stony limestone plains, salt lakes and adjacent dunes
13	Coonana-Ragged Plateau— Sandplain and stripped gneissic plains with low hills of granite and metamorphic rocks; calcretes and scattered small salt lakes along shallow valleys	31	Carnarvon Dunefield— South-north longitudinal dunes
14	Bunda Plateau— Covered karst plain of flat-lying limestone with closed depressions and caves; continuous cliff margin on south coast	32	Carnarvon Plain— Alluvial plain
15	Carlisle Plain— Sandstone plain with shallow closed depressions	33	Kennedy Range— Dissected sandstone plateau with partial lateritic cappings, covered by longitudinal dunes
16	Leemans Sand Plain— Sand plain with small salt lakes	34	North West Cape Ridges— Ranges and peninsula formed by folded sedimentary rocks and limestone dunes
17	Great Victoria Desert Dune Field— Northwest Dunes and Hills - west-east longitudinal dunes broken by low tablelands and ridges	35	Onslow Plain— Alluvial, deltaic and littoral plains; minor islands
18	Great Victoria Desert Dune Field— Main Dunefield - west-east longitudinal dunes	36	Augustus Ranges— Parallel ranges and dissected plateaus with intervening sandy lowlands
		37	Hamersley Plateaus— Dissected bold plateaus and ranges in flat lying or moderately folded sedimentary rocks
		38	Fortescue Valley— Mainly alluvial lowland

TABLE 2.2 - THE MAJOR GEOMORPHOLOGICAL DIVISIONS OF WESTERN AUSTRALIA

Reference	Division and Description	Reference	Division and Description
39	Chichester Range— Narrow range of dipping quartzite and sandstone	55	Richenda Foothills— Rounded hills and ridges and lowlands on a belt of granite and folded metamorphic rocks with minor basalt
40	Nullagine Hills— Dissected flat-topped hills of granites and metamorphic rocks with partial lateritic cappings; narrow estuarine plain and islands	56	Kimberley Plateau— Sandstone plateaus with tabular high summits; ria coast and islands to north-west
41	De Grey Lowlands— Floodplains and deltaic plains; granitic and limestone lowlands; scattered ranges of metamorphic rocks in north	57	Couchman Uplands— Undulating to hilly lower plateaus, mainly on basalt
42	Anketell Hills— Low mesas, buttes and stony rises of lateritized sandstone and shale among east-west longitudinal dunes and sandy plains	58	Drysdale Lowlands— Undulating to hilly lowlands, mainly on basalt
43	Rudall Tablelands— Dissected low sandstone tablelands	59	Bonaparte-Diemen Lowlands— Dissected lateritic lowlands and minor islands; part alluvial, part estuarine coastal plains
44	Stanley Hills and Dunes— Isolated sandstone ridges among west-east longitudinal dunes and sandplain	60	Ord-Victoria Plateaus— Dissected plateaus, mainly basaltic but partly of sandstone and with local lateritic cappings
45	Great Sandy Desert Dunefield— East-west longitudinal dunes and minor salt lakes	61	Birrundudu Plain— Low basaltic plain with clay soils; indeterminate drainage with large claypans
46	Eighty Mile Plain— Coastal dunes and estuarine plain	62	Tanami Sandplain and Ranges— Sandplain with scattered low ranges and tablelands and occasional granitic hills
47	Dampier Tablelands— Low sandstone tablelands, partially lateritized and with extensive sandplain cover	63	Sturt Creek Floodout— Floodout with distributary channels and claypans
48	Fitzroy Plains— Floodplains and broad estuarine plains	64	Wiso Sandplain— Sandplain with minor longitudinal dunes in South; floodplains and floodouts on margins; stony rises in North
49	Fitzroy Ranges— Scattered sandstone tablelands and ranges; extensive sandplain and east-west longitudinal dunes	65	Stansmore Dunefield and Ranges— East-west longitudinal dunes locally broken by narrow sandstone ranges
50	Yampi Peninsula— Parallel ridges of quartzite and sandstone and narrow valleys of basalt; extending as a ria coast and islands	66	Redvers éDunefield— East-west longitudinal dunes
51	Napier Limestone Ranges— Limestone tableland and intricately dissected bevelled ridges; rocky karst surfaces with box valleys	67	Macdonald Sandplain— Mainly sandplain with dune-fringed salt lakes
52	Leopold-Durack Ranges— Prominent ranges of dipping quartzites rimming the main plateau	68	Amadeus Lowland— Dunefields and sandplains with scattered sandstone ranges; salt lakes and calcrete plains along lowland axis
53	Springvale Foothills— Granite hills and minor undulating plains	69	Rawlinson-Petermann Ranges— Dissected sandstone ranges with prominent escarpments
54	Halls Creek Ridges— Ranges and rounded hills on granite and metamorphic rocks		

DIAGRAM 2.2

The major geomorphological divisions of Western Australia. The numbers correspond to those given in Table 2.3 (after Jennings, J.N. and Mabbutt, J.A., 1986: in Jeans, D.N., (ed), Australia—A Geography (Volume One) The Natural Environment).





The geomorphology of the Yilgarn Block is essentially one of an erosional plain, in which lithological differences and major tectonic lineaments are accentuated in their erosional expression. Not surprisingly, the resistant banded iron formations often form prominent ridges. Similarly, large granite domes are prominent features in the western areas of the Yilgarn Block. Even the larger dykes (e.g. the Jimberlana Dyke, of the Norseman region) have a clear topographic expression. Other regional-scale lithological differences are also well marked topographically, for example, the paired metamorphic belts of the Perth-Northam area, which are related to the Northam Plateau.

The western margin of the Yilgarn Block is demarcated by the Darling Fault, which has existed since the Late Proterozoic or Early Palaeozoic. It probably originated as a transcurrent fault, but later functioned as a normal fault with a maximum throw of about 15,000 m. In the Donnybrook area, the Donnybrook Sandstone and Maxicar Beds abut against the Darling Scarp and extend into valleys incised into the scarp. These sediments are of Neocomian age, and are believed to have been deposited at about the time of the last major movement along the Darling Scarp. As a morphotectonic structure, bounding a continental margin, the Darling Scarp (Diagram 2.3) forms one of the 'Great Escarpments' of the world.

Unlike the Yilgarn Block, the Kimberley Block is largely covered by the later Proterozoic sediments and volcanic rocks which form the Kimberley Basin, and consequently little is known of its geology. It is known however, that the block has remained stable since circa 2.1 Ga. The geomorphology of the Kimberleys is dominated by a series of plateaus on which major structural lineaments have strongly controlled drainage net evolution. Surficial depositional elements are generally suppressed, but important Cenozoic alluvial sequences are found, some of which contain diamonds.

The Pilbara Block consists of large granitoid batholiths, some 3-3.5 Ga old, associated with older greenstone belts.

The southern part of the Pilbara Block is overlain by the Fortescue Group of the Hamersley Basin which is dated at 2.7 Ga, suggesting that major stabilisation had by then taken place. The geomorphology of the block is characterised by

erosional plains, in which the lithological controls of the solid geology are clearly expressed. The corestone plains and granite domes reflect the large batholiths.

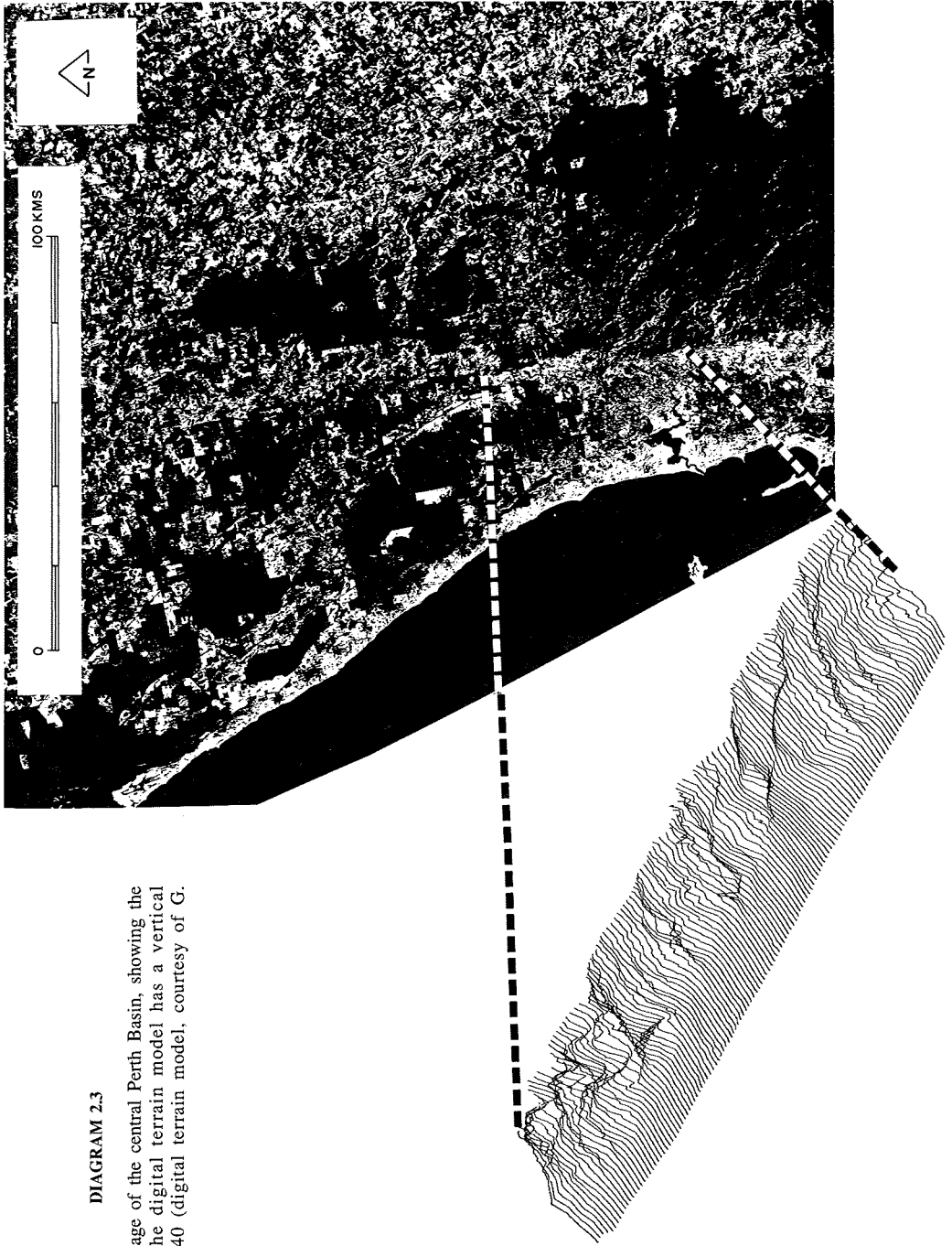
The Proterozoic saw the development of a number of block-marginal mobile belts and the formation of sedimentary basins which led to the deposition of an intracratonic platform cover. The Hamersley Basin is the oldest sedimentary basin and the deposition of the basin infill straddles the Archaean/Proterozoic boundary (2.5 Ga). The Hamersley Basin itself was probably cratonized by circa 2.0 Ga.

The geomorphological continuity of the Hamersley Basin is interrupted by the Fortescue Valley (a possible graben), in which alluvial deposition has taken place. Large alluvial fans debouch out of the bounding escarpments into the valley. To the north of the Fortescue River, the Chichester Range is the geomorphological expression of the Fortescue Group. To the south, the Hamersley Group forms a strongly defined, dissected plateau, on which structural and lithological controls have developed a distinctive terrain (Diagram 2.4).

The Gascoyne Province and Ashburton Trough are the two elements of a complex orogenic zone or mobile belt—the Capricorn Orogen—joining the Pilbara Craton to the Yilgarn Block. In the northern part, the orogen consists of folded sediments of the Ashburton Trough. The major structural elements are indicated by the ridge arrangement of the erosional geomorphology.

In both the Nabberu and Bangemall sedimentary basins, the geomorphology is closely controlled by the geology. Sand dune development is widespread. The major playa systems of Lakes Gregory, Nabberu, Teague, Carnegie and Wells are important depocenters in the region; and especially Lake Carnegie, where large amounts of clastic sediments are at present being supplied to the playa. Some of these clastics result from the extensive stripping of the Permian sediments of the area which reveals older landsurfaces.

The Albany-Fraser Province is a mobile belt which delimits the southern part of the Yilgarn Block. It has been dated at 1.2- 2.1 Ga. Along the western margin of the Yilgarn Block the basement is generally concealed by a thick sequence of Phanerozoic sediments, and is only exposed in the Naturaliste and Northampton blocks.

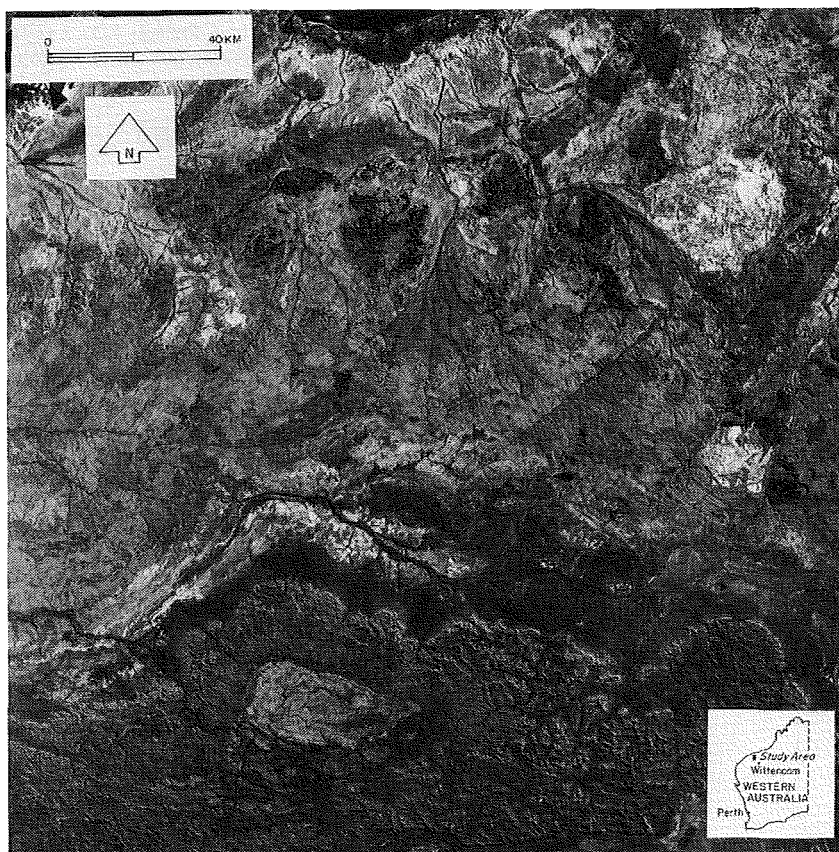


**DIAGRAM 2.3**

Landsat satellite image of the central Perth Basin, showing the Darling Scarp. The digital terrain model has a vertical exaggeration of x40 (digital terrain model, courtesy of G. Mlodawski).

DIAGRAM 2.4

Landsat satellite image showing the contrast in the geomorphological expression of the Pilbara Block (the northern part of the scene) and the Hamersley Basin (the southern part of the scene).



The Kimberley Block and bounding Halls Creek and King Leopold mobile zones of northwestern Australia are part of the wider North Australian Craton. These mobile belts have a very pronounced geomorphological expression (Diagram 2.5).

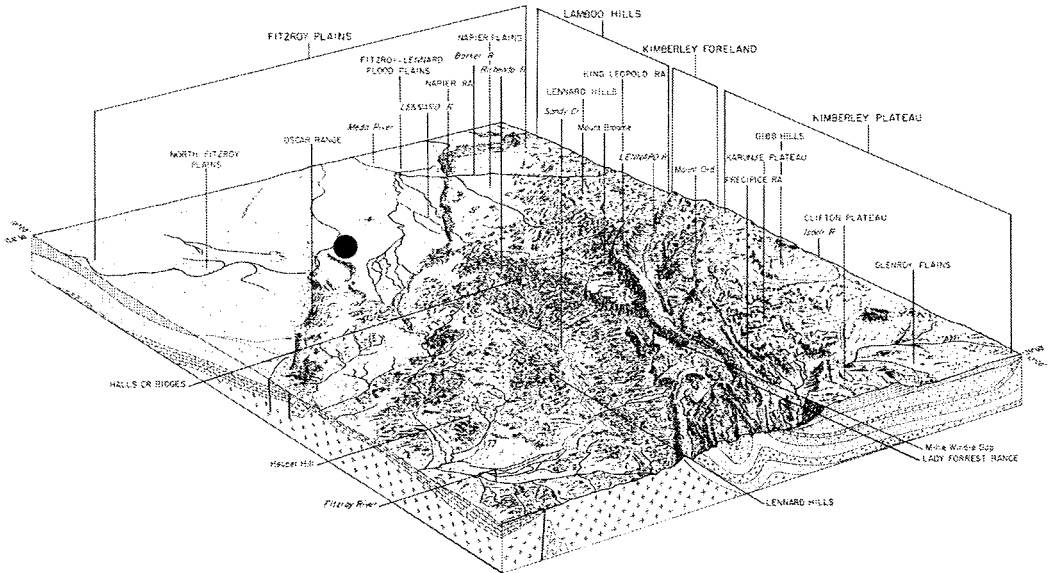
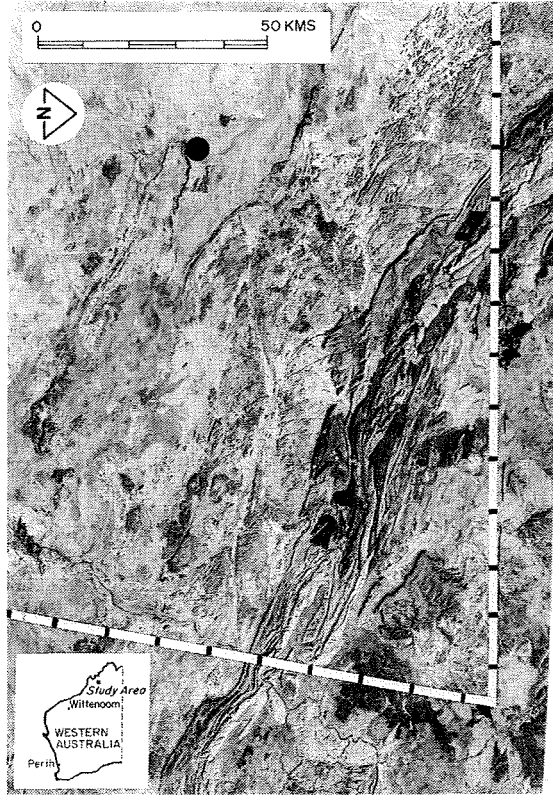
By the end of the Precambrian the morphotectonic framework, which was to control much of the future continental-scale geomorphological evolution of Western Australia, was essentially in place. In this framework the Yilgarn and Pilbara blocks and the associated mobile belts and sedimentary basins, are now combined and constitute the Western Australian Shield. The Shield was to remain the dominant morphotectonic element of the geology of Western Australia, and from at least the end of the Precambrian, large parts of this region were to remain as relatively stable landsurfaces.

Our present understanding of the Early Palaeozoic morphotectonic development of Western Australia is incomplete. However, it is clear that at that time Australia was then part of the Gondwana supercontinent, and that during the Early Cambrian, Gondwana generally experienced continental drift and seafloor spreading. In the region which was to become the northwest margin of Australia, plates diverged, releasing extensive tholeiitic flood basalts. From the Cambrian on there was a southward migration of marine deposition with time, which may reflect the progressive southward opening of a divergent margin, with the development of failed arms off it.

During the Middle and Late Devonian, marine conditions prevailed over much of the Canning, Carnarvon, Bonaparte Gulf and Ord basins and extensive coral reef complexes formed. In the northern Canning Basin the present Napier and

DIAGRAM 2.5

Landsat satellite image of the Lennard River area. The northwest-southeast trending ridges are Proterozoic sedimentary and associated igneous formations, which constitute part of the King Leopold Mobile Zone, which is part of the Halls Creek Province. The Devonian reef complexes which form the Napier and Oscar ranges, are also shown. The area enclosed by the broken line approximates to the area in the block diagram (from Derrick, G.M. and Playford, P.E. 1973: Lennard River, Western Australia. Geological Survey of Western Australia:250 000 Geological Series Explanatory Notes). The 'dots' fix corresponding locations.





Oscar ranges developed as fringing, barrier and atoll reef complexes during the Late Devonian. Today these form limestone ranges, which still reflect much of their original geomorphological expression and clearly show the original reef facies. Karst forms are well developed in some of the more massive limestones.

During the Early Permian, regions which were to contain the northern and western margins of Western Australia, subsided and extensive deposition occurred in the sedimentary basins. Widespread glaciation throughout much of Western Australia during the Early Permian is well documented. Glacial sediments are widely found in a stratigraphic context in the sedimentary basins, from Collie in the south to the Bonaparte Gulf in the north. But outliers of glacial deposits are also known on the Precambrian Shield, which indicate that the Early Permian ice sheet covered much of present-day Western Australia. An ice-cap covering an area of as much as 2.5 million square kilometres is possible but this is not to suggest that it was continuous. For the geomorphological development of Western Australia, Permian widespread glaciation was important. It provided a fresh start for surface denudation processes—just as the Cenozoic ice age has removed much of the weathered mantle that had previously covered the Canadian Shield. Similarly, isostatic adjustments had important geomorphological repercussions. It is not, however, at all certain that any large glacial erosional forms remain in the present landscape of Western Australia.

The marine sediment sequences of the Permian were deposited in broad basins, but at the end of the Permian the depositional basins began to assume a more linear form. This change in style of the environment of deposition was associated with faulting and the development of rift valleys, so that deposition was now along axes which were to parallel the present continental margin.

Along the present western margin, the Triassic saw the development of graben structures, which controlled deposition—grabens were active particularly in the Late Triassic.

During the Jurassic, graben development was less active than in the Triassic. During the Middle Jurassic Gondwana began to break-up, with a mid-ocean spreading ridge entering the north-west coast of Australia. The Perth Basin underwent renewed graben development in the Late Jurassic, and this was the fore-runner of a later episode of rifting.

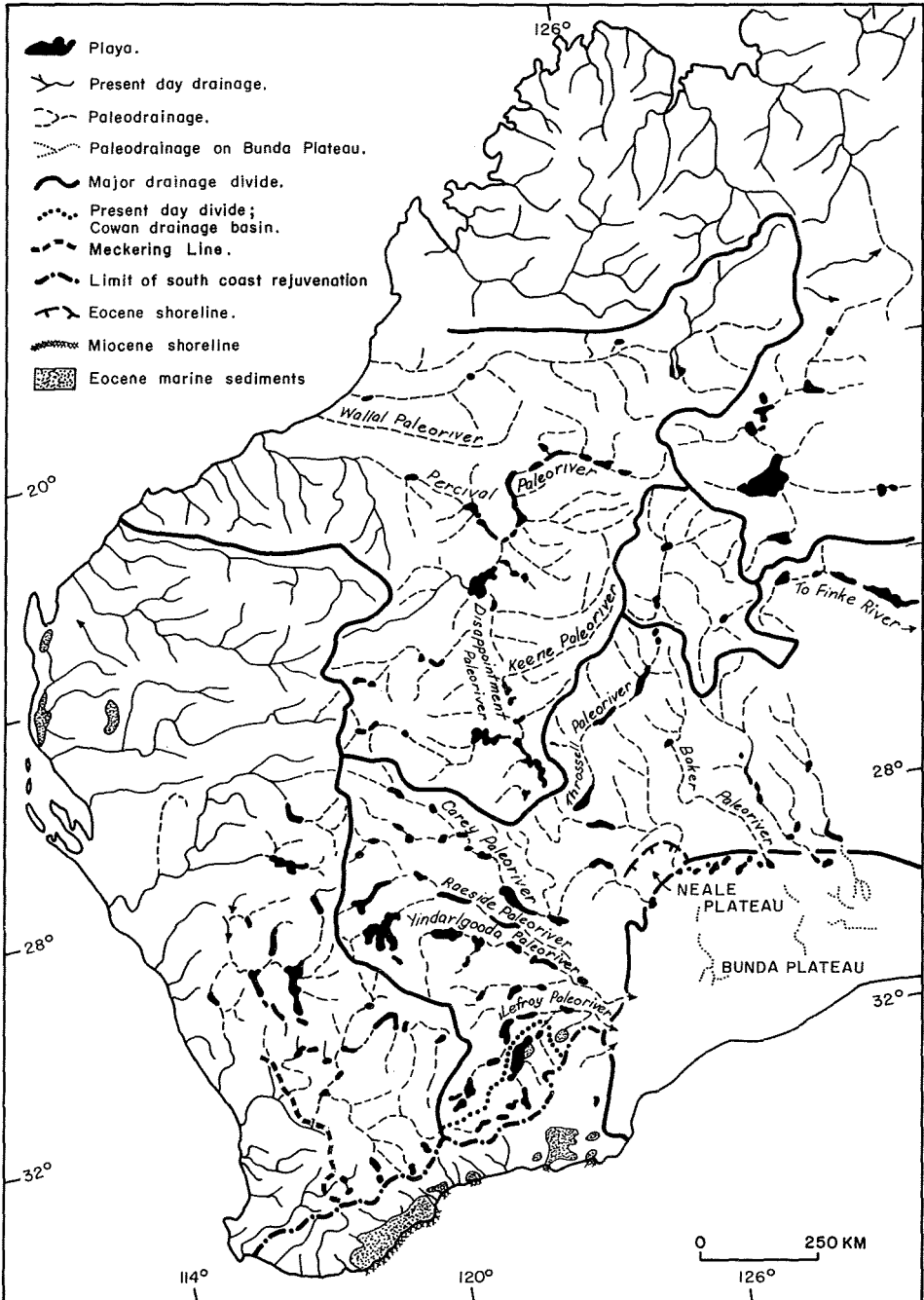
During the Cretaceous the coastal margins of Western Australia began to take on much of their present form. The strong Late Jurassic graben faulting had significantly diminished by the beginning of the Neocomian. In the Early Cretaceous, tensional tectonics between Australia and Antarctica led to the formation of a large downwarp which was to become the Eucla Basin. Along the western margin, the area between the Naturaliste Plateau and the Exmouth Plateau was probably still linked to Greater India. But during the mid-Neocomian, a mid-ocean ridge developed between Australia and Greater India, accompanied by widespread uplift. At the same time India moved away from Australia and the separation has continued to the present day. From the time of the breakup (127 million years (Ma)) until the Early Tertiary (53 Ma), Australia and India were separated by mid-ocean ridge spreading systems.

During the Late Cretaceous the southern margin of Australia was controlled by a series of graben structures parallel to the coast. However, these were less pronounced along the southern margins of Western Australia, and here Late Cretaceous sedimentation was largely restricted to the Eucla Basin.

The spatial relationship of deposits of Cretaceous age to the present geomorphology indicates that major elements in the landscape may be older than 100 Ma. From the distribution of Late Cretaceous sediments it is clear that some of the present valleys, which cut through the scarps of the Darling and Dunsborough faults, were already in existence at that time. There is similar evidence that the lower Murchison River valley may have existed in the Cretaceous. Evidence of the upstream extension of Triassic sediments along the Greenough River valley, suggests that some of the drainage in the southern Carnarvon Basin/northern Perth Basin may have existed in the Triassic. Large playa systems with complex depositional and marginal deflation features are widespread in Western Australia. They are frequently related to a network of palaeochannels which were probably active during the Late Cretaceous. From the combined evidence it is clear that major elements of geomorphology of Western Australia are much older than generally accepted for other parts of the world. In fact, it seems that some elements of the geomorphology of the present landsurface may have survived the break-up of the Gondwana supercontinent.

DIAGRAM 2.6

Major palaeochannels and Tertiary marine sediments and shorelines. The Meckering Line separates the poorly defined streams of the inland region from the more incised coastward draining rivers. The limit of rejuvenation along the south coast is related to the Ravensthorpe Ramp (from van de Graaff, W.J.E., Crowe, R.W.A., Bunting, J.A. and Jackson, M.J., 1977: *Zeitschrift für Geomorphologie*, 21).



**CENOZOIC: THE DEVELOPMENT OF THE PRESENT LANDSURFACE**

The morphotectonic framework of Western Australia was in place by the beginning of the Tertiary, but nevertheless, marine transgressions during the Paleocene, Eocene and Miocene significantly modified large areas of the western and southern margins of Western Australia (Diagram 2.6).

The Eocene saw marine transgressions extending into the western and southern coasts of Western Australia. In the Middle Eocene, shallow seas penetrated into the Eucla Basin, and during the Late Eocene extended to north of Norseman. The Bremer Basin, with its characteristic siltstone, lignite and spongolite, is a product of the Late Eocene transgression. These sediments were deposited over an irregular landsurface of Precambrian rocks, like that now found in the Esperance area. Marine platforms, which formed during the height of the Late Eocene marine transgression, are still evident along some Precambrian uplands, which rise above the Tertiary sediments.

The Miocene saw extensive carbonate deposition in both the Eucla and Carnarvon basins. Today, Miocene limestones dominate the surface geology of the Eucla Basin, and provide the setting for one of the classic karst regions of the world.

Although the morphotectonic framework of Western Australia was established by the Early Tertiary, the details of the geomorphology of the landsurface were still quite different from those of today. This is evidenced by the existence of an extensive palaeochannel network which is thought to have been still active at that time (Diagram 2.6); and climate generally was quite different from that of today. The occurrence of the mangrove palm, *Nipa*, in the Eocene Kings Park Formation suggests that sea surface temperatures may have been warm as 20° – 25° C, significantly warmer than today. Pollen, in Late Eocene sediments, show that over southern Western Australia the vegetation resembled tropical to subtropical rainforest. Similar conditions prevailed over southern Western Australia throughout much of the Oligocene. Early Miocene precipitation was probably high, but more arid conditions set in during the Middle Miocene. By the Late Miocene the arid climates that now prevail over much of Western Australia, had been established, and Australia had essentially reached its present geographical position.

The climates of the Early and Middle Tertiary were conducive to deep weathering; and this is likely to have taken place during the Eocene (?), but certainly the Oligocene and Early-Middle Miocene. Deep weathering resulted in a weathered regolith and extensive laterite formation. The landsurface of much of Western Australia, bears a

**DIAGRAM 2.7**

Uplifted reef-complexes along the western margin of the Cape Range (after van de Graaff, W.J.E., Denman, P.D. and Hocking, R.M., 1976: Geological Survey of Western Australia Annual Report for 1975).

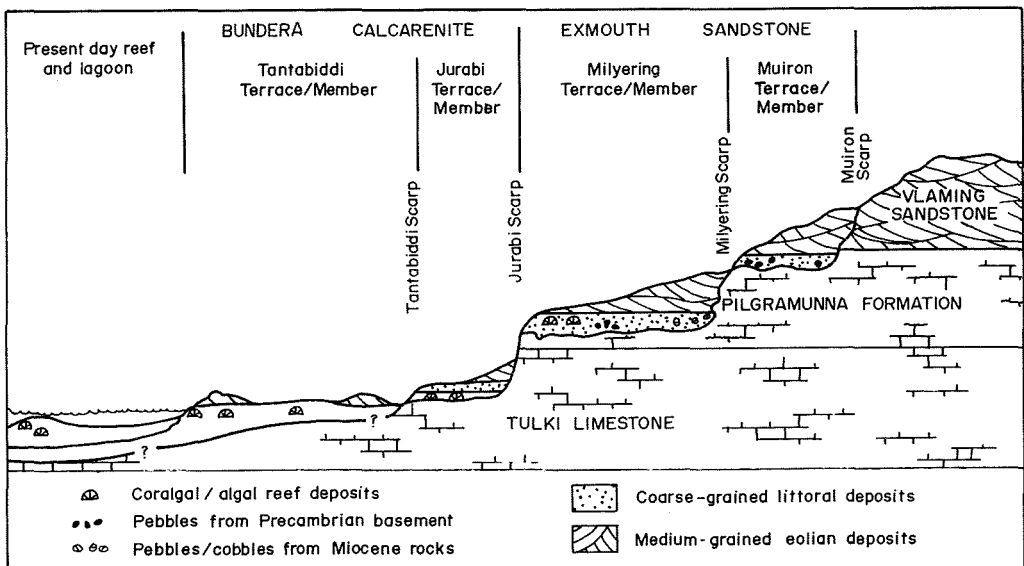
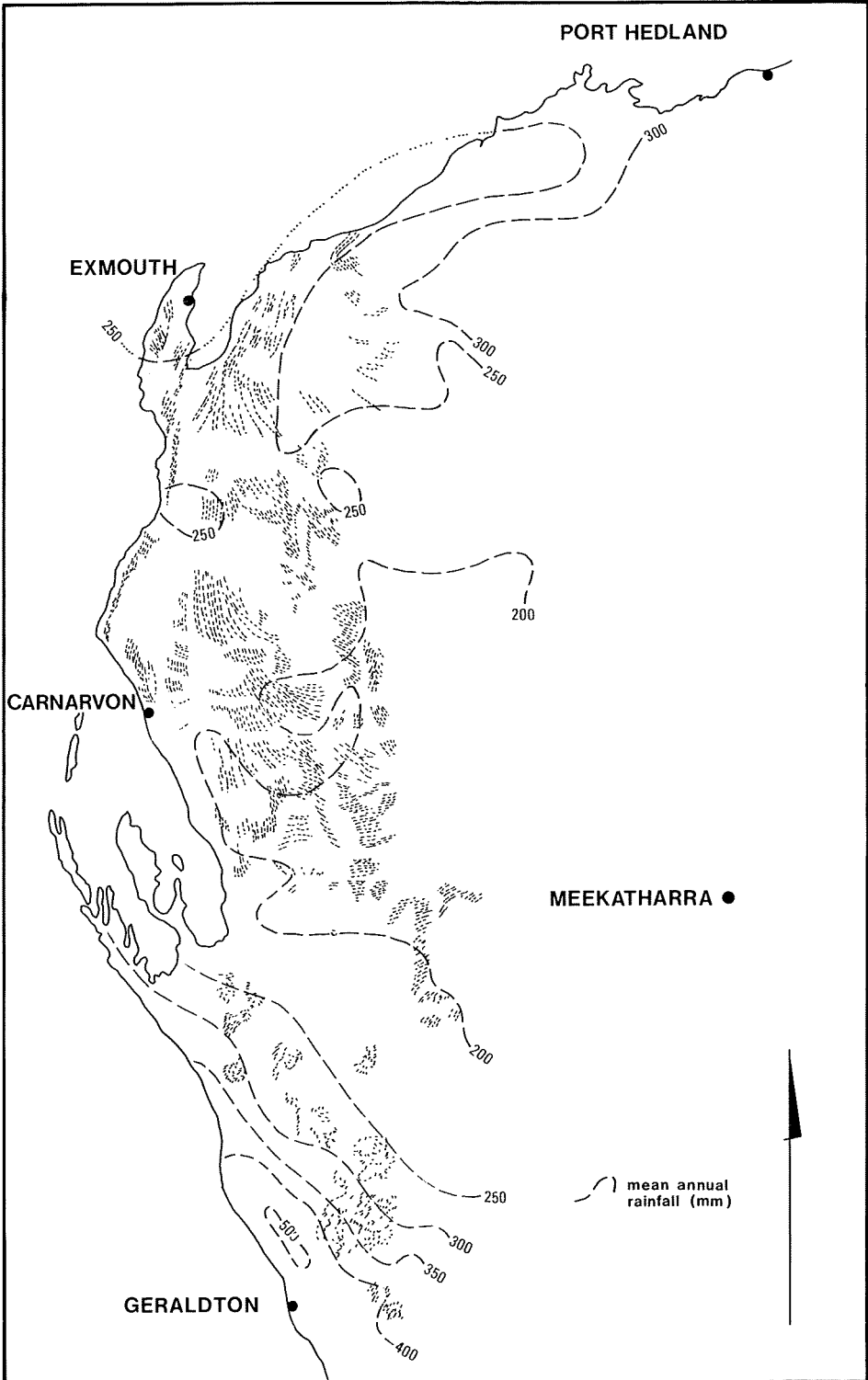


DIAGRAM 2.8

The present occurrence of Late Pleistocene (?) desert dunes in the central coastal areas of Western Australia.





strong imprint of the deep weathering event of the Tertiary, and its control on subsequent geomorphological development is well manifested in etchplain development.

It was traditionally thought that, in terms of tectonics, Western Australia had been essentially stable during much of the Cenozoic. But with the recognition of the South West Seismic Zone, the Jarradale Axis and Ravensthorpe Ramp (Diagram 2.6) and other features, this view has been modified. The most striking geomorphological expression of Cenozoic tectonic activity is in the Exmouth Gulf—Cape Range area. Here, three ranges—the Cape Range, Rough Range and Giralia Range—correspond to anticlinal axes initiated during post- Middle Miocene times by reverse movement on underlying normal faults. The Cape Range is the dominant of the three, reaching a height of some 300 m. The range has been deeply dissected during uplift, which has continued to the present. This is witnessed by warped and uplifted Quaternary reef complexes which now form a staircase along the western flank of the range (Diagram 2.7). On the Yilgarn Block, fault scarps a metre or so high and tens of kilometres long have formed within historic times. Such fault scarps are rapidly eroded and are only incomplete indicators of past seismic activity.

The Late Cenozoic left a significant geomorphological imprint on the landscape as a result of the climatic changes which occurred during this time. The importance of deep weathering to our understanding of the geomorphology is fundamental, but equally striking is the geomorphological expression of the arid climates which first set in during the Late Tertiary. Repeated extensions of the arid zone occurred during the Pleistocene, and resulted in the development of desert dune sequences, which are now stabilised and are found well outside their climatic range (Diagram 2.8). Although no convincing dates are available for these events, it is generally thought that arid zone advances were coincident with global glacial maxima, and that the last massive extension of the arid zone took place at about 18,000 years before present (Ka BP).

Quaternary changes in climate caused variations in the hydrology and sediment supply characteristics of streams. These changes controlled alluvial deposition and resulted in formation of alluvial fills and terrace complexes along the major rivers of Western Australia. The Gascoyne, Fitzroy and at a smaller scale the Swan River, all possess well-developed terrace forms flanking their present courses (Diagram 2.9). In the Geraldton area,

DIAGRAM 2.9

The terraces and associated deposits of the Swan River immediately downstream of the Darling Scarp. The digital terrain model is a view from the north-east (vertical exaggeration approximately x5).

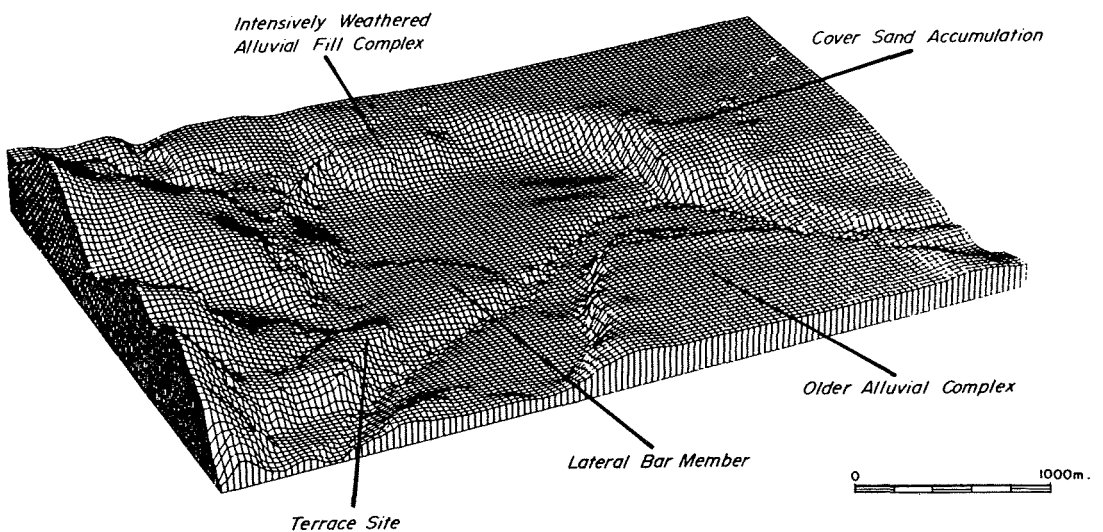


TABLE 2.3 – GEOLOGICAL TIME SCALE

<i>Era</i>	<i>Period</i>	<i>Epoch</i>	<i>Duration (years)</i>	<i>Years before present</i>
Cenozoic	Quaternary	Holocene (Recent)	10,000	10,000
		Pleistocene	1.5–1.8 million	1.5–1.8 m
	Neogene	Pliocene	3–5 million	5–7 m
		Miocene	19 million	26 m
	Tertiary	Oligocene	11–12 million	
	Palaeogene	Eocene	16 million	
		Paleocene	10 million	64–65 m
	Senonian	Maastrichian Campanian Santonian Coniacian	35 million	
		Turonian Cenomanian		100 m
	Mesozoic	Cretaceous	Late	
Early			36 million	136 m
Jurassic		54–59 million	190–195 m	
Triassic		33 million	225 m	
Palaeozoic	Permian	55 million	280 m	
	Carboniferous	65 million	345 m	
	Devonian	50 million	395 m	
	Silurian	35–45 million	430–440 m	
	Ordovician	60–70 million	500 m	
	Cambrian	70 million	570 m	
	Precambrian Eras	Adelaidean	230–530 million	800–1,100 m
Proterozoic	Undifferentiated	250–550 million	1,350 m	
	Carpentarian	450 million	1,800 m	
	Early	700 million	2,500 m	
Archaean		2,100 million	4,600 m	

extensive alluvial deposition, linked to changes in sediment yield processes, took place during the early part of the Late Quaternary. It is now known, from radiocarbon dates, that significant parts of the Swan and Helena river terraces fill were deposited since circa 40 Ka BP. In the Carnarvon Basin, the large wedge of sediments associated with the avulsion of the lower Gascoyne River was deposited over the last 120 Ka.

During the Late Cenozoic, global ice volume changes significantly altered sea level. Thus, during the last interglacial-glacial-interglacial cycle, from about 130 Ka to present, sea level along the Western Australian coast ranged from +8m at 120 Ka to -150 m at 18 Ka BP, and reached its present level (or slightly above) by 6.5 Ka BP. These changes in sea level have influenced geomorphological evolution along many coastal areas in Western Australia.

During the Late Tertiary or Early Pleistocene, shoreline complexes now at heights of 115-90 m (Eneabba and Ridge Hill Shelf) and 20-80 m (Yoganup Formation) were deposited in the Perth Basin. They are the initial sequences of a series of coastal barriers which formed in the Perth Basin throughout the Quaternary. At present there is evidence for possibly three major Pleistocene barrier complexes.

In the course of the Late Cenozoic there was a significant change in the nature of coastal sediments in the Perth Basin. The older barrier sequences are essentially siliciclastic deposits, whereas the younger Pleistocene barriers are carbonate rich. The Tamala Limestone sequences which dominate much of the coastal plain of the Perth Basin, and which in the Carnarvon Basin have led to the development of the distinctive Shark Bay region, are a Middle to Late Quaternary phenomenon.

Significant geomorphological modifications have taken place over many parts of Western Australia in the last 150 years, linked to European land use practises: consequently rates of sediment yield may well be by an order of magnitude higher than earlier in the Late Cenozoic. Widespread erosion is evident in many catchments and high rates of sediment supply are changing the hydraulic and sediment regimes of streams. Wind erosion is equally widespread, and in the most severely affected catchments, such as the Gascoyne, the loss of the vegetation cover has resulted in the local mobilisation of former desert dunes, giving rise to fears of desertification.

## GLOSSARY

*Basalt*: An aphanitic crystalline rock of volcanic origin, composed largely of plagioclase feldspar and dark minerals such as pyroxene and olivine - the extrusive equivalent of gabbro.

*Batholith*: A large intrusive mass of igneous rock, typically granite, outcropping over at least 100 square kilometres and extending to an unknown depth. Batholiths are particularly characteristic of orogenic belts in subduction zones.

*Craton*: The large, relatively immobile (stable) portion of continents, consisting of shields and platforms, which has remained unaffected by orogenic activity for commonly several periods of time.

*Dyke*: A tabular intrusion of igneous rock, normally of intermediate grain size, that cuts discordantly through the surrounding rock.

*Graben*: A block of the Earth's crust, generally with a length much greater than its width, that has dropped relative to the blocks on either side.

*Granite*: A coarse grained acid igneous rock, consisting mainly of quartz, alkali feldspar and mica, with various accessory minerals. It occurs in intrusive bodies from crystallised magma, or the 'granitisation' (metasomatic transformation) of pre-existing rocks.

*Karst*: A topography formed over limestone, dolomite or gypsum and characterised by sinkholes, caves and underground drainage.

*Laterite*: Weathered material composed principally of the oxides of iron, aluminium, titanium, and manganese; laterite ranges from soft, earthy, porous soil to hard, dense rock.

*Lignite*: Coal of relatively recent origin, intermediate between peat and bituminous coal; often contains patterns from the wood from which it formed. Also known as brown coal.

*Mantle*: The section of the Earth's interior between the crust and the outer core, bounded at the top by the Mohorovicic discontinuity and at the base by the Gutenberg discontinuity.

*Metamorphic rock*: A rock formed from pre-existing solid rocks by mineralogical,

structural and chemical changes, through the action of heat or pressure or both.

*Mobile belt:* A long, relatively narrow region where crustal mobility by magmatism, metamorphism and tectonic activity has led to widespread deformation.

*Orogeny:* An episode of tectonic activity (folding, faulting, thrusting) and mountain-building usually related to a destructive plate margin.

*Playa:* A low, essentially flat, part of a basin or other undrained area in an arid region.

*Regolith:* The layer or blanket of unconsolidated rocky debris of any thickness that overlies bedrock and forms the surface of the land.

*Sedimentary basin:* An area of continued subsidence of the crust that accumulates sediment over a prolonged period.

*Shield:* A major structural unit of the Earth's crust, consisting predominantly of Precambrian metamorphic and igneous rocks which have remained unaffected by later orogenics.

*Spongolite:* A rock or sediment composed chiefly of the remains of sponges.

*Tectonics:* A branch of geology dealing with the broad architecture of the outer part of the Earth, that is, the regional assembling of structural or deformational features, a study of their mutual relations, origin and historical evolution.

*Transcurrent fault:* A strike-slip fault characterised by a steeply inclined surface.

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## Chapter 3

# CLIMATE AND METEOROLOGY

*(Contributed by the Western Australian Regional Office of the Bureau of Meteorology)*

**Western Australia is the largest State in the Commonwealth, extending from latitude 13°30' S to 35°08' S, and from longitude 113°09' E to 129° E. It stretches about 2,400 kilometres in a north-south direction and about 1,600 kilometres west-east. A little more than one-third of the State lies within the tropics, while the remainder extends southward to the temperate zone.**

Because of its large size and its latitudinal position, Western Australia has entirely different climates in its northern and southern parts, while in the central regions there is a gradual change from the tropical climate of the north to the typical Mediterranean climate of the south.

Most of the State is a plateau between 300 and 600 metres above mean sea-level and there are no outstanding mountain ranges. Where the edge of the plateau forms the Darling Range along the southern part of the west coast, it exerts a marked influence on the rainfall, causing a rapid increase from the coastal plain to the higher land. Elsewhere the effect of topography is less marked and its main influence is seen in the general decrease of rainfall with increasing distance from the coast.

### PRESSURE SYSTEMS

Weather during the year is controlled largely by the movement of the anticyclonic belt (high pressure systems with anti-clockwise winds) which lies in an east-west direction across the continent for about six months of the year.

In winter this system moves northward, bringing clear skies with fine sunny days and easterly winds to the tropics. With this northward movement, westerly winds on the southern side of the anticyclones extend over the southern part of

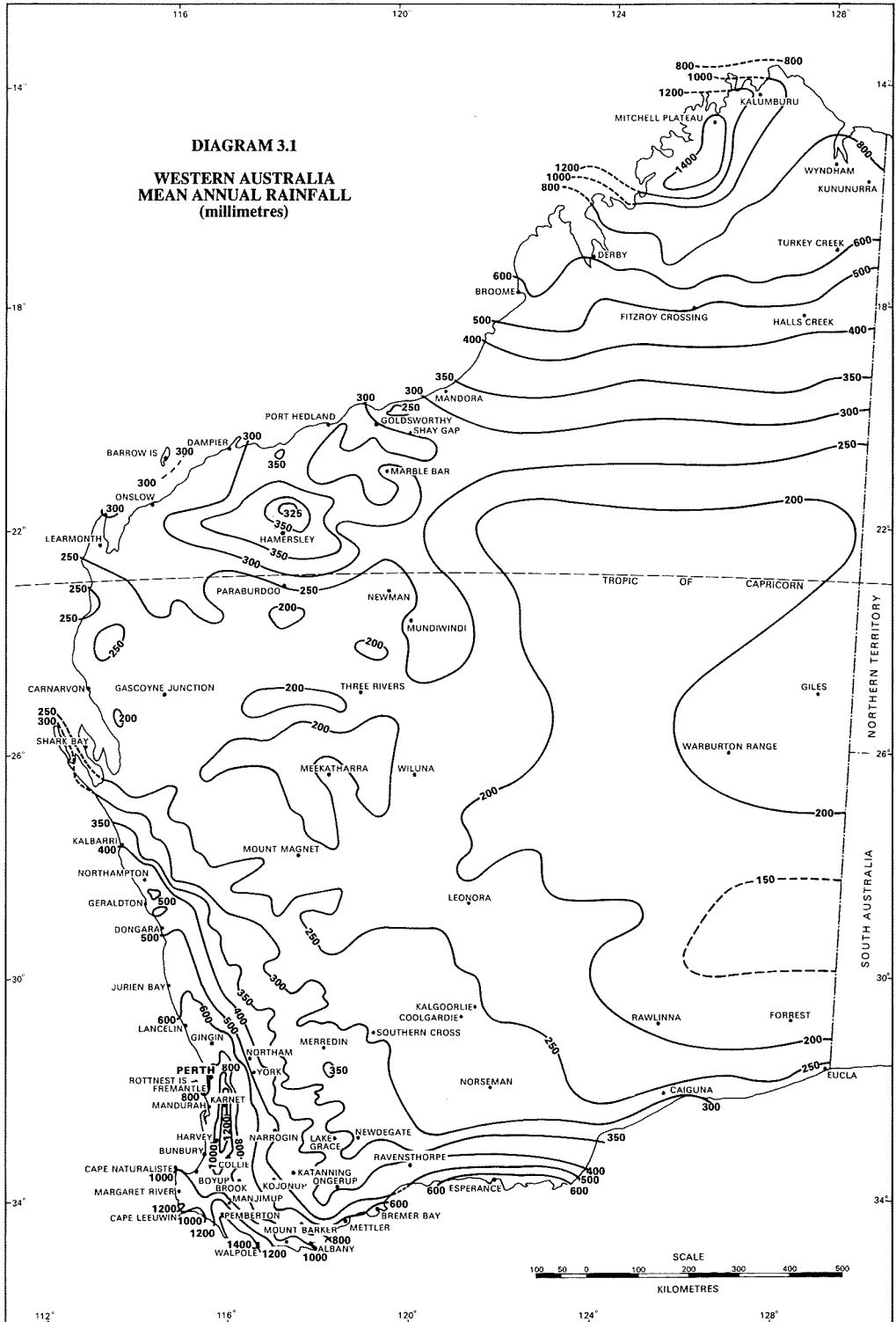
the State, bringing with them cool cloudy weather and rain. In mid-winter the northern fringe of the 'Roaring forties' extends to Western Australia and there are frequent westerly gales in the south coastal belt.

These westerly winds are maintained by a series of depressions (low pressure systems with clockwise winds), which move eastward well south of the Western Australian coast, and others which originate in the Indian Ocean and move south-eastward past Cape Leeuwin. The extent to which westerlies affect the State depends largely on the intensity and the position of these depressions.

Towards the end of winter the anticyclonic belt moves southward, and the westerlies are confined more to the lower south-west and the south coastal districts. By summer the anticyclonic belt has moved so far south that its axis is off the south coast and easterly winds prevail over most of the State.

During this summer period the midday sun is at a high elevation in the tropics and the continual heating leads to the development of a monsoonal depression over this region. Wind circulation round this system causes easterlies on its southern or inland side, but in the coastal districts north-east from Onslow, and in parts of the Kimberley,

DIAGRAM 3.1



westerlies prevail. Winds in both the north and the south of the State are then in the opposite direction to those prevailing during the winter.

Nearing summer's end the anticyclonic belt moves northward again. The monsoonal depression over the tropics dissipates and westerlies again gradually extend northward to the southern part of the State.

During the northern 'Wet' season (from about December to March), occasional cyclones, known locally as 'willy willys', bring strong winds and rain to the tropics. They originate generally in the Timor Sea or off the north-west coast and often move first in a south-westerly direction parallel to the coast and later in a south-easterly direction.

They frequently move inland between Broome and Onslow but occasionally travel further westward before curving to the south-east and moving inland over the west coast. Others fade out at sea without ever crossing the coast. Those that move inland usually start to dissipate soon after crossing the coast, but occasionally they move right across the State, passing into the Southern Ocean and moving off towards Tasmania.

These storms are often extremely violent and have on occasions almost completely wrecked towns on the north-west coast, while a cyclone which struck a pearling fleet off the Eighty Mile Beach in 1887 caused the loss of twenty-two vessels and 140 lives.

However, despite the damage which they cause, the storms are of great benefit to the pastoral regions on account of the heavy and widespread rain which generally accompanies them. The heaviest fall ever recorded in one day in Western Australia, 747 millimetres, was received at Whim Creek from a cyclone in 1898.

## RAINFALL

The moist rain-bearing winds in this State are in general from a westerly direction. The easterlies, having come from the dry inland parts of Australia, usually bring fine weather and clear skies.

Because of this the highest rainfall occurs in the winter months in the south of the State, and in the summer months in the north. In between these areas there is a gradual change from one rainfall regime to the other.

Proceeding northward from the winter rainfall area of the south-west of the State, the wet period occurs earlier during the year. Across a belt Carnarvon-Menzies-Eucla, there is a more rapid change, and this belt divides the winter rainfall area from that which receives most of its rain in the first six months of the year. Further north, the change is more gradual but continuous and in the Kimberley most of the year's rainfall is received in the summer months which, in the southern parts of the State, are the driest of the year.

TABLE 3.1 – RAINFALL AT REPRESENTATIVE CLIMATOLOGICAL STATIONS  
(Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)

Reporting station and characteristic		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year	
COASTAL															
Wyndham	(New site) (a)—														
	Rainfall (mm)—	Average	166	193	153	23	10	2	7	-	8	18	54	101	735
		Highest	329	369	428	119	98	23	84	-	78	75	174	226	1,101
		Lowest	47	43	-	-	-	-	-	-	-	-	2	15	63
		Highest one day	89	77	140	74	48	23	49	-	78	38	84	87	140
	Wet days—	Average number	15	14	11	3	1	-	-	1	3	6	9	63	
Broome—	Rainfall (mm)—	Average	175	162	92	25	30	19	5	2	2	9	41	564	
		Highest	825	427	439	226	176	208	72	23	24	28	50	279	1,228
		Lowest	5	8	-	-	-	-	-	-	-	-	-	-	139
		Highest one day	351	151	204	107	119	127	55	12	13	15	37	210	351
		Wet days—	Average number	11	11	7	3	3	2	1	1	1	1	5	47
Port Hedland M.O. (b)—	Rainfall (mm)—	Average	58	94	46	23	28	18	10	4	1	4	17	304	
		Highest	454	360	251	352	170	125	81	35	9	8	67	219	627
		Lowest	-	-	-	-	-	-	-	-	-	-	-	-	45
		Highest one day	387	329	152	111	156	53	46	25	3	7	59	169	387
		Wet days—	Average number	5	7	4	2	3	3	2	1	1	1	2	32

TABLE 3.1 - RAINFALL AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*  
 (Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)

Reporting station and characteristic		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
COASTAL (continued)														
Onslow1—														
Rainfall (mm)—	Average	27	46	49	19	45	43	18	10	1	1	2	4	266
	Highest	261	539	415	279	259	227	222	107	25	27	56	61	998
	Lowest	-	-	-	-	-	-	-	-	-	-	-	-	15
	Highest one day	192	356	283	157	124	111	76	62	17	21	30	38	356
Wet days—	Average number	2	3	3	2	3	4	2	2	-	-	-	-	21
Carnarvon M.O. (b)—														
Rainfall (mm)—	Average	13	21	15	12	39	49	44	18	6	7	5	1	230
	Highest	157	149	93	89	195	161	180	51	22	53	81	4	557
	Lowest	-	-	-	-	-	1	-	1	-	-	-	-	75
	Highest one day	66	78	77	76	95	96	82	35	17	25	81	4	96
Wet days—	Average number	2	3	2	3	5	7	7	5	3	3	1	1	42
Geraldton—														
Rainfall (mm)—	Average	6	14	15	26	71	112	95	67	30	20	10	5	471
	Highest	53	131	89	100	282	286	243	131	81	109	47	59	843
	Lowest	-	-	-	1	-	25	24	11	-	-	-	-	220
	Highest one day	36	69	88	48	62	109	72	59	39	71	24	51	109
Wet days—	Average number	2	2	3	6	10	14	15	13	9	7	4	2	87
Perth (Bureau of Meteorology)—														
Rainfall (mm)—	Average	8	12	19	45	123	184	173	136	80	54	21	14	869
	Highest	115	166	145	149	308	476	425	318	199	200	73	81	1,339
	Lowest	-	-	-	-	14	55	62	12	9	1	-	-	509
	Highest one day	55	87	77	67	76	99	76	74	52	55	39	47	99
Wet days—	Average number	3	3	4	8	14	17	18	17	14	11	6	4	119
Bunbury—														
Rainfall (mm)—	Average	11	12	22	46	128	183	171	124	80	54	26	14	871
	Highest	157	103	91	175	288	412	417	302	201	195	84	80	1,365
	Lowest	-	-	-	-	10	36	49	21	-	5	-	-	484
	Highest one day	115	86	66	61	79	82	95	62	58	39	38	27	115
Wet days—	Average number	2	2	4	7	14	18	20	17	14	11	6	4	119
Albany M.O. (b)—														
Rainfall (mm)—	Average	23	23	28	65	96	99	124	106	82	79	48	25	798
	Highest	141	62	85	127	260	224	204	174	133	172	117	97	966
	Lowest	3	4	6	21	47	45	55	52	43	37	6	5	628
	Highest one day	80	36	52	52	40	38	43	44	44	53	29	42	80
Wet days—	Average number	8	8	11	14	18	19	21	21	18	15	13	10	176
Esperance—														
Rainfall (mm)—	Average	14	27	25	48	77	80	98	88	55	50	39	17	618
	Highest	35	80	82	155	186	162	193	145	119	117	87	85	868
	Lowest	2	-	1	6	18	33	23	39	16	16	21	1	468
	Highest one day	25	70	31	34	51	61	45	31	28	77	42	24	77
Wet days—	Average number	5	6	6	10	12	14	15	15	13	11	8	6	121
Eucla—														
Rainfall (mm)—	Average	14	19	21	25	31	29	24	26	21	19	17	14	260
	Highest	95	182	127	205	104	155	83	82	85	74	114	116	433
	Lowest	-	-	-	-	-	2	-	2	-	1	-	-	112
	Highest one day	54	115	51	41	75	36	26	38	40	33	42	65	115
Wet days—	Average number	3	4	6	7	10	10	10	9	8	6	5	4	82
WHEAT BELT														
Carnamah—														
Rainfall (mm)—	Average	11	15	21	23	51	82	70	54	28	18	11	9	393
	Highest	103	103	180	121	170	231	188	192	83	73	91	57	783
	Lowest	-	-	-	-	2	13	11	12	1	-	-	-	204
	Highest one day	97	78	153	89	74	61	43	79	33	40	71	50	153
Wet days—	Average number	2	2	3	5	9	13	14	11	8	5	3	2	75

TABLE 3.1 – RAINFALL AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*  
(Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
WHEAT BELT (continued)													
Wongan Hills—													
Rainfall (mm)— Average	11	16	20	23	53	75	70	52	28	19	11	9	389
Highest	78	111	166	81	188	220	174	131	97	66	60	59	675
Lowest	-	-	-	-	1	17	8	8	2	-	-	-	161
Highest one day	69	80	81	62	64	70	41	34	37	36	39	57	81
Wet days— Average number	2	2	3	5	8	12	13	12	8	6	3	2	76
Kellerberrin—													
Rainfall (mm)— Average	10	15	22	22	43	58	53	41	26	19	12	13	334
Highest	87	127	152	110	119	163	123	100	76	77	86	67	661
Lowest	-	-	-	-	-	15	11	3	2	1	-	-	172
Highest one day	52	108	103	58	41	53	38	40	24	37	45	57	108
Wet days— Average number	2	2	3	5	8	12	13	11	8	6	3	2	75
Southern Cross—													
Rainfall (mm)— Average	14	20	21	21	34	41	38	30	19	16	15	12	281
Highest	113	137	169	128	119	183	107	88	106	79	75	72	577
Lowest	-	-	-	-	-	5	6	1	-	-	-	-	118
Highest one day	63	84	61	44	55	43	36	40	25	55	51	40	84
Wet days— Average number	3	3	3	5	8	10	11	9	6	5	3	2	68
Northam—													
Rainfall (mm)— Average	8	13	19	24	57	84	85	62	36	25	12	9	434
Highest	80	190	189	88	148	233	221	170	129	100	70	66	711
Lowest	-	-	-	-	1	10	20	3	3	-	-	-	194
Highest one day	45	116	126	75	65	67	54	33	31	58	32	50	126
Wet days— Average number	2	2	3	5	10	15	16	14	10	7	4	2	90
Wandering—													
Rainfall (mm)— Average	10	15	20	35	79	118	115	94	61	43	19	14	623
Highest	156	244	122	121	195	368	324	270	192	130	65	106	1,051
Lowest	-	-	-	-	11	25	34	14	8	1	-	-	297
Highest one day	115	138	104	51	61	85	69	53	40	43	48	64	138
Wet days— Average number	3	3	4	7	13	17	17	16	13	11	6	4	114
Narrogin—													
Rainfall (mm)— Average	10	17	21	30	65	92	89	69	47	34	18	13	505
Highest	155	237	128	121	167	300	243	185	121	128	79	95	741
Lowest	-	-	-	-	10	25	25	16	7	2	-	-	269
Highest one day	91	115	114	63	68	71	81	42	36	49	38	58	115
Wet days— Average number	2	3	4	6	11	15	15	14	11	9	5	3	98
Katanning—													
Rainfall (mm)— Average	13	17	22	31	61	79	76	63	46	37	21	16	482
Highest	217	225	134	162	148	214	174	173	123	115	98	74	782
Lowest	-	-	-	-	1	7	21	22	13	4	5	-	273
Highest one day	116	126	70	106	59	70	38	44	37	50	55	55	126
Wet days— Average number	3	4	5	7	13	17	18	16	13	10	6	4	116
OTHER INLAND													
Halls Creek M.O. (b)—													
Rainfall (mm)— Average	149	124	71	22	14	5	7	3	5	16	32	69	517
Highest	501	484	381	162	105	87	71	49	85	92	175	208	922
Lowest	13	3	2	-	-	-	-	-	-	-	1	4	250
Highest one day	202	124	100	88	62	36	48	42	37	61	97	120	202
Wet days— Average number	13	12	8	3	2	1	1	1	1	3	6	10	62
Marble Bar—													
Rainfall (mm)— Average	76	79	56	21	23	23	12	6	1	4	10	36	347
Highest	310	337	389	241	187	165	134	46	24	116	71	243	798
Lowest	-	-	-	-	-	-	-	-	-	-	-	-	12
Highest one day	152	121	305	125	91	105	63	32	24	84	61	150	305
Wet days— Average number	7	7	5	2	2	2	2	1	-	1	2	4	35



TABLE 3.1 - RAINFALL AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*  
 (Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
OTHER INLAND (continued)													
Meekatharra M.O. (b)—													
Rainfall (mm)— Average	26	31	23	13	25	35	22	11	6	6	13	9	220
Highest	129	142	166	66	96	187	166	56	41	62	113	32	441
Lowest	-	-	-	-	-	1	-	-	-	-	-	-	66
Highest one day	103	57	58	37	37	114	62	23	17	25	82	24	103
Wet days— Average number	4	4	4	4	5	6	6	4	2	2	2	3	46
Laverton—													
Rainfall (mm)— Average	22	25	30	22	25	25	16	14	9	7	15	15	221
Highest	142	144	122	205	124	126	66	85	67	50	152	135	452
Lowest	-	-	-	-	-	-	-	-	-	-	-	-	66
Highest one day	75	87	67	54	52	40	33	41	44	49	91	71	91
Wet days— Average number	3	3	4	3	5	5	4	4	2	2	3	3	41
Kalgoorlie M.O. (b)—													
Rainfall (mm)— Average	22	28	20	19	27	32	26	20	15	16	18	14	257
Highest	186	308	143	99	110	186	83	65	98	84	115	60	488
Lowest	-	-	-	-	-	2	2	1	-	-	-	-	108
Highest one day	154	178	70	50	45	57	28	40	44	77	77	27	178
Wet days— Average number	3	4	4	5	7	8	9	7	5	4	4	3	63
Rawlinna—													
Rainfall (mm)— Average	13	17	20	17	18	19	14	16	13	13	13	15	188
Highest	210	123	85	114	81	131	59	155	85	64	81	117	497
Lowest	-	-	-	-	-	-	-	-	-	-	-	-	77
Highest one day	100	73	48	58	31	38	25	66	72	31	65	49	100
Wet days— Average number	2	3	3	3	5	5	5	5	4	3	3	3	44
Collie—													
Rainfall (mm)— Average	16	15	24	50	129	187	182	142	100	68	32	16	961
Highest	243	178	105	183	270	474	440	414	249	213	106	81	1,467
Lowest	-	-	-	0	15	56	52	31	15	2	1	-	598
Highest one day	74	106	84	63	62	91	69	73	58	49	48	32	106
Wet days— Average number	3	3	5	9	17	20	22	20	17	14	8	5	143
Manjimup—													
Rainfall (mm)— Average	20	20	31	64	137	177	179	149	108	79	47	24	1,035
Highest	92	117	138	194	269	332	320	323	257	165	122	78	1,761
Lowest	-	-	1	8	26	80	43	49	24	9	3	-	650
Highest one day	79	44	89	77	79	83	50	54	59	53	49	32	89
Wet days— Average number	5	6	7	11	17	20	22	20	17	14	10	7	156
Pemberton—													
Rainfall (mm)— Average	21	20	38	81	155	199	219	165	118	92	62	35	1,205
Highest	82	86	128	213	337	365	391	388	214	189	160	92	1,712
Lowest	1	1	5	6	36	116	130	50	45	13	6	3	802
Highest one day	60	30	77	81	77	59	91	61	45	44	45	42	91
Wet days— Average number	6	6	8	12	18	20	22	21	18	16	12	9	168
Mount Barker—													
Rainfall (mm)— Average	23	24	36	56	86	98	107	92	81	72	43	29	746
Highest	182	179	129	234	243	209	261	173	157	160	155	87	1,095
Lowest	1	1	4	4	16	43	22	33	18	16	3	1	431
Highest one day	105	72	56	139	71	68	72	48	45	54	64	44	139
Wet days— Average number	7	7	10	13	17	19	21	20	18	16	11	9	168

(a) Commencing with Year Book No. 21[—]1983 figures relate to reporting station on a new site. (b) Meteorological Office.

TABLE 3.2- ANNUAL RAINFALL AT REPRESENTATIVE STATIONS  
(millimetres)

Station	1984	1985	1986	1987	1988	Long term 1989 average (a)	
Albany M.O. (b)	612	773	820	740	667	956	808
Broome M.O. (b)	497	503	395	339	528	482	583
Bunbury	710	817	(c)	665	529	843	871
Carnamah	418	442	231	388	274	388	395
Carnarvon M.O. (b)	208	352	202	210	103	108	231
Collie	1,040	812	753	638	620	759	973
Esperance M.O. (b)	468	643	561	651	572	552	623
Eucla	390	287	240	312	204	361	261
Geraldton M.O. (b)	419	512	392	558	460	466	470
Giles M.O. (b)	426	208	84	2,002	260	242	263
Halls Creek M.O. (b)	731	679	283	457	699	508	518
Kalgoorlie M.O. (b)	240	293	210	280	306	272	253
Katanning	569	467	409	397	330	517	486
Kellerberrin	386	374	261	337	272	333	334
Leonora	225	329	223	233	261	244	222
Manjimup	966	1,029	913	791	715	(c)	1,044
Marble Bar	338	412	238	266	330	620	345
Meekatharra M.O. (b)	218	329	170	303	289	186	213
Mount Barker	611	697	601	618	535	830	751
Narrogin	662	462	435	387	453	534	508
Newman	240	316	270	177	302	326	321
Northam	615	357	322	445	391	404	436
Onslow	126	(c)	67	432	180	180	267
Pemberton	1,039	1,284	1,040	997	869	1,388	1,220
Perth (Bureau of Meteorology)	820	827	691	930	768	912	870
Port Hedland M.O. (b)	289	253	102	167	153	533	315
Southern Cross	287	304	346	331	274	382	281
Wandering	697	511	489	507	472	598	631
Wongan Hills	471	412	356	401	377	477	389
Wyndham	661	723	462	683	872	663	775

(a) Number of years of record used to calculate the long-term average varies from station to station. (b) Meteorological Office. (c) Records incomplete.

## TEMPERATURE

The hottest months in Western Australia are November in the Kimberley, December a little further south and January near the Tropic of Capricorn. In the tropics temperatures generally rise from July, the coldest month, to November. In some places further rises occur, but in others the onset of the 'Wet' prevents this further rise and there is a slight fall. As the rains cease at these latter places temperatures start to rise again and there is another minor peak in March or April. After this there is a general fall until July.

South of the tropics the hottest month is January, except in coastal districts where February is hotter. The coldest month is again July.

The most consistently hot place in the State is Wyndham, where the mean maximum throughout the year is 35.5°C and the mean minimum for the coldest month is 16.9°C. Although at Marble Bar the yearly mean maximum of 35.3°C is very similar to that of Wyndham, its mean minimum

temperatures are consistently lower, falling to 11.6°C in the coldest month. The mean maximum at Marble Bar is the highest in Australia, exceeding 37.8°C in the five months from November to March inclusive. There are often long spells of hot weather in this region and during one period, from 31 October 1923 to 7 April 1924, the maximum temperature at Marble Bar reached or exceeded 37.8°C on 160 consecutive days.

Further south temperatures are lower, but even in the southern parts of the State there are occasional heat waves, the highest temperature on record being 50.7°C recorded at Eucla on the south coast.

Near the coast the sea breeze generally brings relief from high temperatures. It blows nearly every afternoon in the hot months, and is known in Perth as the 'Fremantle Doctor'. Away from the influence of the sea, extremes are greater, day temperatures being higher and night temperatures lower than in the coastal districts. During the winter, temperatures have fallen below -1.1°C in



4 December 1990

Corrigendum

# WESTERN AUSTRALIAN YEAR BOOK 1990

Catalogue Nos. 1300.5 and 1301.5 (Issued on 14 September 1990)

Errors have been detected in Table 3.2 on page 34 and in Diagram 12.2 on page 166. The correct versions of the table and diagram respectively are printed below.

B. N. PINK  
DEPUTY COMMONWEALTH STATISTICIAN  
AND GOVERNMENT STATISTICIAN

TABLE 3.2- ANNUAL RAINFALL AT REPRESENTATIVE STATIONS  
(millimetres)

Station	1984	1985	1986	1987	1988	1989	<i>Long term average (a)</i>
Albany M.O. (b)	773	820	740	667	956	961	811
Broome M.O. (b)	503	395	339	528	482	309	563
Bunbury	817	(c)	665	529	843	666	871
Camamah	442	231	388	274	388	300	390
Camarvon M.O. (b)	352	202	210	103	108	160	227
Collie	812	753	638	620	r(c)	759	960
Esperance M.O. (b)	643	561	651	572	552	773	626
Eucla	287	240	312	204	361	248	259
Geraldton M.O. (b)	512	392	558	460	466	427	472
Giles M.O. (b)	218	84	r200	260	r234	421	260
Halls Creek M.O. (b)	679	283	457	699	508	205	511
Kalgoorlie M.O. (b)	293	210	280	306	272	180	256
Katanning	467	409	397	330	517	462	484
Kellerberrin	374	261	337	272	333	269	330
Leonora	329	223	233	261	244	130	223
Manjimup	1,029	913	791	715	r(c)	(c)	1,032
Marble Bar	412	238	266	330	620	373	345
Meekatharra M.O. (b)	329	170	303	289	186	328	221
Mount Barker	697	601	618	535	830	710	745
Narrogin	462	435	387	453	534	443	505
Newman	316	270	177	302	326	213	310
Northam	357	322	445	391	404	347	433
Onslow	(c)	67	432	180	180	200	263
Pemberton	1,284	1,040	997	869	1,388	1,186	1,204
Perth (Bureau of Meteorology)	827	691	930	768	912	738	868
Port Hedland M.O. (b)	253	102	167	153	533	568	314
Southern Cross	304	346	331	274	382	278	283
Wandering	511	489	507	472	598	516	622
Wongan Hills	412	356	401	377	477	335	388
Wyndham	723	462	683	872	663	461	730

(a) Number of years of record used to calculate the long-term average varies from station to station. (b) Meteorological Office. (c) Records incomplete.





TABLE 3.3 — TEMPERATURE AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*  
 (Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)

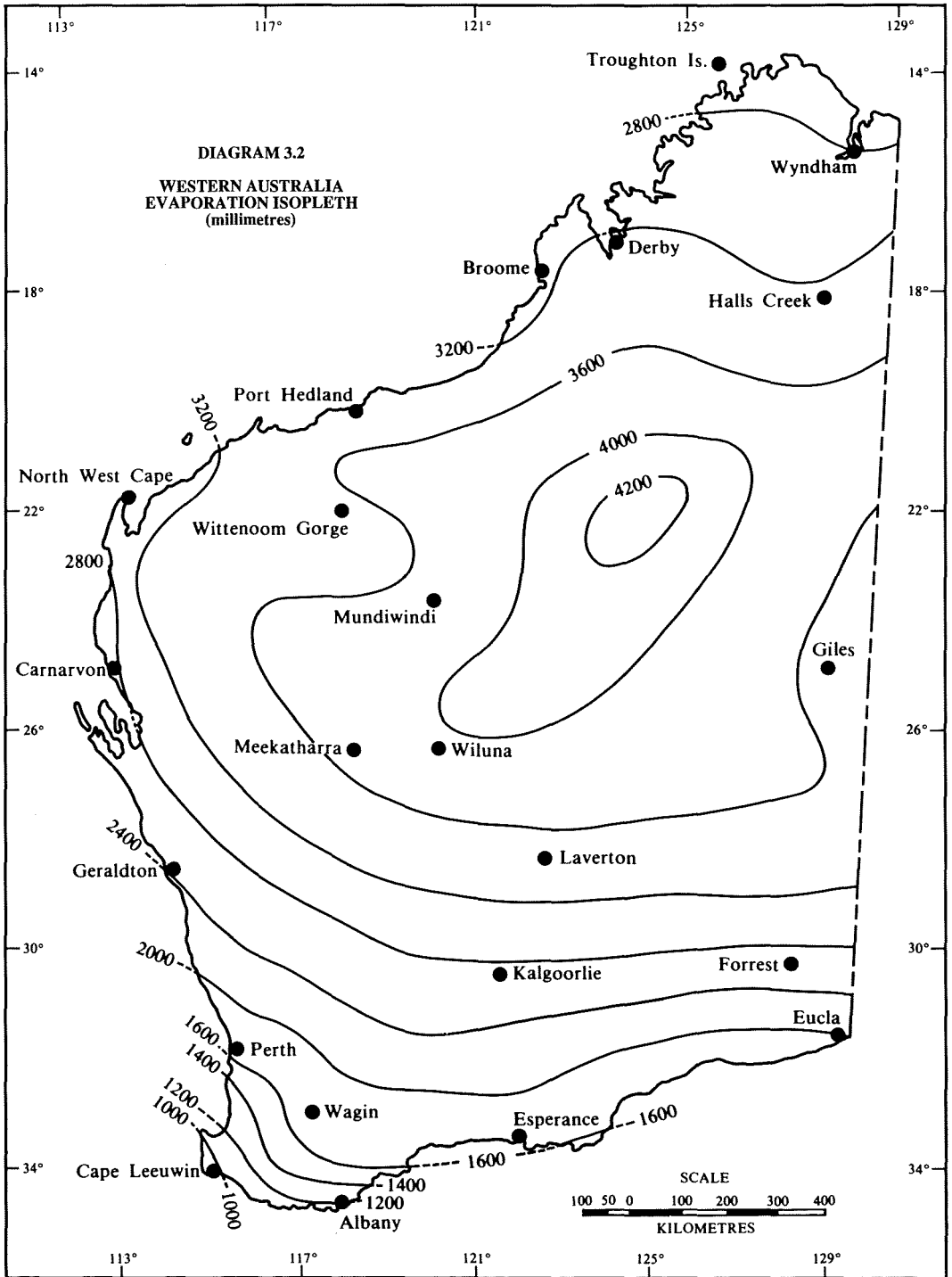
Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
WHEAT BELT (continued)													
Wongan Hills—													
Mean max. °C	34.4	33.9	30.6	25.9	21.1	17.9	16.9	17.6	20.4	24.8	28.7	32.4	25.2
Mean min. °C	17.9	18.2	16.2	13.1	9.6	7.6	6.5	6.5	7.5	10.1	12.9	15.7	11.4
Highest max. °C	47.4	44.5	43.5	39.2	34.7	26.0	25.4	27.2	35.2	39.4	41.8	44.2	47.4
Lowest min. °C	8.8	9.6	5.6	2.8	-0.6	0.5	-0.9	-0.5	0.2	0.6	4.3	5.3	-0.9
No. of days 30.0°C and over	25	22	16	6	-	-	-	-	-	5	11	22	108
No. of days 40.0°C and over	4	4	-	-	-	-	-	-	-	-	-	2	10
No. of days 2.0°C and under	-	-	-	-	-	1	1	3	-	-	-	-	6
Kellerberrin—													
Mean max. °C	33.9	33.2	30.2	25.5	20.5	17.3	16.2	17.6	20.8	24.4	28.9	31.9	25.1
Mean min. °C	16.8	16.7	15.1	11.7	8.4	7.0	5.7	5.6	6.6	8.8	12.3	14.9	10.8
Highest max. °C	46.5	46.7	44.4	39.2	35.6	26.9	24.9	28.3	36.5	39.4	43.1	45.0	46.7
Lowest min. °C	7.2	6.1	4.0	1.1	-2.2	-2.2	-2.0	-1.3	-1.0	0.3	1.7	5.4	-3.3
No. of days 30.0°C and over	25	21	15	5	-	-	-	-	-	5	12	20	102
No. of days 40.0°C and over	4	2	-	-	-	-	-	-	-	-	-	1	7
No. of days 2.0°C and under	-	-	-	-	1	2	3	5	2	-	-	-	13
Southern Cross—													
Mean max. °C	34.6	33.7	30.7	25.7	20.5	17.1	16.3	18.0	21.9	25.4	29.7	33.2	25.7
Mean min. °C	17.1	17.1	15.0	11.3	7.4	5.7	4.3	4.7	6.4	9.1	12.7	15.5	10.4
Highest max. °C	46.1	47.2	44.4	39.6	33.3	27.5	26.7	30.6	34.8	39.3	43.4	45.9	47.2
Lowest min. °C	5.6	5.6	3.4	-1.1	-3.3	-4.3	-5.0	-3.9	-3.3	-1.1	1.1	3.4	-5.0
No. of days 30.0°C and over	27	23	17	6	-	-	-	-	1	7	14	24	118
No. of days 40.0°C and over	5	2	1	-	-	-	-	-	-	-	1	2	11
No. of days 2.0°C and under	-	-	-	-	2	4	8	8	4	1	-	-	26
Northam—													
Mean max. °C	34.0	33.6	30.6	25.9	20.8	17.7	16.7	17.8	20.4	23.7	28.3	32.1	25.1
Mean min. °C	17.1	17.1	15.4	12.0	8.5	6.4	5.4	5.7	7.0	9.0	12.5	15.4	10.9
Highest max. °C	46.2	46.7	43.9	39.5	35.1	27.2	25.0	28.0	34.6	39.4	44.1	45.6	46.7
Lowest min. °C	7.3	7.5	5.5	-0.6	-2.7	-3.9	-2.1	-1.1	-1.0	-0.4	2.1	5.6	-3.9
No. of days 30.0°C and over	25	22	16	6	-	-	-	-	-	4	10	22	107
No. of days 40.0°C and over	4	4	-	-	-	-	-	-	-	-	-	2	10
No. of days 2.0°C and under	-	-	-	-	1	3	3	4	2	-	-	-	14
Wandering—													
Mean max. °C	31.7	31.0	28.2	23.5	18.9	16.0	15.1	16.0	18.1	21.3	25.8	29.5	22.8
Mean min. °C	13.7	13.7	12.0	8.9	6.3	5.0	4.1	4.0	4.8	6.2	9.1	11.9	8.2
Highest max. °C	45.6	44.6	41.9	37.2	33.2	25.0	23.8	26.1	30.9	36.9	39.8	42.8	45.6
Lowest min. °C	3.3	2.8	-0.6	-2.2	-5.6	-5.7	-4.4	-3.9	-3.5	-2.6	-1.7	1.0	-5.7
No. of days 30.0°C and over	20	17	11	3	-	-	-	-	-	2	7	16	76
No. of days 40.0°C and over	2	1	-	-	-	-	-	-	-	-	-	1	3
No. of days 2.0°C and under	-	-	-	1	6	7	9	11	9	5	1	-	48
Narrogin—													
Mean max. °C	30.8	30.0	27.2	22.4	18.2	15.3	14.6	15.1	17.3	21.2	24.9	28.9	22.0
Mean min. °C	14.7	14.9	13.6	10.9	8.1	7.0	5.8	5.6	6.2	8.1	10.7	12.9	9.5
Highest max. °C	43.7	42.8	40.9	36.1	32.2	26.2	22.2	24.9	36.4	37.8	42.1	43.2	43.7
Lowest min. °C	4.3	3.9	3.3	-	-1.4	-2.7	-2.7	-2.7	-3.0	-1.7	-	1.8	-3.0
No. of days 30.0°C and over	16	14	8	2	-	-	-	-	-	1	5	14	57
No. of days 40.0°C and over	1	1	-	-	-	-	-	-	-	-	-	-	2
No. of days 2.0°C and under	-	-	-	-	1	2	4	5	3	-	-	-	17
Katanning—													
Mean max. °C	30.3	29.4	26.7	22.6	18.3	15.4	14.4	15.4	17.7	20.6	25.0	28.4	22.1
Mean min. °C	13.6	13.7	12.5	10.2	7.9	6.5	5.4	5.5	6.4	7.6	10.0	12.1	9.2
Highest max. °C	43.8	44.6	41.7	36.1	32.3	24.1	22.2	23.8	30.6	37.8	41.1	43.3	44.6
Lowest min. °C	5.0	3.3	1.7	0.6	-1.1	-2.1	-3.9	-2.2	-1.2	-0.6	1.7	2.7	-3.9
No. of days 30.0°C and over	17	13	8	1	-	-	-	-	-	1	5	12	58
No. of days 40.0°C and over	1	1	-	-	-	-	-	-	-	-	-	-	2
No. of days 2.0°C and under	-	-	-	-	1	2	3	4	2	-	-	-	13



TABLE 3.3 – TEMPERATURE AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*  
 (Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
OTHER INLAND													
Halls Creek—													
Mean max. °C	36.8	35.8	35.6	33.8	29.8	27.3	27.0	29.9	33.6	36.9	38.4	38.2	33.8
Mean min. °C	24.1	23.6	22.6	20.2	16.6	13.5	12.2	14.7	18.5	22.4	24.3	24.7	19.9
Highest max. °C	44.3	43.8	42.2	39.9	37.2	35.0	34.0	37.8	40.2	43.8	45.0	44.9	44.9
Lowest min. °C	15.6	12.2	11.0	7.2	2.4	0.2	-1.1	0.4	3.0	8.9	11.7	12.1	-1.1
No. of days 30.0°C and over	30	27	30	28	17	6	6	16	27	30	30	30	279
No. of days 40.0°C and over	6	4	2	-	-	-	-	-	-	3	8	9	31
No. of days 2.0°C and under	-	-	-	-	-	-	-	-	-	-	-	-	-
Marble Bar—													
Mean max. °C	41.0	40.0	39.1	36.0	30.6	27.0	26.7	29.5	33.8	37.4	40.5	41.6	35.3
Mean min. °C	26.1	25.6	24.7	21.2	16.4	12.9	11.6	13.2	16.6	20.1	23.6	25.4	19.8
Highest max. °C	49.2	48.3	46.7	45.0	39.4	35.6	35.0	37.2	42.6	45.6	47.2	48.3	49.2
Lowest min. °C	18.9	13.9	15.3	11.1	5.6	1.1	2.2	3.9	5.6	10.0	14.4	17.2	1.1
No. of days 30.0°C and over	30	27	31	28	18	6	4	13	26	30	30	30	273
No. of days 40.0°C and over	19	14	12	2	-	-	-	-	-	8	16	23	94
No. of days 2.0°C and under	-	-	-	-	-	-	-	-	-	-	-	-	-
Meekatharra—													
Mean max. °C	38.1	36.6	34.6	29.1	23.3	19.4	18.6	21.0	25.3	29.1	33.1	36.3	28.6
Mean min. °C	24.2	23.7	21.5	16.9	11.7	8.7	7.3	8.3	11.5	14.8	18.5	22.0	15.8
Highest max. °C	44.8	44.3	43.7	38.8	34.3	28.3	28.8	32.6	37.7	40.2	42.3	45.0	45.0
Lowest min. °C	12.2	12.3	10.3	5.8	1.7	-3.1	-0.2	-	-3.5	5.2	5.2	11.1	-3.1
No. of days 30.0°C and over	30	26	27	13	2	-	-	-	4	14	23	29	169
No. of days 40.0°C and over	10	6	2	-	-	-	-	-	-	-	1	4	22
No. of days 2.0°C and under	-	-	-	-	-	-	1	-	-	-	-	-	1
Laverton—													
Mean max. °C	36.3	34.3	32.0	27.8	22.6	19.1	17.7	19.9	24.2	28.7	32.3	34.2	27.4
Mean min. °C	21.0	19.9	18.1	14.7	9.9	7.7	5.4	6.2	9.4	13.7	16.8	19.1	13.5
Highest max. °C	46.1	46.1	44.4	40.0	35.0	30.2	30.1	33.9	36.8	40.6	43.9	45.6	46.1
Lowest min. °C	7.2	7.5	6.1	2.8	-0.9	-2.8	-4.2	-2.8	-1.1	2.2	4.4	10.0	-4.2
No. of days 30.0°C and over	28	23	20	12	2	-	-	-	4	13	21	25	147
No. of days 40.0°C and over	8	4	2	-	-	-	-	-	-	-	2	3	18
No. of days 2.0°C and under	-	-	-	-	1	2	6	4	-	-	-	-	12
Kalgoorlie—													
Mean max. °C	33.6	31.9	29.6	25.1	20.4	17.5	16.5	18.3	22.0	25.5	28.9	32.1	25.3
Mean min. °C	18.2	17.7	15.9	12.4	8.3	6.2	4.8	5.4	7.8	10.8	13.9	16.6	11.5
Highest max. °C	46.4	46.1	44.5	39.2	33.3	27.6	28.1	30.6	36.8	40.7	41.7	45.0	46.4
Lowest min. °C	8.4	8.6	5.3	1.7	-1.8	-3.0	-3.4	-2.4	-0.6	-1.0	3.4	5.5	-3.4
No. of days 30.0°C and over	24	18	14	5	-	-	-	-	1	6	12	21	100
No. of days 40.0°C and over	3	2	1	-	-	-	-	-	-	-	-	2	8
No. of days 2.0°C and under	-	-	-	-	1	4	8	6	1	-	-	-	20
Rawlinna—													
Mean max. °C	32.9	31.7	29.6	25.5	21.7	18.6	17.9	19.8	23.4	26.3	29.6	31.7	25.7
Mean min. °C	15.3	15.1	14.3	11.3	8.1	5.9	4.4	5.1	7.4	9.8	12.2	14.2	10.3
Highest max. °C	47.9	46.4	44.7	40.0	35.0	31.3	29.7	33.9	39.3	41.7	45.6	45.7	47.9
Lowest min. °C	5.6	5.0	6.1	1.7	-	-2.7	-2.3	-3.2	-0.6	0.7	0.8	5.1	-3.2
No. of days 30.0°C and over	23	17	14	7	1	-	-	-	3	9	14	19	106
No. of days 40.0°C and over	5	3	2	-	-	-	-	-	-	-	1	3	13
No. of days 2.0°C and under	-	-	-	-	1	3	7	4	1	-	-	-	16
Collie—													
Mean max. °C	31.1	30.6	27.7	22.4	19.1	16.5	15.6	16.3	18.0	21.3	24.8	28.9	22.7
Mean min. °C	14.2	14.1	12.3	9.5	7.1	6.2	4.7	4.7	6.1	7.8	10.2	12.6	9.1
Highest max. °C	44.4	43.4	40.8	36.7	30.4	24.4	22.8	26.1	30.3	36.3	38.8	41.7	44.4
Lowest min. °C	3.2	1.8	0.2	-1.3	-2.2	-4.0	-3.9	-3.2	-2.2	-0.6	0.3	1.7	-4.0
No. of days 30.0°C and over	19	15	10	2	-	-	-	-	-	1	5	13	63
No. of days 40.0°C and over	1	-	-	-	-	-	-	-	-	-	-	-	2
No. of days 2.0°C and under	-	-	-	1	3	5	6	8	4	1	-	-	28

DIAGRAM 3.2



**TABLE 3.3 – TEMPERATURE AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — continued**  
(Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
OTHER INLAND (continued)													
Manjimup—													
Mean max. °C	27.0	26.9	24.5	20.7	17.2	15.1	14.2	14.8	16.4	18.6	21.6	24.6	19.9
Mean min. °C	13.0	13.2	12.3	10.4	8.6	7.3	6.3	6.3	7.0	8.2	10.0	11.5	9.2
Highest max. °C	41.7	41.2	38.9	33.6	29.2	22.9	21.7	24.7	28.1	33.3	37.4	38.8	41.7
Lowest min. °C	5.6	4.4	3.3	1.6	-0.6	0.2	-2.8	-1.1	-0.6	0.6	1.7	4.4	-2.8
No. of days 30.0°C and over	10	10	5	-	-	-	-	-	-	-	1	7	33
No. of days 40.0°C and over	-	-	-	-	-	-	-	-	-	-	-	-	-
No. of days 2.0°C and under	-	-	-	-	-	1	-	1	-	-	-	-	2
Pemberton—													
Mean max. °C	26.0	26.1	24.1	20.6	17.6	15.6	14.7	15.1	16.5	18.6	21.1	20.9	23.6
Mean min. °C	13.0	13.5	12.5	10.7	9.1	8.1	7.1	6.8	7.3	8.4	10.1	11.8	9.7
Highest max. °C	41.7	40.1	38.9	33.9	28.3	23.2	22.0	25.6	28.3	30.6	37.0	38.5	41.7
Lowest min. °C	4.4	4.4	3.9	2.7	-	-0.4	-1.4	-1.1	-0.3	0.6	2.1	3.9	-1.4
No. of days 30.0°C and over	8	8	4	1	-	-	-	-	-	1	1	5	29
No. of days 40.0°C and over	-	-	-	-	-	-	-	-	-	-	-	-	-
No. of days 2.0°C and under	-	-	-	-	-	-	1	1	1	-	-	-	3
Mount Baker—													
Mean max. °C	26.2	25.9	24.0	21.0	17.6	15.2	14.2	15.0	16.8	18.7	21.8	24.9	24.3
Mean min. °C	12.6	12.8	12.1	10.4	8.4	6.9	5.8	5.9	6.8	7.9	9.7	12.0	11.3
Highest max. °C	43.9	43.2	40.6	37.2	32.2	23.3	22.2	24.4	28.9	35.6	39.3	40.0	43.9
Lowest min. °C	4.4	5.3	5.1	2.8	1.0	-	-0.6	0.5	0	1.7	3.5	5.0	-1.3
No. of days 30.0°C and over	10	8	5	1	-	-	-	-	-	-	2	6	32
No. of days 40.0°C and over	-	-	-	-	-	-	-	-	-	-	-	-	1
No. of days 2.0°C and under	-	-	-	-	-	-	1	1	-	-	-	-	2

## THUNDERSTORMS

Thunderstorms are frequent in the Kimberley during the 'Wet' season but are practically unknown in the 'Dry'.

In most of the State south from the tropics thunderstorms are most frequent in the summer months but in the south-west they are more uniformly distributed and in many places in coastal districts they are most frequent in winter.

The winter storms are often accompanied by hail which, however, is usually not heavy enough to cause damage. Hail accompanying summer storms can be much heavier, and occasionally damages ripening crops in the wheat belt. Both winter and summer thunderstorms may be accompanied by severe squalls, but these are infrequent.

## EVAPORATION

Except for the lower south-west, evaporation from a free water surface exceeds the annual rainfall, and in a large proportion of the State it is more than ten times greater than the rainfall.

It is least in the winter months, amounting in July to less than fifty millimetres in the far south-west, and to about 225 millimetres in the northern tropics. In January, when evaporation is highest, it totals about 200 millimetres on the far south coast and reaches 500 millimetres in the East Gascoyne and North-Eastern Meteorological Districts. Further north, evaporation is reduced by the moister air over the tropics at this time of the year.

Diagram 3.2 shows the average annual annual evaporation using the Class A pan evaporimeter with bird guard.

## GROWING SEASON RAINFALL

Crop production in the agricultural districts of the south-west of the State is dependent on the winter rains. The bulk of the useful rainfall for this purpose occurs in the six-month period between May and October. Diagram 3.3 shows the median (50 percentile) value of the rainfall in this period and the decile 1 (10 percentile) rainfall, (i.e. the rainfall total which on average is not exceeded in one year in ten) is shown in Diagram 3.4.

DIAGRAM 3.3

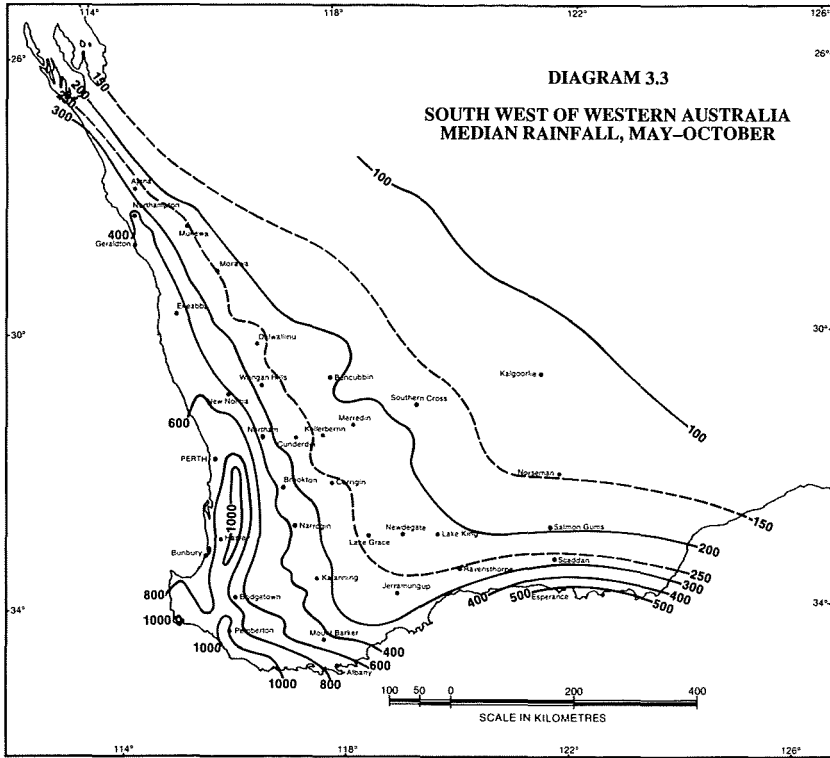
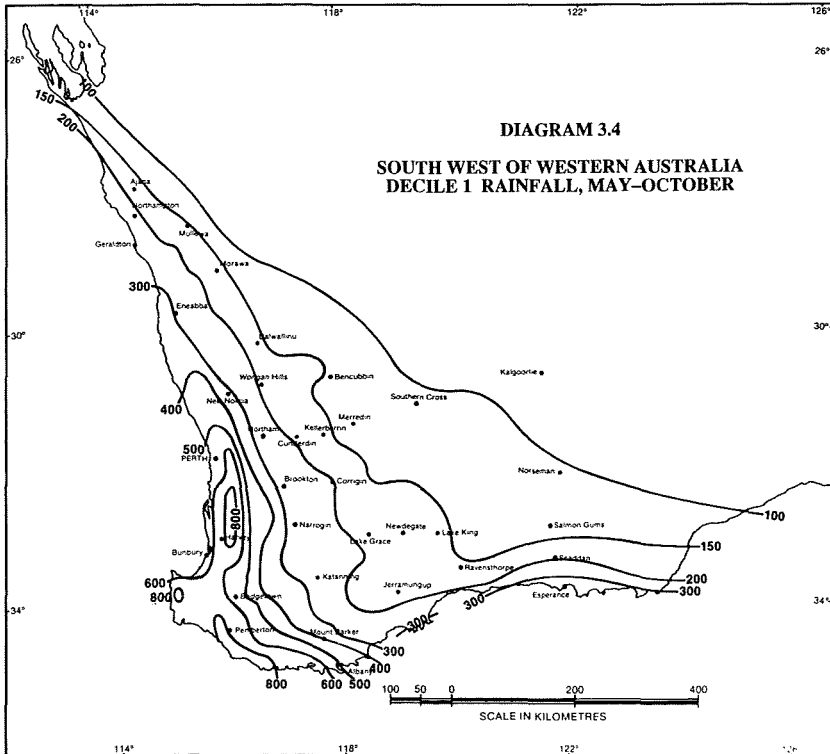


DIAGRAM 3.4



**SNOW**

Snow has been known to fall as far north as Wongan Hills, but it is only in the southern districts that it occasionally lies on the ground. It is seen on top of the Stirling Ranges for a short time nearly every winter, but elsewhere is very infrequent and of negligible importance.

**METROPOLITAN CLIMATE**

Perth has more sunshine and a greater number of clear days during the year than any other State capital city. It also has the wettest winter, the driest summer, and is the windiest of the capital cities. The highest temperature on record for Perth is 44.7°C (12 January 1978) and the lowest 1.2°C (7 July 1916).

**TABLE 3.4 – CLIMATOLOGICAL DATA – PERTH BUREAU OF METEOROLOGY**

Month	Wind				Temperature				Relative humidity (Saturation = 100%)		Sunshine Mean daily amount	Cloud (proportion of sky covered)— Mean of readings at 9 a.m. 3 p.m. and 9 p.m.	Evaporation Mean daily amount
	Prevailing direction		Speed		Highest		Lowest		At 3 p.m.				
	9 a.m.	3 p.m.	Average	High-est	Highest in sun		Lowest terrestrial		Mean	p.m.			
Number of years of observations	30 (a)	30 (a)	63		63		81		30 (a)	30 (a)	30 (a)	13 (b)	
			km/h	km/h	°C	date	°C	date	%	%	hours	%	mm
Jan.	E	SSW	17.5	89	80.7	22/1914	4.2	20/1925	53	43	10.8	29	9.3
Feb.	ENE	SSW	17.2	113	78.7	4/1934	4.3	1/1913	52	43	10.2	31	8.9
Mar.	E	SSW	16.2	113	75.0	19/1918	2.6	(c)	57	46	9.1	35	7.1
Apr.	ENE	SSW	13.7	130	69.4	8/1916	-0.7	26/1960	60	48	7.3	42	4.4
May	NE	WSW	13.5	119	63.3	4/1925	-3.9	31/1964	68	58	6.1	54	3.0
June	N	NW	13.5	128	57.5	9/1914	-3.4	27/1946	72	63	5.0	59	2.3
July	NNE	W	14.2	137	56.2	13/1915	-3.8	30/1920	73	63	5.4	56	2.4
Aug.	N	WNW	15.1	156	62.8	29/1921	-3.0	18/1966	71	60	6.4	56	2.8
Sept.	ENE	SSW	15.1	113	67.5	29/1916	-2.7	(d)	64	57	7.4	4.9	4.0
Oct.	SE	SW	16.1	104	71.8	19/1954	-1.2	16/1931	64	54	8.9	48	5.7
Nov.	E	SW	17.2	102	75.0	30/1925	-1.1	1/1968	57	47	9.9	39	7.1
Dec.	E	SSW	17.7	102	76.0	11/1927	3.3	29/1957	54	46	10.7	32	8.7
Year—													
Average	E	SSW	15.6	..	..	..	..	..	62	52	8.1	44	..
Extremes	..	..	..	156	80.7	22/1/14	-3.9	31/5/64	..	..	..	..	..

(a) Standard 30 year's normal (1911-1940). (b) Class A Pan 1967-1979. Correction of + 7% applied for bird screen. (c) Recorded on 8 March 1903 and 16 March 1967. (d) Recorded on 8 September 1952 and 6 September 1956.

## Chapter 4

### FLORA AND FAUNA

#### The Vegetation of Western Australia<sup>1</sup>

Contributed by T.E.H. Aplin and P.G. Wilson

(Western Australian Herbarium, Department of Conservation and Land Management)

The flora of Western Australia consists of about 8,000 species of flowering plants (angiosperms), 15 cycads and conifers (gymnosperms) and 50 ferns. The families of flowering plants that characterise the flora are also widespread throughout Australia, e.g. Myrtaceae, Proteaceae and Leguminosae. The Styliaceae, Goodeniaceae and Epacridaceae, which are poorly represented outside Australia, are well developed in Western Australia. Large groups of plants that are almost wholly endemic in this State are the *Chloanthaceae*, *Prostantheroideae* (Lamiaceae), *Persoonieae* and *Banksieae* (Proteaceae) and *Epacrideae* (Epacridaceae). At the generic level there are forty-seven monotypic genera, most of which are endemic in the South-West Province, while at the species level 2,472, or 68 per cent of species in the South-West are endemic, although it has been suggested that the degree of endemism may approach 75-80 per cent.

Climatically, Western Australia shows a marked variation from a predominantly summer rainfall pattern in the north to a characteristically Mediterranean-type winter rainfall pattern in the south. Between these two rainfall systems is a large region whose climate is characterised by the extreme variability of the rainfall both annually and seasonally.<sup>2</sup> The vegetation of Western Australia is determined by these varying climatic

patterns, although local changes in geology, soils, topography and drainage may affect the structure and/or the floristic composition of plant communities. The delineation of the present day vegetation also reflects the past tectonic and climatic history of the Australian continent.

It is generally accepted that in the Palaeozoic era the Australian continent was united with the continents of Africa, Antarctica, India and South America in a once common land-mass known as Gondwana. During this period these continents had a common flora as exemplified by the *Glossopteris* elements. In the late Neocomian period (Early Cretaceous), rifting between India (with Africa and South America) and Australia (with Antarctica) was initiated. In Eocene times (Early to Mid Tertiary), sea-floor spreading between Australia and Antarctica commenced and for the first time the southern coasts were warmed by the entering Indian Ocean. The early Tertiary flora of the South-West Province contained several sub-tropical rainforest and mangrove genera in abundance. The Australian continental block was isolated at about the time the pan-Australian flora began to develop, and the northward drift of the continent which brought the Australian block into contact with the Asian block in the middle Miocene period (Late Tertiary) allowed the entry of a different flora, the 'Indo-Malayan' flora.

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1 See Appendix for reference to additional information in earlier issues of the Year Book  
2 See Chapter 3, Climate and Meteorology



The degree of endemism and diversification in the south-western flora, which had its origin in pre-Miocene times, was brought about largely by the isolation caused by the late Eocene and Miocene seas which inundated the Nullarbor Shelf. Another factor that contributed to the diversification of the flora was the lateritisation that occurred in the Tertiary period, with the subsequent dissection of the lateritic landscape causing fragmentation of a once continuous flora.

### FORMATIONS AND ALLIANCES

The classification of vegetation involves the groupings of similar structural units and the grouping or classification of the floristic components present in all strata of plant communities that form part of the vegetation.

### BOTANICAL PROVINCES AND DISTRICTS

The vegetation of Western Australia has been sub-divided into three Botanical Provinces. The areas that these provinces occupy are determined largely by climatic pattern. Within each province are smaller regions, known as Botanical Districts, in which the structure and floristics of the vegetation are determined partly by climate and partly by geology and soils. The boundaries of these provinces and districts are shown in Diagram 4.1.

TABLE 4.1 – PLANT COMMUNITIES – MAJOR STRUCTURAL FORMATION

<i>Life-form and height of tallest stratum</i>	<i>Projective foliage cover of tallest stratum, as per cent</i>	<i>Description</i>
Trees over 30 m	70-100 30-70 10-30 under 10	High closed forest High open forest High woodland High open woodland
Trees 10-30 m	70-100 30-70 10-30 under 10	Closed forest Open forest Woodland Open woodland
Trees under 10 m	70-100 30-70 10-30 under 10	Low closed forest Low open forest Low woodland Low open woodland
Shrubs over 2 m	70-100 30-70 10-30 under 10	Closed scrub Open scrub High shrubland High open shrubland

TABLE 4.1 – PLANT COMMUNITIES – MAJOR STRUCTURAL FORMATION — *continued*

<i>Life-form and height of tallest stratum</i>	<i>Projective foliage cover of tallest stratum, as per cent</i>	<i>Description</i>
Shrubs 1-2 m	70-100 30-70 10-30 under 10	Closed heath Open heath Shrubland Open shrubland
Shrubs under 1 m	70-100 30-70 10-30 under 10	Low closed heath Low open heath Low shrubland Low open shrubland
Herbs	70-100  30-70 10-30	Closed herbland, closed tussock grassland, closed sedgeland, etc. Herbland, tussock grassland, sedgeland, etc. Open herbland, open tussock grassland, open sedgeland, etc
Hummock grasses	10-30 under 10	Hummock grassland Open hummock grassland

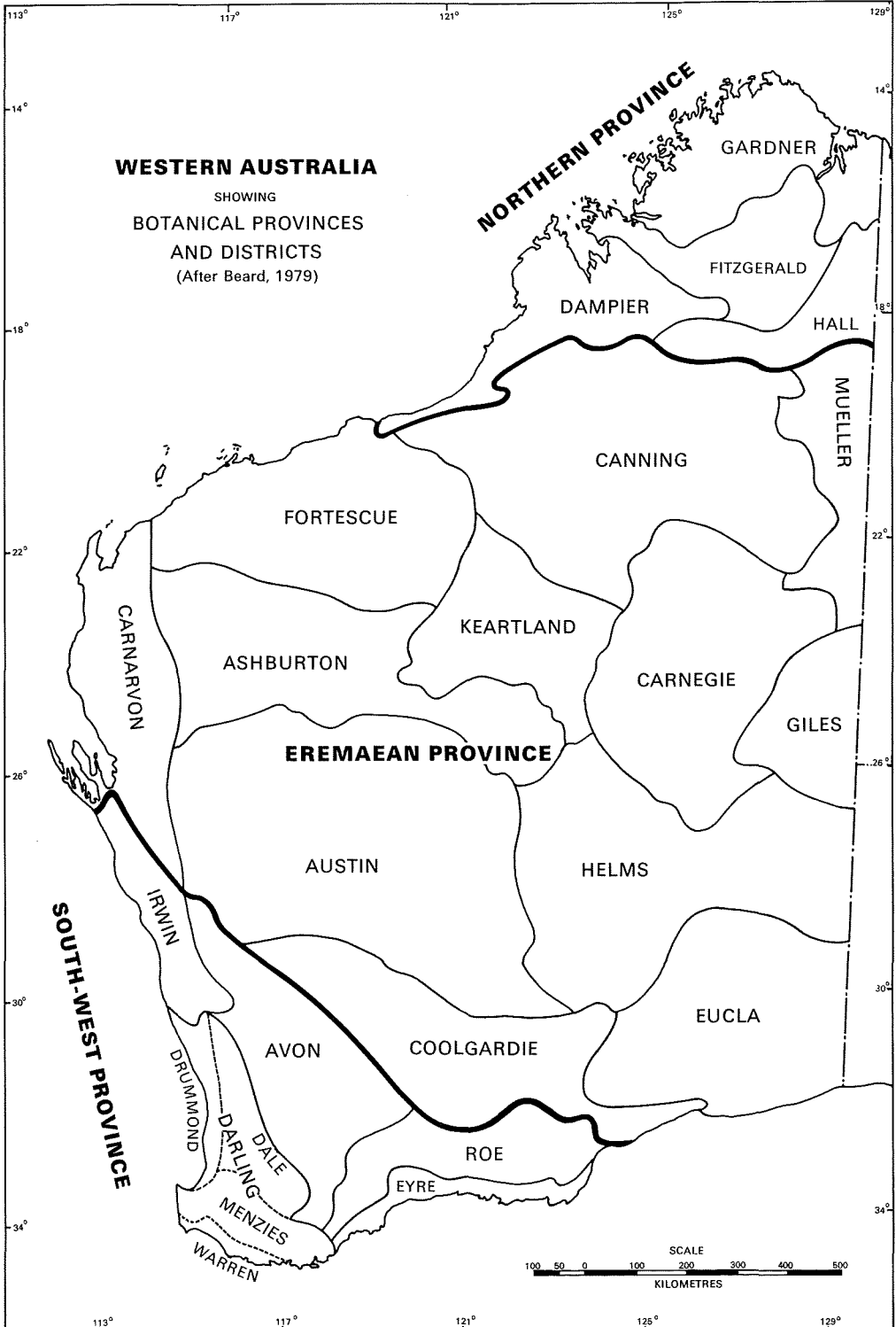
### The Northern Province

The Northern Province, or Tropical Zone, is characterised by a dry monsoonal climate. The rainfall received in the summer months ranges from less than 500 mm to over 1,250 mm per annum. The annual mean maximum temperature is over 30°C. The evaporation rate ranges from 2,000-2,500 mm per annum.

The vegetation formation consists of grassy *Eucalyptus* open forests and woodlands. The major components are 'Australian' elements, with 'Indo-Malayan' elements as minor components. The latter are usually found in special habitats such as streamlines or scarps. Some important 'Indo-Malayan' genera are *Ficus* (Moraceae), *Barringtonia* (Lecythidaceae) and *Terminalia* (Combretaceae).

**The Gardner Botanical District.** The Gardner botanical district, commonly referred to as the Kimberley Plateau, consists of a series of sandstone, shale, quartzite and volcanic rocks. The topography varies from alluvial flats through rolling to hill landscape to very rugged dissected plateau. Saline mud flats are present along estuaries.

DIAGRAM 4.1



On the volcanic rocks and shales, on gently undulating to hilly topography, the woodland and open woodland formations consist mainly of *E. tectifera*-*E. grandifolia* alliance. *E. tectifera* sub-alliance is restricted to the volcanic soils while *E. grandifolia* sub-alliance is developed on the shales and sandstones. *E. latifolia* and *E. papuana* alliances characterise the flats and levee soils.

On the sandstone and quartzite rocks, ranges and hogbacks, the woodland, open woodland and low open woodland formations are mainly made up of *E. tetradonta*-*E. miniata* alliance. In this alliance, *E. tetradonta* sub-alliance is found mainly in the northern high-rainfall region while *E. phoenicea*-*E. ferruginea* (Scarlet Gum-Rusty Bloodwood) sub-alliance is its southern lower-rainfall counterpart.

Other alliances and associations found in the Gardner botanical district are *Terminalia* spp.-*Dichanthium* spp. woodland and grassland communities, on soils of heavy texture; *E. brevifolia*, *E. argillacea* and *Melaleuca viridiflora* associations on podsols, over shales and sandstones; fringing communities of *E. camaldulensis* and *Terminalia* spp.-*Ficus* spp.-*Melaleuca* spp.; and mangrove communities on the estuarine mud flats. Closed mixed forests of 'Indo-Malayan' elements such as *Calophyllum*, *Ficus*, *Carallia*, *Barringtonia*, *Nauclea*, *Randia* and *Myristica* and *Melaleuca leucadendra* (Cadjaput) fringe gullies, while semi-deciduous vine thickets with lianes such as *Aristolochia*, *Capparis*, *Cansjera*, *Adenia* and *Canavalia* occur in small pockets.

**The Hall Botanical District.** In the Hall botanical district, the low open woodlands of *E. pruinosa* association are the low-rainfall counterparts of *E. tectifera* woodlands and occur on soils derived from basic rocks. *E. brevifolia* association is generally seen on skeletal soils on acid rocks, and also on many other soils. Low open woodlands of *Terminalia* spp. alliance occur on cracking clay soils formed on volcanics and limestone. Tussock grasslands with *Astrebla*, *Dichanthium*, *Chrysopogon* and *Panicum* occur on high-level plains of Tertiary alluvia. The rugged hilly country of the Halls Creek ridges carries *E. brevifolia* and *E. pruinosa* low open woodland associations over *Triodia intermedia*. The gently undulating plains with calcareous soils carry arid short grass communities of *Enneapogon* (Bottle Washers), *Aristida* and *Sporobolus*.

**The Fitzgerald Botanical District.** The Fitzgerald botanical district consists essentially of mountain ranges, plateaus and steep-sided valleys. The ranges and plateaus are made up of quartzite and shale-sandstone with lateritic remnants, lightly covered with a thin soil mantle. The vegetation comprises mainly low open woodland of *E. brevifolia*, *E. dichromophloia* and *E. phoenicea*-*E. ferruginea* communities, with a patchy shrub layer and *Plectrachne pungens* as the main ground component.

**The Dampier Botanical District.** The Dampier botanical district is a region in which a great thickness of gently folded sedimentary rock, of Palaeozoic and Mesozoic age, overlies a Precambrian basement of crystalline rock. The basement outcrops along the north and east of the basin.

The upland regions consist of low hills and stony plains with granite domes, gneiss, hills, schist ridges and gently sloping sandy plateaus. The vegetation formations consist of low open woodland formations of Eucalyptus species with a hummock grassland ground layer. The main alliance of *E. brevifolia* is represented by a number of associations. One noteworthy association is *Grevillea pyramidalis*. The hummock grassland layer consists of the genera *Triodia* and *Plectrachne* in almost pure stands of species. A short grass ground storey with *Enneapogon* and *Aristida* may be seen on the interfluves and hillfoot slopes to the south-east. The drainage floors usually carry low open woodland formations of *E. dichromophloia* and *E. tectifera* alliances. The grass layer includes the genera *Chrysopogon*, *Sehima*, *Sorghum* and *Dichanthium*.

The Dampier botanical district contains extensive areas of sandy plains which lack surface drainage. The dominant layer in the vegetation is composed of *Acacia*, the more important species being *A. tumida*, *A. eriopoda*, *A. pachycarpa*, *A. holosericea* and *A. monticola*. *E. dichromophloia* and *E. zygophylla* make up the tallest stratum of the low woodland formation containing these *Acacia* species. Other tree genera include *Gyrocarpus*, *Atalaya*, *Hakea*, *Grevillea*, *Lysiphillum*, *Persoonia* and *Erythrophleum*, with the occasional *Adansonia*. In the high rainfall area, a woodland formation of *E. miniata* alliance is present. This alliance also has a strong layer of *Acacia* shrubs. In this district *E. tetradonta* is not associated with *E. miniata* as it is in the Gardner botanical district.

### The Eremaean Province

The Eremaean Province, which lies between the predominantly summer and predominantly winter rainfall patterns of the north and the south-west, respectively, is intermediate in character. The rainfall, which over most of the province is less than 400 mm per annum, is received either from extensions of summer rainfall southward or from northern extensions of the southern winter systems. The vegetation of the province varies from woodland, high shrubland, low shrubland to hummock grassland. Eleven botanical districts have been broadly recognised, seven of them in the desert area.

**The Fortescue Botanical District.** The Fortescue botanical district, usually placed in the Northern Province, consists of the Pilbara block. The vegetation of the narrow coastal strip carries grasslands of *Eragrostis* and *Eriachne* and low open shrublands of *Acacia translucens*-*A. inaequilatera* alliance. *Acacia pyrifolia* high open shrubland alliance is present on granite and basalt soils. High shrubland and low woodland *A. aneura* alliance is found along the major valleys and southern flanks of the Hamersley Range. On the Proterozoic rocks of the Hamersley Range the characteristic vegetation is a low open woodland formation, with *E. leucophloia* alliance. Hummock grassland ground layer found on stony soils consists mainly of *Triodia wiseana* and *T. basedowii*. Low woodland formations of *E. dichromophloia*-*E. setosa*, with *Triodia basedowii* as ground cover, occur on the sand plains.

**The Ashburton and Austin Botanical Districts.** The Ashburton and the Austin botanical districts are separated by rainfall patterns. The former, with its rainfall more likely to occur in summer, and the latter, with its rainfall more likely to occur in winter, both carry extensive low woodland and high shrubland formations of *A. aneura* alliance but, whereas the northern alliance is associated more with grass genera such as *Aristida*, *Eragrostis*, *Eriachne*, *Panicum*, *Brachiaria*, *Triodia* and *Setaria*, the southern alliance is associated more with genera such as *Danthonia*, *Eremophila*, *Maireana*, *Helipterum*, *Cephalopterum*, *Velleia*, *Swainsona* and other herbaceous annuals. *A. aneura* alliance consists of a number of sub-alliances and associations. *Maireana pyramidata* is associated with *A. aneura* on saline alluvial plains. Other woody genera that are prominent in the *A. aneura* alliance are *Hakea*, *Grevillea*, *Atriplex*, *Frankenia*, *Plagianthus*, *Alectryon* and *Brachychiton*.

**The Carnarvon Botanical District.** The Carnarvon botanical district, a sedimentary basin in which the exposed surface rocks range from Permian to Recent in age, is mostly low-lying. The vegetation on the northern plains consists of *Acacia xiphophylla* high open shrubland with *Triodia basedowii* as ground cover. On the sand plains the vegetation is predominantly *Acacia pyrifolia* open shrubland, with scattered *Owenia reticulata*, and with *Triodia pungens* and *Plectrachne schinzii* as ground cover. On Cape Range *E. dichromophloia* low open woodland, with *Triodia pungens* and *T. wiseana*, is to be seen.

*Acacia* species such as *A. coriacea*, *A. ramulosa*, *A. sclerosperma*, *A. xiphophylla*, *A. tetragonophylla*, *A. grasbyi* and *A. ligulata* form high open shrubland or low open woodland communities with shrub species of other genera over a wide area of this botanical district. On alluvial flats the low shrub understorey layer consists of species of *Maireana* and *Atriplex*. *Halosarcia* low open shrubland occupies the wetter sites. On Kennedy Range a mixed open shrubland with *Triodia basedowii* and *T. pungens* as ground cover is present.

The Canning, Mueller, Kearland, Carnegie, Giles and Helms botanical districts make up the desert region of Western Australia.

**The Canning and Mueller Botanical Districts.** The Canning and Mueller districts contain extensive areas of high shrubland with several species of *Acacia* dominating. On the sandy plains the dominant species is *A. pachycarpa* with *Triodia pungens* as ground cover. Scattered trees of *Eucalyptus* sp. (Desert Bloodwood) are present on the dunes. *Owenia reticulata* (Desert Walnut) is the principal low tree species in the north-western sector. *E. pachyphylla* and *E. odontocarpa* are prominent in the north-eastern sector, while woodlands of *Allocasuarina decaisneana* are also of local importance there, in the interdunes.

**The Keartland Botanical District.** The Keartland district has a noticeable abundance of *Thryptomene maisonneuvei* and other Myrtaceae in the high shrubland formation. The Desert Bloodwood is present on the dunes, together with *Plectrachne schinzii*. *A. aneura* is of local importance, on small hills and mesas, with *Triodia pungens*. Hills of igneous rocks are covered with *Plectrachne melvillei*.

**The Carnegie Botanical District.** The Carnegie district carries extensive areas of *A. aneura*, with *Danthonia* and seasonal ephemerals. On the rises of the lateritic plains hummock grasslands of *Triodia basedowii* and high shrublands with *E. kingsmillii* merge in with the *A. aneura* which tend to thin out. Desert Bloodwood, *Allocasuarina decaisneana*, and *E. coolabah* become more local in distribution, while *Plectrachne schinzii* is increasingly replaced by *Thryptomene maisonneuvei* southwards.

**The Giles Botanical District.** The Giles district consists of ranges with sandhill country between them, somewhat similar to the Carnegie district. *Allocasuarina decaisneana* groves are very common in sandhill country between the ranges. *Triodia basedowii* and *Plectrachne schinzii* provide ground cover. On the ranges the high shrubland is made up predominantly of *Acacia* spp. including *A. aneura*, with *Eremophila*, *Hakea*, *Grevillea* and *Eucalyptus* as co-dominants in some areas. *Callitris columellaris* is locally dominant. *Triodia basedowii* and *Plectrachne melvillei* form the hummock grassland ground layer.

**The Helms Botanical District.** The Helms district contains extensive areas of *A. aneura* alliance. A high shrubland formation characterised by *E. youngiana* alliance is also well developed. Associated with the shrubland community are other tall shrubs such as *Hakea*, *Acacia*, *Melaleuca*, *Grevillea* and other *Eucalyptus* species. Patches of open woodland of *E. gongylocarpa* are restricted apparently to areas where the sand is deeper. The hummock grass associated with *E. youngiana* and *E. gongylocarpa* is *Triodia basedowii*.

**The Eucla Botanical District.** The Eucla botanical district, commonly referred to as the Nullarbor Plain, is dominated by a low shrubland formation of *Maireana sedifolia*. *Atriplex*, *Stipa* and seasonal ephemerals are well represented. Towards the margin a low open woodland of *Acacia sowdenii* alliance, with a shrubland understorey of *Maireana* and *Atriplex*, becomes more and more evident. To the north this is replaced by a low woodland made up of *Acacia aneura*, *Casuarina cristata* and *Myoporum platycarpum*. Along the coastal strip low woodlands of *E. socialis*, *E. gracilis* and *A. sowdenii* alliances are to be seen on the ridges and flats, respectively. *E. transcontinentalis*-*E. flocktoniae* woodland alliance, found in the extreme south-western portion, forms a continuum

with a similar formation in the Coolgardie botanical district.

**The Coolgardie Botanical District.** The Coolgardie botanical district marks the transition from the South-West Province to the Eremaean Province, from the Eucalyptus zone to the *Acacia* zone. In this district a high degree of variability occurs within *Eucalyptus* and *Acacia*. It is thought that this variability may have been due to climatic oscillations known to have occurred since the Pleistocene period, thus making many of the 'species' of recent origin. The vegetation is a mosaic of woodland and shrubland formations. Woodland formations include *E. salmonophloia*, *E. transcontinentalis*-*E. flocktoniae*, *E. torquata*-*E. lesouefii*, *E. dundasii*-*E. longicornis*, *E. brockwayi* and *Acacia aneura* alliances. Shrubland formations include *Grevillea eriostachya*-*G. didymobotrya*-*G. excelsior*, *Eucalyptus foecunda*, *E. eremophila* and other mallee or shrub eucalypts, *Acacia* spp.-*Casuarina* spp.-*Melaleuca* spp. and *Acacia aneura* alliances.

### The South-West Province

The South-West Province, which receives its rainfall in winter and has a warm to cool temperate climate, has a high degree of endemism in its flora. The degree of endemism is most powerfully expressed in the cusps of its triangular-crescentic area particularly in the high shrubland and heath formations found to the north of the Hill River and to the east of the Fitzgerald River. The shrubland and heath formations in the South-West Province, apart from certain communities dominated by *Eucalyptus* and *Acacia*, are known as Kwongan. Large areas of this province have been altered greatly by man and contain a high proportion of the naturalised alien species recorded in the State.

**The Darling Botanical District.** The Darling botanical district consists of four subdistricts. The *Warren* subdistrict, which occupies the extreme south-western corner of Western Australia, has an annual rainfall in excess of 1,200 mm. The main vegetation formations are the high open forest, on granite soils represented by *E. diversicolor* alliance; open forest on lateritic soils represented by *E. marginata*-*E. calophylla* alliance; low forest and scrub of *Agonis flexuosa* on extensive coastal dunes; also on sand dunes, heaths, with *Jacksonia horrida*-*Acacia decipiens*; and sedgeland of *Evandra aristata*-*Anarthria* spp. in waterlogged areas.

The *Menzies* subdistrict marks the transition from the *Warren* subdistrict to the *Dale* subdistrict.

In the *Drummond* subdistrict the narrow strip of Recent or Pleistocene sand dunes carry scrub or low forests of *Agonis flexuosa* alliance at the southern edge, with *Acacia rostelifera*. *A.cyclops*-*A. cochlearis* alliance and sand dune complex over most of its length. Inland and parallel to the coastal dune system is a narrow belt of coastal limestone hills, the natural habitat of *E. gomphocephala* woodland alliance. The greater part of the Perth basin is mantled with aeolian sands. The northern sector carries a low forest formation of *Banksia menziesii*-*B. attenuata*-*Allocasuarina fraseriana*-*E. todtiana* alliance, with a heath understorey, and smaller areas of *B. prionotes* alliance; the southern part is dominated by a *E. marginata*-*E. calophylla* open forest or woodland alliance, with a heath understorey, and smaller areas of *Banksia* low forest. Poorly drained swampy areas carry *Casuarina obesa* low forest alliance. Swamp and fen formations are made up of complex communities of sedgeland. Watercourses in the district are fringed by a *E. rudis*-*Melaleuca* spp. alliance.

The *Dale* subdistrict occupies the laterite capped plateau dissected by young streams to form steep-sided valleys. An open forest formation of *E. marginata*-*E. calophylla* alliance characterises the lateritic erosional and deep depositional surfaces, with *E. wandoo* alliance restricted to the heavier pediment soils.

**The Irwin Botanical District.** The Irwin botanical district, for the most part, overlies sedimentary rocks from Silurian to Quaternary age, with smaller areas of Precambrian metamorphics. At the northern extremity, the Irwin district consists of red and yellow sands underlain by Mesozoic sediments. High shrubland formations are made up of mixed high shrubland with a heath understorey, with mainly Proteaceous and Myrtaceous elements, *Acacia* spp.-*Allocasuarina acutivalvis* and *Melaleuca* spp. and *Hakea* spp. scrub alliances. Low woodlands of *Banksia menziesii*-*B. attenuata*, *B. ashbyi*-*B. sceptrum*, *B. prionotes* and *Actino-strobos arenarius* occur on deep sands. Heath and low heath formations of Proteaceae, Myrtaceae, and Leguminosae occur in areas where the sand is shallow or where a lateritic crust is present.

The vegetation of the coastal dune system is an extension of the Darling district. The limestone hills in the Irwin district carry low woodlands of

*E. erythrocorys*. Poorly drained areas and small lakes carry or are fringed by *Casuarina obesa* and *E. rudis*-*Melaleuca* spp. alliances.

The central to southern portions of the Irwin district are characterised by the so-called 'sand plains'. These carry low woodlands of *Banksia menziesii*-*B. attenuata*-*E. todtiana* and *B. prionotes* alliances particularly on the deeper sands. *E. lane-polei* (Salmonbark Wandoo) and *E. accedens* (Powderbark Wandoo) are of local significance, on heavy clay soils. In areas of deep dissection, the valleys carry woodlands of *E. wandoo* and *E. calophylla* alliances. Heath and low heath formations cover most of the elevated regions. Proteaceae, Myrtaceae and Leguminosae are dominant components, while on laterite hills *Xanthorrhoea reflexa* and *Dryandra* spp. become very conspicuous. High shrubland communities with *Grevillea eriostachya*-*G. didymobotrya*-*G. eriostachya*, *Lambertia multiflora* (Native Honeysuckle) and *Actinostrobos arenarius* alliances are also significant in the sandplain region.

**The Avon Botanical District.** The Avon botanical district, which covers most of the so-called wheat belt, is now for the most part cleared of native vegetation for farming.

On the eastern edge of the Darling district, on the low hilly to hilly terrain, with hard acidic yellow mottled soils, the pediments of early erosional cycles, the woodland formation consists of *E. wandoo* alliance. *E. marginata*-*E. calophylla* alliance occurs on soils which tend more to ironstone gravels with a sandy matrix. *E. wandoo* alliance is associated with *E. accedens*, and with *E. astringens* which commonly occur on lateritic breakaways. In the southern portion *E. gardneri* (Blue Mallet) and *E. falcata* (Silver Mallet) are more commonly seen on the breakaways, while *E. cornuta* woodland alliance replaces the *E. wandoo* woodland alliance. *E. wandoo* woodland has a very open low shrub layer.

On the hard neutral red soils of the river valley systems, which represent further erosional cycles, the woodland formation is represented by the *E. loxophleba* alliance, with *Acacia acuminata* as its main associate. *A. acuminata* tends to merge with the *E. wandoo* alliance, particularly as the soils become sandy or gritty. In the southern portion *E. occidentalis* alliance replaces the *E. loxophleba* alliance. *E. occidentalis* woodlands occur also on the clay soils of swamps or seasonal shallow lakes.

Extensive areas of *E. salmonophloia* woodland alliance are found in the hard alkaline yellow soils further to the east, on valley plains and terraces. *E. salmonophloia* woodland has an open mixed low shrub understorey with *Maireana* and *Atriplex* dominating in more saline soils. Other trees associated with this alliance are *E. salubris* (Gimlet), *E. longicornis* (Red Morrel) and *E. melanoxylon* (Black Morrel).

Salt lakes, remnants of once extensive river systems, carry *Casuarina obesa* and *Melaleuca* spp. low woodland alliances on the fringes with low shrubland formations of *Halosarcia* spp. alliance in the old watercourse. *E. sargentii* (Salt River Gum) and *E. kondininensis* (Kondinin Blackbutt) grow on saline soils.

**The Eyre Botanical District.** The Eyre botanical district lies at the edge of the Archaean Shield where it abuts into the Proterozoic metamorphics of the Albany-Esperance block. The latter consists largely of sediments of middle and late Eocene age, at one time mantled by a lateritic crust, which is represented in the present landscape by narrow ironstone gravel ridges and erosional scarps along the northern edge.

The Stirling and Mount Barren Ranges which rise abruptly out of an otherwise predominantly undulating landscape are composed of hard Proterozoic metasedimentary rocks. The ranges carry Kwongan of closed heath and scrub formations of mixed Myrtaceae, Proteaceae, Leguminosae and Epacridaceae alliance. Woodlands of *E. marginata*-*E. calophylla*, *E. wandoo* and *E. cornuta* occur on the lower slopes and valleys of the Stirling Range.

Over a large area of the Eyre district, the vegetation is made up of Kwongan of high shrubland formations with shrub or mallee eucalypts dominating. *E. tetragona*, *E. redunca*-*E. uncinata*, *E. gardneri*-*E. nutans* and *E. eremophila*-*E. oleosa* alliances form a mosaic over the area, the former on the undulating upper slopes and rises nearer the coast. Patches of mixed heath and low heath of Proteaceae, Myrtaceae and Leguminosae are present. The heath vegetation merges into and forms the understorey of the high shrubland communities. To the east *E. tetragona* alliance gives way to *E. tetragona*, while on the sandy soils *Banksia speciosa*-*lambertia inermis* and *Nuytsia floribunda* become dominant.

Woodland formations of *E. occidentalis*, *E. loxophleba* and *E. salmonophloia* alliances occur along drainage lines and loamy slopes and flats.

Low forests of *E. platypus*-*E. gardneri*-*E. falcata* alliance occur locally on scarp slopes.

The littoral fringe of the coastal plain is made up of a chain of granite bosses with drift sand between them. *Acacia rostellifera*-*A. cyclops*-*A. cochlearis* and *Agonis flexuosa* scrub alliances are present with the sand dune and granite lithic complexes. *Banksia baxteri* and *B. attenuata*, as well as *Lambertia inermis* (Chittick), are dominant on the drift sand, inland, with *E. marginata* and *E. cornuta*, the former found to the west, the latter restricted to interdunal flats.

**The Roe Botanical District.** The Roe botanical district contains a number of plant communities found in the adjacent Eyre, Avon and Coolgardie districts. On residual sandplains there are extensive areas of mixed heath.

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## The Fauna of Western Australia

(Contributed by the Western Australian Museum)

### EXTINCT FAUNAS<sup>3</sup>

Earth's oldest recorded organic remains occur in Western Australia. Stromatolites discovered near Marble Bar are about 3,500 million years old. They are dome-shaped structures in which sediment has been trapped by single-celled Cyanobacteria. Stromatolites have been found throughout sediments of Precambrian age; living survivors also occur in Western Australia, the best known being in Shark Bay.

Invertebrate marine life in the Cambrian (570-500 million years ago) is revealed in rocks in the Ord River district, crowded with trilobites (*Redlichia*, *Xystridura*), brachiopods (*Wimanella*, *Billingsella*) and *Biconulites*.

The Ordovician (500-400 million years) saw a substantial thickness of marine deposition in the West Kimberley, with abundant fossil nautiloids (e.g. *Kyminoceras*) and other molluscs, graptolites, trilobites and brachiopods (*Spanodonta*).

The Silurian (440-395 million years) seems to have passed with little sedimentation in Western Australia. In the lower Murchison district however, sandy deltaic deposit formed around the mouth of an extensive river system. This sandstone, now incised by the gorge of the Murchison River, has preserved tracks of a range of marine animals including those of large, scorpion-like predators known as eurypterids.

Seas of the Devonian (408-360 million years ago) abounded in early forms of fish. Limestones of this age in the West Kimberley have yielded exquisitely preserved fossils, including more than 34 species of primitive armoured fishes (placoderms), sea-living lungfish (dipnoans), rhipidistians and actinopterygions. Many of these show such fine anatomical details preserved that they have formed the basis for extensive revision of the classification and phylogeny of early vertebrates. Extensive shallow-water Devonian limestone reefs around the south-western part of the central Kimberley Block contain abundant marine faunas, including stromatoporoids (*Amphipora*, *Actinostroma*), corals, (*Hexagonaria*,

*Thamnopora*), brachiopods (*Stringocephalus*, *Ladjia*, *Schuchertella*), nautiloids (*Beloceras*), goniatites (*Manticoceras*, *Platyclymeria*), other molluscs, bryozoans and trilobites. The oldest known vascular plants from Western Australia occur only rarely in Devonian sediments of the East Kimberley (the lycopod *Leptophloeum*) and of the Carnarvon area (a lepidodendroid).

The Carboniferous (345-280 million years) saw deposition confined to parts of the East and West Kimberley and Carnarvon areas. The marine formations contain rich invertebrate faunas, including corals (*Syringopora*), brachiopods (*Camarotoechia*, *Cleiothyridina*, *Unispirifer*), trilobites, molluscs and bryozoans, and fishes.

Permian deposits (280-225 million years) cover extensive areas in Western Australia. Principal occurrences are in the West Kimberley, Carnarvon and Irwin River districts. Marine sediments contain diverse invertebrate faunas, including crinoids (*Calceolispongia*, *Jimbacrinus*), brachiopods (*Neospirifera*, *Linoproductus*, *Aulosteges*, *Strophalosia*), goniatites (*Juresanites*), bivalves (*Deltopecten*, *Schizodus*), gastropods (*Ptychomphalina*, *Bellerophon*), corals (*Pleurophyllum*, *Euriphyllum*) and the rare trilobite *Ditomopyge*. A shark, *Helicoprion*, is known from the Carnarvon district. Permian coal measures occur in the Collie and Irwin districts and contain a flora which includes *Glossopteris*, *Gangamopteris* and *Noeggerathiopsis*.

Rocks of the Triassic (225-194 million years) are exposed only in a few small areas of the State. A marine deposit in the Erskine Range, West Kimberley, contains large amphibians (*Deltasaurus*, *Blinasaurus*), fish including a dipnoan (*Ceratodus*) and invertebrates (*Lingula*). A similar deposit in the Geraldton district has yielded remains of *Deltasaurus*, ammonites (*Ophiceras*) and other invertebrates, including molluscs and brachiopods. Terrestrial deposits in the West Kimberley contain remains of the 'Seed Fern' *Dicroidium*, the bennettitalean *Otozomites* and other plants.

3 Contributed by K.J. McNamara and G.W. Kendrick.

Jurassic (194-135 million years) marine sediments in the Geraldton area contain a rich, well-preserved mollusc fauna, notably bivalves (*Trigonia*, *Cucullaea*, *Oxytoma*, *Astarte*), and ammonites (*Fontannesia*, *Otoites*, *Pseudotoites*), a large nautiloid, brachiopods and rare echinoids. Slightly younger marine faunas in the West Kimberley contain the bivalves *Inoceramus*, *Buchia* and *Malayomaorica*, the ammonite *Kossmatia* and belemnites.

Australian Jurassic land vegetation included elements with extensive global distributions. Plants of this period recorded from the West Kimberley, include the Bennettites *Taeniopteris*, *Otozamites* and *Ptilophyllum*, the conifers *Brachyphyllum* and *Elatocladus* and *Ginkgoites*, related to the living Ginkgo.

Widespread deepwater radiolarites of the Cretaceous Period (135-65 million years) in the Carnarvon hinterland contain the large ammonites *Tropaeum*, *Australiceras* and numerous belemnites. Chalk occurs sporadically from near Exmouth Gulf southwards to near Perth and contains rich faunas of bivalves (*Inoceramus*, oysters etc.), brachiopods (*Inopinatarcula*, *Magadina*), crinoids (*Marsupites*, *Uintacrinus*) and occasional pachydiscoid ammonites. Greensands in the Gingin-Dandaragan district have yielded ichthyosaur, plesiosaur and mosasaur remains, as well as shark teeth. A Late Cretaceous deposit near Exmouth Gulf is notable for its prolific ammonite fauna which lived close to the time of extinction of this group of cephalopod molluscs. Western Australia's only known dinosaur, a theropod, *Megalosauropus broomensis*, is known only from footprints preserved in Lower Cretaceous sandstone at Broome. Land vegetation (including *Cladophlebis*, *Otozamites*) associated with this and other Lower Cretaceous deposits show affinities with archaic Jurassic forms.

The onset of the Tertiary (65-1.6 million years) brought major changes to marine faunas, with the decline and disappearance of a number of long-standing Cretaceous groups and their gradual replacement by more modern forms. Marine limestones and greensands of Paleocene (65-54 million years) age form an extensive surface outcrop in the Exmouth district and are notable for well-preserved faunas of echinoids (*Giraliaster*, *Schizaster*), brachiopods (*Tegulorhynchia*) and bryozoans; the nautiloids *Aturoidea*, *Deltoidonautilus* and *Teichertia* are also represented.

Eocene (55-40 million years) marine deposits in the Carnarvon hinterland contain well-preserved faunas, notably corals and molluscs including the nautiloid *Aturia*. Plant remains include familiar modern genera, such as *Banksia*, *Casuarina* and forms related to *Araucaria*. *Banksia* cones from this area provide the earliest unequivocal record for the genus in Australia. Eocene deposits along the south coast contain a great diversity of fossil remains, both marine and non-marine. Marine groups present include many species of sponges, echinoids and molluscs, including the nautiloids *Aturia*, *Cimomia* and *Teichertia*. Rich assemblages of fossil leaves, wood, pollen, spores and occasional fruiting bodies are known from Eocene and other early Tertiary deposits in southern Western Australia. Most of this diverse flora remains to be identified; however, the presence of tree ferns and other ferns such as *Gleichenia*, the conifers *Araucaria*, *Agathis* and *Dacrydium*, palms such as *Livistona*, the Antarctic Beech, *Nothofagus*, mangroves including rhizophoraceans and genera of humid-tropical affinity, such as *Ficus*, *Terminalia*, *Bombax* and *Anacolosa* indicate vegetation consistent with a humid temperate rainforest environment.

In the Miocene Epoch (23-5 million years), extensive deposits of marine limestone were laid down in the Carnarvon and Nullarbor districts. These contain rich fossil assemblages, notably molluscs and echinoids. Affinities of the northern fauna lie strongly with the tropical Indo-Pacific; those of the Nullarbor area lie mainly with south-eastern Australia. Towards the end of the period, a marked intensification of global cooling was observed, accompanied by a substantial fall in sea level and in Australia, a shift toward continental aridity.

Sea levels appear to have remained lower than at present around Western Australia during most of Pliocene time (5.0-1.6 million years). Faunal remains from this period are known from deposits on the Roe Plains of the southern Nullarbor and from the subsurface near Perth. The coastline near Perth lay close to the foot of the Darling scarp, the Swan Coastal Plain being, for a time, wholly submerged.

During Quaternary time (the last 1.6 million years) many caves formed and have preserved the fossil remains of a vertebrate fauna of much greater diversity than that recorded today. Included are species of kangaroo (*Macropus*) larger than any living kangaroo, as well as other large macropods including *Sthenurus* and *Protemnodon*; the large diprotodontid *Zygomaturus*; the 'marsupial lion',

*Thylacoleo*; a koala, *Phascolarctos*, a wombat *Vombatus*; a large echidna, *Zaglossus*; a giant flightless bird of the family Dromornithidae and a large boid snake, *Wonambi*. When these elements became extinct is unknown, but it appears to have been more than 40,000 years ago. The Thylacine (*Thylacinus*) and Tasmanian Devil (*Sarcophilus*) became totally extinct within Western Australia more recently, the Thylacine disappearing about 3,500 years ago. The Dingo appeared first in relatively recent times no more than 4,000 years ago, co-existing only for a brief period with its marsupial counterpart, the Thylacine.

## CONTEMPORARY FAUNAS

### Origins and Distributions<sup>4</sup>

**Terrestrial.** The origins of the Australian fauna can be explained by the breakup of the southern hemisphere supercontinent, Gondwana, in the Cretaceous and the northward drift of Australia during the Tertiary to close the 4,000 kilometre gap with South-East Asia. Consequently the contemporary fauna comprises an ancient Gondwanic element with affinities with faunas of the other southern continents, and a more recent post-Gondwanic northern continental element. Representatives of the latter have reached Australia at different times by flying or rafting across water barriers of varying width. Among the earliest to arrive were successful rafters, such as lizards and rodents and good flyers such as certain birds and bats. Others (including humans) less able to cross the barriers arrived later by 'island-hopping' via the unstable arc of islands linking South-East Asia at times when sea levels were lower and water barriers narrower. There are thought to have been two main routes of invasion to Australia as a whole: from the Malaysian Archipelago (or Philippines) via Celebes to New Guinea and Cape York Peninsula, and via the Sunda Arc to the Kimberley and Arnhemland.

The present distribution of the modern Western Australian fauna reflects not only past geological and climatic events, particularly those of the Quaternary, but also short term climatic oscillations. The broad distribution patterns of most living terrestrial animals can generally be related to today's major climatic zones which give rise to three major faunal divisions: a northern tropical fauna adapted to conditions of reliable monsoonal summer rain and dry winters

characteristic of the Kimberley; a temperate fauna adapted to Mediterranean-type conditions with reliable winter rainfall and dry summers characteristic of the south-west and, between them, a fauna adapted to arid conditions with irregular and variable rainfall that prevail over the remainder of the State. These broad faunal divisions do not necessarily reflect origins and both Gondwanic and post-Gondwanic elements may be present in each. However, particularly in some of the more mobile groups, such as birds and bats, the Kimberley has stronger South-East Asian representation than the others. Additionally, a number of interesting Gondwanic relics are now confined to the south-west, e.g. certain genera of legless lizards (*Pygopodidae*), an onychophoran (*Occiperipatoides*) and the Salamander Fish (*Lepidogalaxias*).

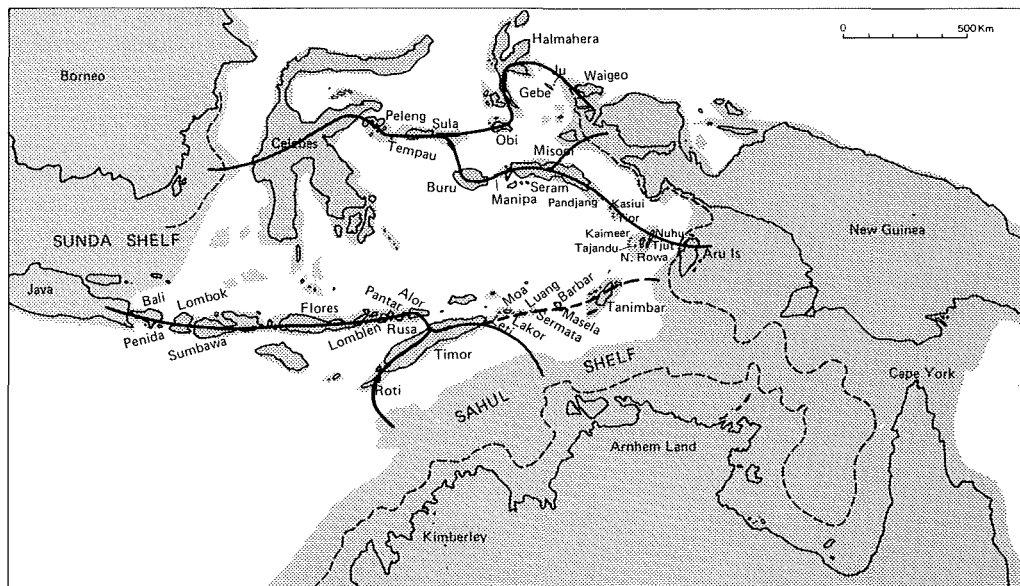
Elevation has little influence on broad faunal distributions as Western Australia is generally of low relief, averaging only about 400 m above sea level with a maximum of 1,200 m.

The distribution of some terrestrial species, particularly medium-sized marsupials, has been substantially modified by recent direct and indirect influence of European man (e.g. land clearing and introduction of alien animals), usually resulting in marked contraction of former distributional ranges, but a few distributions, such as that of the Crested Pigeon, have expanded. Near-shore islands, cut off by rising sea levels, such as Barrow, Bernier, the Houtman Abrolhos and the Archipelago of the Recherche, are important refuges for a number of terrestrial animals that have recently disappeared from the mainland or have contracting distributions. On some islands, forms have evolved that are distinct from their mainland counterparts.

**Inland Waters.** The inland waters of Western Australia may be divided into rivers and inland drainage systems. The flow regimes of the rivers reflect the climatic zones of the State. Rivers of the northern zone flow during the summer wet season. During the winter dry season flow is dependant on groundwater and may cease altogether, leaving only pools.

The fauna is rich and diverse, examples being the freshwater crocodile *Crocodylus johnstoni*, large freshwater prawns or Cherrabun (*Macrobrachium*) and archer fishes (*Taxotidae*). Rivers of the arid

DIAGRAM 4.2  
FAUNAL MIGRATION ROUTES TO AUSTRALIA



Exposed land areas at the lowest sea-level of approximately minus 120 m (stippled) and at the average sea level over the last 120,000 years of minus 50 m (dotted line). Postulated faunal migration routes are shown as solid lines (redrawn from Birdsell, 1977).

zone from the De Grey to the Murchison are subject to periodic flooding usually associated with cyclones, but become reduced to isolated pools during drought. The faunal assemblages of the larger rivers are impoverished in comparison with the rich assemblages of the Kimberley and some species represent outliers of these. Flow of most permanent rivers and streams of the south-western winter rainfall zone slows down substantially in summer and some are reduced to chains of pools. Increased salinity caused by agricultural clearing and building of dams is rapidly altering much of the riverine ecosystem in this zone. The fauna of the south-western rivers and streams is of particular interest for its Gondwanic element, examples of which are native minnows (*Galaxiidae*), freshwater crayfish (*Parastacidae*) and a freshwater mussel (*Westralunio*).

The inland drainage systems can be divided into fresh-water 'gnamma-holes' usually in granite outcrops, claypans (including man-made dams), swamps, soaks and lakes; and saline lakes. Gnamma-holes, claypans and soaks of the arid zone are characterised by an ephemeral fauna, mainly of brachiopod crustacea. Many birds and

mammals dependent of free water must move away if they dry up. Man-made dams have increased the availability of water and the abundance and distributions of certain animals in this zone have changed. Permanent lakes, swamps and soaks along the south-western coast are important refuges for water birds. The saline lakes of the inland and south-west support an interesting and highly adapted ephemeral fauna. Conspicuous when water is present are brine shrimps (*Artemia* and *Parartemia*), which at times build up to high population densities and attract large numbers of water birds, many of which breed there.

**Coastal Waters.** The coastal marine fauna of the north coast is distinct from that of the south coast although a few species do occur around the entire coastline. The northern fauna is representative of the widespread tropical Indo-West-Pacific fauna. It is the product of the continuous tropical conditions experienced on the north coast since the beginning of the Tertiary due to Australia's northward drift. The southern fauna is representative of a temperate element largely restricted to the Australian south coast. The south coast has experienced less stable environmental conditions than the north since the break-up of Gondwana, including circulation

changes (development of the west wind drift) and marked temperature fluctuations owing to glaciations and changes in position of the sub-tropical convergence. Consequently, the origins of the present fauna are complex, sometimes involving renewed contact between sister species which had evolved on the west and east coasts. Some species of the northern and southern faunas overlap on the west coast, with the distribution of tropical species being extended well south by the southward flow of the Leeuwin current in winter. This overlap region of the west coast is characterised by a number of endemic species. Of these, two commercially important examples are the Western Rock Lobster *Panulirus cygnus* and the Western Jewfish *Glaucosoma hebraicum*.

### Mammals<sup>5</sup>

The modern Australian mammal fauna comprises approximately equal numbers of marsupials (pouched mammals), and eutherians (true placental mammals), and two species of monotremes (egg-laying mammals).

Western Australia, with about one-third of the area of the continent, has 55 per cent of all Australian species of mammals. This fauna comprises 166 native and 19 introduced (including the Dingo) species, including representatives of all modern families except those of the Platypus, Tasmanian Tiger, Koala and rhinolophid bats. Excluding exotics and the single monotreme, the Echidna, the terrestrial assemblage comprises 53 per cent marsupials, 21 per cent rodents and 26 per cent bats. This is a close reflection of the proportion of these broad groups on the continent as a whole.

Because of the extensive coastline encompassing both tropical and temperate areas, Western Australian waters have representatives of most of the Australian aquatic mammals, including four seal, seventeen whale and fifteen killer whale and dolphin species, as well as a particularly large population of Dugong (*Dugong dugon*) at Shark Bay.

Nineteenth century American and other whalers took Sperm Whales *Physeter macrocephalus*, Southern Right Whales *Eubalaena australis* and Humpback Whales *Megaptera novaengliae*; local bay whalers also took the latter two species, while in the 20th century Humpbacks and Sperm Whales

were hunted from shore stations. Humpbacks were so seriously overfished that the industry ceased in 1963 but there has been some recovery in numbers recently. Southern Right Whales are also being seen more frequently. Sperm whaling ceased in 1978. All cetaceans now receive special protection under the *Commonwealth Whale Protection Act 1980*.

The State's mammal fauna can be grouped into broad divisions related to climatic zones mentioned on page 54. The south-western zone is particularly rich in native terrestrial mammals, with sixty-three species recorded since European settlement. Endemics comprise the Dibbler, *Parantechinus apicalis*; White-tailed Dunnart, *Sminthopsis granulipes*; Western Ringtail Possum, *Pseudocheirus occidentalis*; Honey Possum, *Tarsipes rostratus*; Broad-faced Potoroo, *Potorous platyops*; Banded Hare-wallaby, *Lagostrophus fasciatus*; Quokka, *Setonix brachyurus*; Western Brush Wallaby, *Macropus irma*; the marsupial mice, *Sminthopsis gilberti* and *S. griseoventer*; *Sminthopsis* spp; Ashy Grey Mouse, *Pseudomys albocinerus*; and the Western Mouse, *Pseudomys occidentalis*.

The south-western zone is noticeably richer in macropodids than the other broad regions. However, many south-western species in the kangaroo family are now extinct there and persist only on the continental islands off the coast. Those no longer in the south-western zone are: Long-nosed Potoroo, *Potorous tridactylus*; Broad-faced Potoroo, *P. platyops* (extinct); Burrowing Bettong, *Bettongia lesueur*; Banded Hare-wallaby, *Lagostrophus fasciatus*; Rufous Hare-wallaby, *Lagorchestes hirsutus* and Crescent Nailtail Wallaby, *Onychogalea lunata* (extinct). Compared to the northern zone, the south-western zone is poor in bat species.

The northern zone of reliable summer rainfall has a relatively rich mammal assemblage of sixty-five species, particularly of the small vespertilionid and hipposiderid bats. This assemblage is more distinctive than those of the other regions, containing groups not found elsewhere in the State (hipposiderid bats; Blossom-bat, *Macroglossus*; mosaic-tailed rats, *Melomys*; tree rats, *Mesembriomys*; Rabbit-eared Rat, *Conilurus*; Scaly-tailed Possum, *Wyulda* and the little Rock-wallaby, *Peradorcas*) but excluding other genera that are widely represented elsewhere





# WESTERN AUSTRALIA'S FLORAL HERITAGE



The wildflowers of Western Australia are renowned for their unusual forms and spectacular displays of colour.

With over 10 000 species, it is not surprising that many have developed special requirements for their survival. Fire, for instance, plays an important role in the life cycle of many W.A. plants. For other species an association with soil fungi is just as

important, but perhaps the most amazing adaptation is seen in our orchids. Many have developed specialised floral parts that not only mimic native insects but also give off chemical attractants (pheromones) in order to achieve pollination.

The Department of Conservation and Land Management (CALM) has the responsibility of managing the numerous nature reserves, national



parks and State forest areas where large numbers of our beautiful wildflowers occur, including many of the 238 species currently regarded as endangered.

CALM's research, ecological and environmental protection officers gather information on many different plant species enabling management plans to be produced. Reserve officers and national park rangers play an important role in educating the public and locating new populations of rare species, and wildlife officers ensure that protected plants are not taken illegally. All are helping to ensure that our wonderful floral heritage will survive for future generations to enjoy.

The photos in the accompanying essay, taken by CALM Research Officer Andrew Brown, capture the colour and form adopted by some of Western Australia's magnificent flora.



*Rose banjine is a common species on coastal plains between Perth and Albany (above).*



*Pink starbush is a rare species confined to a few lateritic hills in the Toodyay-York area (above).*

*Confined to the sandplains between Eneabba and Mogumber, Burdett's banksia produces spectacular displays of colour in summer (previous page).*

*The custard orchid is relatively uncommon and is found in scattered populations in low-lying areas between Northampton and Esperance (right).*

*The blue lady sun orchid can be found growing in a variety of habitats between Jurien Bay and Esperance (far right).*



*Snakebush produces carpets of flowers in late spring and summer. It is a low, spreading shrub found in coastal heath between Dongara and Albany (above).*





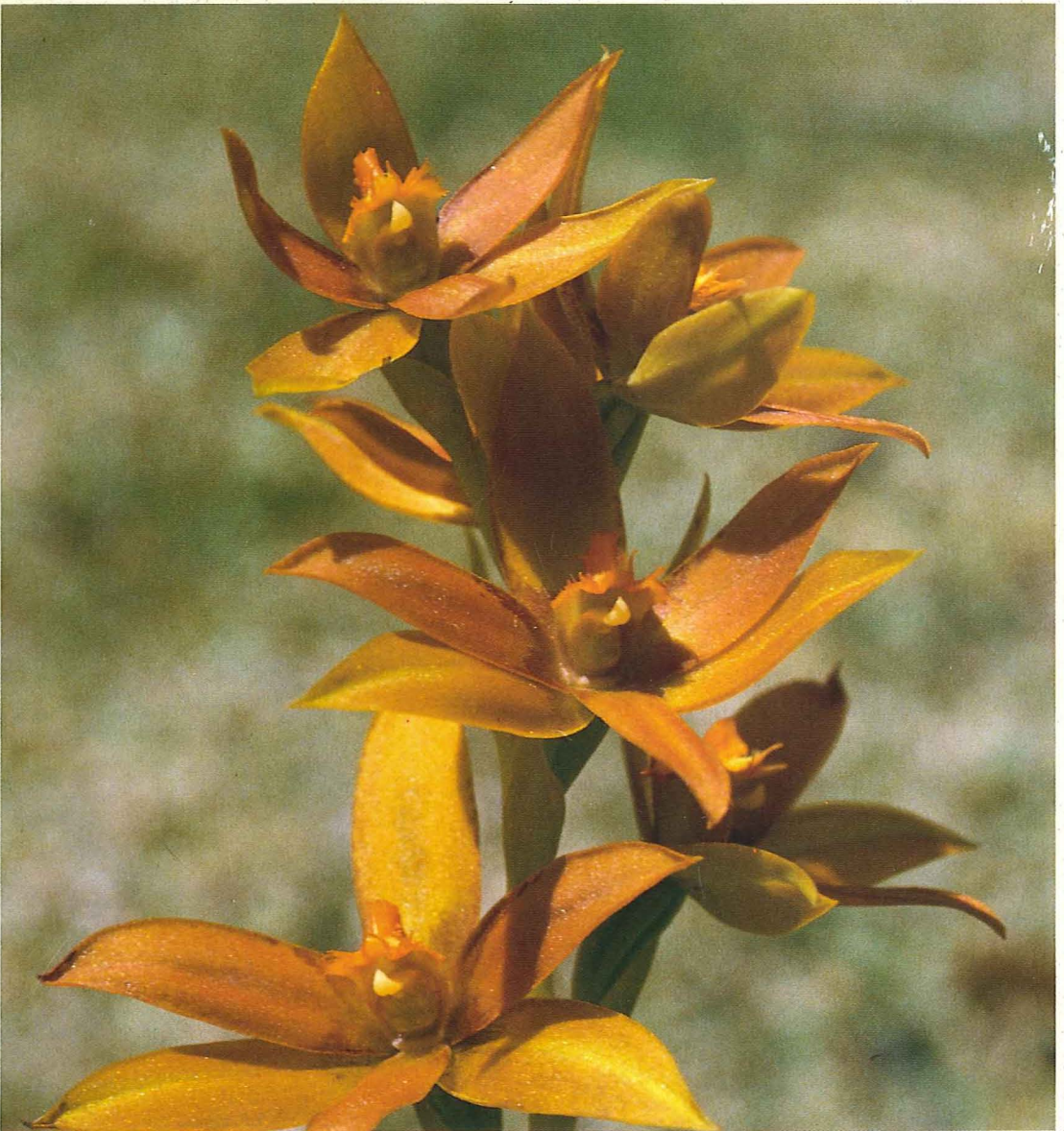






*Found at its best following summer fire, yellow kangaroo paws often produce a blaze of colour on the sandplains north of Perth (left).*

*Cinnamon sun orchid is a rare species confined to the steep slopes of the Darling Range near Perth, and is characterised by its strong cinnamon odour (below).*



(Stick-nest rats, *Leporillus*; hopping mice, *Notomys*; Kultarr, *Antechinomys*; ningauis, *Ningau* and long-nosed bandicoots, *Perameles*). Endemic to the Kimberley are: *Antechinus* sp. 'ningbing'; Scaly-tailed Possum, *Wyulda squamicaudata*; Warabi, *Petrogale burbidgei* and Yellow-lipped Eptesicus, *Eptesicus douglasorum*.

The south-western part of the Kimberley, incorporating Dampier Land, has a mammal fauna that is supplemented to some extent by an intrusion of arid and semi-arid zone mammals from the Great Sandy Desert. The subhumid North Kimberley has a group of species not found elsewhere in the region, including the Little Rock-wallaby, *Peradorcas concinna*; Warabi, *Petrogale burbidgei*; Northern Brown Bandicoot, *Isoodon macrourus*; Common Planigale, *Planigale maculata*; Black-footed Tree Rat, *Mesembriomys gouldi*; Pygmy Long-eared Bat, *Nyctophilus walkeri* and Lesser Wart-nosed Horseshoe Bat, *Hipposideros stenotis*. However, the species richness of this area declines with rainfall gradients and major geomorphological changes across the region. The east Kimberley has a relatively depauperate mammal assemblage with few drier-country species. This reflects the combined influence of the drier climate and its geomorphological similarities to the north Kimberley.

The arid zone includes the deserts, Pilbara, North West Cape, Murchison and Gascoyne areas. Over much of the region rain generally falls in summer, although the southern deserts and western part of the other areas receive most of their effective rain in winter. Mosaics of desert dune, sandplains and alluvial plain environments are found throughout the region.

The deserts, contrary to popular belief, are not markedly poor in species of mammals. Fifty-two species of native mammals are recorded from there. Although none is confined to the desert areas, a number are restricted to desert substrates (Hairy-footed Dunnart, *Sminthopsis hirtipes*; Lesser Hairy-footed Dunnart, *S. youngsoni*; Long-tailed Dunnart, *S. longicaudata*; Spinifex Hopping Mouse, *Notomys alexis*; Desert Bandicoot, *Perameles eremiana* and Desert Mouse, *Pseudomys desertor*). Dasyurids, particularly the species *Sminthopsis* and native rodents of the genus *Pseudomys*, are well

represented (both genera by six species). However, the other rodent genera are poorly represented there.

Slightly fewer than half of the species found in the deserts have restricted arid or semi-arid distributions; many are widely distributed species including a few tropical intruders (Northern Brush-tailed Possum, *Trichosurus arnhemensis*; Northern Nailtail Wallaby, *Onychogalea unguifera* and Northern Mastiff-bat, *Chaerophon jobensis*) and those from the temperate south-western zone referred to earlier. The relative proportions of arid and wetter tropical elements in the desert mammal fauna show gradational changes as the deserts approach the south-western zone.

The mammal assemblage of the Pilbara, North West Cape, Gascoyne and parts of the Murchison areas shows greatest affinity with that of the deserts; as in the deserts, there are relatively fewer species (forty-nine) than either the northern or the south-western zones. Like the deserts these areas have relatively few macropodid and rodent species while dasyurids are well represented. Bats are well represented and the number of species (nineteen) in these areas is second only to the Kimberley—although as in the deserts there are relatively few vespertilionids. The Pilbara, because of its geomorphological similarities with the Kimberley, retains some elements of the Kimberley mammal fauna (Northern Quoll, *Dasyurus hallucatus*; Common Rock Rat, *Zyromys argurus*; Orange Horseshoe Bat, *Rhinionictis aurantius*); it also has the endemic species: *Pilbara Ningau*, *Ningau timealeyi* and Chapman's *Pseudomys*, *Pseudomys chapmani*. The Little Red *Antechinus*, *Dasykaluta rosamondae*, once thought to be restricted to the Pilbara is now also known from the adjacent deserts.

As in eastern Australia, the group that has suffered most since European settlement comprises the medium-sized species i.e. the Desert Bandicoot, *Perameles eremiana*; Pig-footed Bandicoot, *Chaeropus ecaudatus*; Long-nosed Potoroo, *Potorous tridactylus*; Broad-faced Potoroo, *P. platyops*; Crescent Nailtail Wallaby, *Onychogalea lunata* and stick-nest rats, *Leporillus* spp. Several of the Western Australian species that are now extinct are however small rodents, namely *Notomys longicaudatus* and *N. macrotis*. The only

group of mammals that has not apparently declined is the bats. In fact bats seem to have been favoured in some areas, such as the Pilbara and Murchison, by mining activity which has created new habitats in mine shafts.

### Birds <sup>6</sup>

For its size Western Australia has a small avifauna. Three hundred and eighty species breed here and another 130 visit the State.

As in most groups of animals and plants, the distribution of birds in Western Australia can be related to the principal climatic zones: the northern summer-rain zone, the central arid zone and the south-western winter-rain zone.

The northern zone, a region of open woodlands with grassy understorey, is the stronghold in Western Australia of such granivorous birds as the finches and pigeons. The larger streams are lined with relatively lush forests; living in them are many species of birds, especially honeyeaters, not found further south but which extend eastwards through the Northern Territory to Queensland. In north-west Kimberley, where mean annual rainfall exceeds 1,000 millimeters, semideciduous vine forests and thickets develop on basaltic soils and other favourable sites. Confined to them are the Scrub Fowl, Red-crowned and Torres Strait Pigeons, Rufous Owl and Rainbow Pitta.

The arid zone, a region of low and unreliable rainfall, occupies the greater part of the State. North of the Tropic of Capricorn little rain is received outside summer and early autumn. Here the vegetation is predominantly a hummock grassland of spinifex (*Triodia*) that supports very few species of birds. The woodlands of river gum and cajuput fringing the north-western rivers are somewhat richer in birds, including a few Kimberley species such as the Peaceful Dove, Pheasant Coucal, Blue-winged Kookaburra, Black-tailed Tree-creeper and Black-chinned Honeyeater.

With mean annual rainfall ranging from 250 millimetres at the mulga-eucalypt line to 1,500 millimetres in the karri forests of the deep south-west the winter-rainfall zone is much more diverse than the others. In the drier parts of the zone many of the birds inhabiting the mallee and

eucalypt woodlands, e.g. the Mulga Parrot, Mallee Fowl, Southern Whiteface, Chestnut-tailed Thornbill and White-browed Babbler, also inhabit the adjacent mulga scrubs of the arid zone. Others, like the Southern Scrub-robin, Gilbert Whistler and White-eared Honeyeater, do not transgress the mulga-eucalypt line; nor do they penetrate the eucalypt forests of the wetter parts of the zone.

Whereas the distributions of the mallee and woodland birds are continuous with or only narrowly separated from those of eastern Australia, the birds of the wetter forests and heaths of the south-west are widely separated. In isolation some of them have evolved into distinct subspecies, e.g. the Little Wattlebird and White-cheeked Honeyeater, or even full species, e.g. Baudin's Cockatoo, Noisy Scrub-bird, White-breasted Robin, Elegant Fairy-wren, Western Spinebill and Red-eared Firetail. One south-western forest bird, the Red-capped Parrot, has no close relative in south-eastern Australia.

### Reptiles <sup>7</sup>

Four families of turtles, five families of lizards, seven families of snakes and one family of crocodiles are represented in Australia. Only one of them, the Chelydidae, was certainly here before the fragmentation of Gondwana. The gecko subfamily Diplodactylinae could be another example; it occurs in Australia, the Loyalty Islands, New Caledonia and New Zealand. The families Pygopodidae and Carettochelyidae are confined to Australia and New Guinea; in the absence of fossils their place of origin is unknown, as is that of marine families Cheloniidae and Dermochelyidae. All remaining families, plus the gecko subfamily Gekkoninae, probably arrived here from South-East Asia after Australia drifted northwards from Antarctica.

In Western Australia there are 8 genera and 13 species of turtles; 42 genera and 313 species of lizards; 30 genera and 102 species of snakes; and 1 genus and 2 species of crocodiles.

The northern summer-rain zone has more in common with the far north of the Northern Territory and north Queensland than with the rest of Western Australia. It is the only part of the State inhabited by colubrid snakes, wart snakes and crocodiles, and it is much richer than other

6 Contributed by G.M. Storr.

7 Contributed by G.M. Storr.

regions in monitors, blind snakes and mud snakes. In the gecko family the dominant genera are *Gehyra* and *Oedura*; among dragon lizards, *Diporiphora* and *Gemmatophora*; among skinks, *Carlia*, *Ctenotus* and *Eulamprus*; and among elapid snakes, *Demansia* and *Denisonia*.

The fauna of the arid zone is strongly demarcated from that of the northern zone but forms a continuum with that of the south-western zone. In other words the mulga-eucalypt line is irrelevant in reptile distribution. Reptiles are generally much less sensitive to changes in the vegetation than to changes in the soil. Among arid-zone geckos the dominant genera are *Diplodactylus*, *Gehyra* and *Nephrurus*; among the dragons, *Ctenophorus* and *Tympanocryptis*; among skinks, *Ctenotus* and *Lerista*; and among elapid snakes, *Vermicella*. The seas of the Pilbara share with the Kimberley the bulk of the State's sea snakes and marine turtles.

The arid zone is not so impoverished in reptiles as in birds and frogs. It owes this to the fact that lizards are essentially lovers of warm dry climates, and in particular to the great radiation of two genera of skinks (*Ctenotus* and *Lerista*) and a genus of geckos (*Diplodactylus*).

The south-western winter-rain zone is the most diverse part of the State. From the warm dry north to the cool humid south there is a gradual decline in the number of geckos, dragon lizards, monitors and blind snakes. The number of skinks and elapid snakes does not decline, but the composition of these families changes rapidly. For example, the dominant skink genera in the north are *Ctenotus* and *Lerista*; in the south, *Egernia*, *Morethia* and *Hemiergis*. Compared with other regions, the south-western zone is notable for its wealth of legless lizards; indeed no other part of Australia is as rich in these lizards as the coastal plains between Shark Bay and the Swan River.

Unlike the birds, the reptiles of the south-western zone have little in common with those of south-eastern Australia. The south-western zone is well represented by such northern and arid genera as *Diplodactylus*, *Ctenophorus*, *Tympanocryptis*, *Ctenotus*, *Lerista*, *Menetia*, *Morethia* and *Vermicella*. Genera shared with south-eastern Australia include *Phyllodactylus*, *Aprasia*, *Hemiergis*, *Leiopisma* and *Notechis*. Except in the far south these genera constitute only a minor

part of the fauna, and one of them (*Leiopisma*) contains only two species, compared with twelve in south-eastern Australia and Tasmania.

### Amphibians<sup>8</sup>

Frogs alone occur in Australia, and they are represented over most of the continent by only two families, the 'tree frogs'; (Hylidae) and 'ground frogs' (Leptodactylidae). Since its contact with the northern island arc, two other families have entered Australia, namely the Ranidae (a single species in North Queensland) and the Microhylidae (eight species in North Queensland, one of which reaches the far north of the Northern Territory).

The frogs of Western Australia comprise two families: the Hylidae (2 genera, 25 species) and Leptodactylidae (12 genera, 51 species). In the far north (the region of good summer rains) hylid frogs slightly predominate. In the south-west (the region of good winter rains) leptodactylid frogs are overwhelmingly predominant. The intervening arid zone is understandably inhabited by many fewer species, but here too leptodactylids greatly predominate, owing to their ability to burrow and so avoid desiccation during droughts.

### Fishes<sup>9</sup>

The fish fauna of Western Australia comprises approximately 1,600 species, of which the tropical northern component is by far the largest with about 65 per cent of the total. The remaining species are divided between the southern temperate marine and freshwater environments which contain about 400 and 60 species respectively. Only about 6 per cent (95) of the marine species are endemic to Western Australia, whereas nearly 50 per cent of the freshwater fishes fall into this category. It has been conservatively estimated that another 200-300 species remain to be collected off this State, mainly from deep water.

Western Australia's temperate fish fauna consists of two major components, a cool temperate fauna inhabiting the south coast and lower west coast, and a warm temperate or subtropical fauna along the west coast. The first component is generally made up of species that are shared with other areas of southern Australia, whereas the warm temperate

8 Contributed by G.M. Storr.

9 Contributed by G.R. Allen and J.B. Hutchins.



component contains many species endemic to Western Australia. Among the coastal reef fishes for instance, over 55 species are confined to the seas of the State, most of which have the major portion of their distributions along the west coast. The temperate fauna extends up the west coast to the region of Kalbarri, thereafter the number of cool-water species decrease sharply northwards until Coral Bay where this element disappears.

The tropical fishes tend to be widespread, occurring throughout the vast Indo-West Pacific region. The northern tropical fauna is by far the largest comprising approximately 1,200 species. The majority are inhabitants of coral reefs, or their immediate vicinity, for example in adjacent sand flats or weed beds. The larger predators are the best known because of their edible qualities and the sport they provide for anglers. The most common fishes in this category include the gropers, coral cods, and coral trout (all members of the family Serranidae), the jacks or trevallies (Carangidae), tropical snappers or sea perches (Lutjanidae, unrelated to the popular southern snapper of the family Sparidae), sweetlips (Haemulidae), emperors (Lethrinidae) and barracuda (Sphyraenidae).

Coastal estuaries and sandflats represent another major tropical habitat for at least 100 species, including the juveniles of some species which later migrate to reefs. Mulletts (Mugilidae), threadfins (Polynemidae), ponyfishes (Leiognathidae), silver biddies (Gerriidae) and herrings (Clupeidae) are common.

The freshwater fish fauna of Australia is small by world standards, consisting of about 150 species. However, this total can be approximately doubled if species which are basically marine or estuarine, but frequently enter freshwater, are added. The main reason for Australia's impoverishment is the extremely arid climate. Nearly all its freshwater fishes were derived in relatively recent times from sea-dwelling ancestors.

The Western Australian fauna can be conveniently divided into south-western (temperate) and northern (tropical) components with little intermixing of the two except in a few streams between the Murchison and Greenough Rivers. The south-western freshwater fishes are mainly confined to the coastal belt between Esperance and

Perth. Ten species are known from this region. Half of these belong to the family Galaxiidae, commonly known as native minnows. The group is represented by two genera: *Galaxias* and *Galaxiella*. The Salamanderfish, *Lepidogalaxias salamandroides* was formerly believed to belong to this group, but recent studies indicate that it is in a separate family (Lepidogalaxiidae). This small (five centimetre) fish is of special interest to biologists, some of whom believe that it is a pre-Gondwanic relic showing affinities with northern hemisphere esocoid fishes. It inhabits streams and waterholes in the Pemberton area and aestivates in damp soil during drought.

The northern fauna is more diverse and comprises twelve species in the Pilbara region and about 45 species in the Kimberley Division. About half are endemic to the State. The most speciose families are the grunters (Teraponidae), catfishes (Ariidae and Plotosidae), rainbowfishes (Melanotaeniidae), hardyheads (Atherinidae), glassfishes (Ambassidae) and gudgeons (Eleotridae).

#### Echinoderms<sup>10</sup>

All five groups of echinoderms: feather stars (Crinoidea) star fish (Asteroidea), brittle stars (Ophiuroidea), sea urchins (Echinoidea) and sea cucumbers (Holothuriodea), are well represented. The majority are either tropical species or endemic species with tropical affinities.

Certain edible holothurians known as *bêche-de-mer* or *trepang* occur on the shores and reefs of the north-west. Little is known of the fishing potential for trepang, but the resource has been traditionally fished by boats from Indonesia. The only other echinoderm of potential economic importance is the Crown-of-thorns starfish, *Acanthaster planci* which has caused extensive damage to coral reefs in the Indo-West Pacific.

#### Molluscs<sup>11</sup>

The marine molluscs number over 2,000 species. The shallow water marine molluscs may be divided into a northern tropical Indo-West Pacific fauna, a temperate southern Australian fauna and a region of overlap, characterised by the presence of west coast endemic species. The North West Cape area is the major geographical limit for tropical molluscs, with nearly one-third of species

10 Contributed by L.M. Marsh.

11 Contributed by F.E. Wells.

having their southern limit in that area. Two subsidiary areas of southern limits occur on the west coast at Shark Bay and the Houtman Abrolhos. The Houtman Abrolhos is the southernmost area that can be considered to have a basically tropical fauna; 72 per cent of the molluscs are tropical forms. South of the Abrolhos the tropical species rapidly drop out; only about 3 per cent of the tropical species occur as far south as Cape Leeuwin. Most of the temperate molluscs occur along the entire south coast of Western Australia to Cape Leeuwin. About 20 per cent have their northern limit in the Cape Leeuwin-Cape Naturaliste region; only 3 per cent extend to the north coast, beyond North West Cape. Endemics comprise about 10 per cent of the west coast fauna. While some occur on the north or south coasts most endemics have at least part of their range on the west coast. Although the number of endemic species is only a small fraction of the total molluscan fauna, some species occur in large numbers and are thus ecologically important in coastal habitats.

Commercial fisheries exist for abalone, scallops, squid and pearl oysters.

The freshwater mollusc fauna is impoverished, but best developed in the Kimberley. Salt lake snails, *Coxiella*, reach their greatest diversity and abundance in the south-west. Some freshwater snails are vectors for parasites.

The land snail fauna is adapted to a wide variety of climatic conditions, ranging from moist situations to the most arid. In the Kimberley the family Camaenidae is particularly diverse. *Bothriembryon* is diverse in the south and south-west.

### Corals<sup>12</sup>

Approximately 318 species of corals in 70 genera have been recorded for the State. Coral growth is best developed off the tropical north with patch and platform reefs on the inner Sahul and North-West Shelves and a series of atolls along the shelf edge—Ashmore, Seringapatam and Scott Reefs and the Rowley Shoals. Along the mainland coast of the Kimberley and Pilbara and adjacent islands are fringing reefs. Best developed is the Ningaloo Reef which extends 220 kilometres southward from North West Cape. The most

southerly true coral reefs in the Indian Ocean occur at the Houtman Abrolhos off Geraldton. South of the Abrolhos the coral fauna diminishes sharply but extensive colonies of *Pocillopora damicornis* and *Montipora* grow at Rottnest Island from where 25 species have been recorded. Seven genera reach Geographe Bay and four extend to the Recherche Archipelago. The southward extension of corals along the west coast to the south coast is facilitated by the Leeuwin current which transports larvae and maintains slightly elevated water temperatures in winter.

### Crustaceans<sup>13</sup>

The most important commercial crustacean species is the Western Rock Lobster, *Panulirus cygnus*, a west coast endemic. On the south coast, the Southern Rock Lobster, *Jasus novaehollandiae*, supports a small fishery. On the continental slope off the North west shelf five species of deep water lobsters, *Metanephrops*, are trawled, together with several species of deep water prawns.

The Swan River Prawn or School Prawn, *Metapenaeus dalli*, is netted by amateurs and professional fishermen in west coast estuaries. In northern gulfs and bays larger prawns are taken by commercial trawlers. Fishing centres are at Shark Bay, Exmouth Gulf and Nickol Bay. The main species are the Western King Prawn, *Penaeus latisulcatus*, Brown Tiger Prawn, *P. esculentus* and Banana Prawn, *P. merguensis*. Two species of shovel-nosed lobsters sometimes taken in trawls are the Moreton Bay Bug, *Thenus orientalis*, and the Balmain Bug, *Ibacus peronii*.

The Blue Swimming Crab, *Portunus pelagicus*, is plentiful in summer in the estuary of the Swan River and at Mandurah. The large edible crab, *Hypothalassia armata*, occurs in deep water between Rottnest Island and Geraldton and Australia's largest crab, *Pseudocarcinus gigas*, is occasionally caught in deep water along the south-west and south coasts. Possibly two species of large edible mud crab (*Scylla*) occur in the mangroves of the north.

Crustaceans of the inland waters fall into the ecological climate-dependent groupings mentioned on page 55. The Cherrabun (*Macrobrachium*), a large freshwater prawn, occurs in permanent pools of the Kimberley.

12 Contributed by L.M. Marsh.

13 Contributed by P.F. Berry, D.S. Jones and G.J. Morgan.



Ephemeral inland waters are often inhabited by shield shrimps (*Triops*, *Lepidurus*), fairy or brine shrimps *Artemia*, *Parartemia* and *Branchinella* and water fleas Cladocera. These produce resistant eggs which survive in dry sediment for years, hatch after occasional rains, grow rapidly to maturity and breed before the water dries up.

Permanent inland waters support copepods (especially *Boeckella*), water fleas (Cladocera) and shelled fairy shrimps (Conchostraca).

Several species of freshwater crayfish occur in the south-west. The Marron, *Cherax tenuimanus*, lives in permanent streams with deepwater pools; the Jilgie, *C. quinquecarinatus* in shallow permanent water, while the Koonac, *C. preissii* burrows in swamps. Three other crayfish species of *Engaewa* live in isolated seepages and swamps. The 'White Yabbie', *C. destructor* has been introduced from south-eastern Australia into many wheatbelt dams for local consumption. The shrimp *Palaemonetes australis* is abundant in fresh water and estuaries.

## ARACHNIDS AND MYRIAPODS<sup>14</sup>

### Arachnids

Six major groups of arachnids are known to occur in Australia: Spiders, scorpions, mites (and ticks), pseudoscorpions, harvestmen and schizomids.

Spiders are the most conspicuous group, with many different species occurring in or around houses. Orbweaving spiders (Araneidae) often spin large, sticky webs at night for prey capture, while others such as wolf spiders (Lycosidae) and huntsman spiders (Heteropodidae) are vagrant hunters, and usually do not construct aerial webs. Trapdoor spiders are common in Western Australia, but females are rarely seen due to their habit of seldom moving from their silk-lined burrow. However, upon maturity males leave their burrows to search for potential female mates. They then may wander into houses or fall into swimming pools. Local trapdoor spiders are often confused with the dangerous Sydney Funnel-web Spider (*Atrax robustus*), but true funnel-web spiders have never been reported from Western Australia.

The only Western Australian spider that is capable of inflicting a dangerous bite is the Red-back Spider (*Latrodectus hasselti*). This widespread

species is very common around dwellings and other buildings, and although not aggressive, should be treated with caution. An antivenene is available.

Scorpions occur in many different habitats in Western Australia, but the largest dig deep spiral burrows to avoid desiccation. Mites and ticks (Acarina) are ubiquitous. Of the former, several are known to sporadically feed on humans, but the association is normally short-lived. Ticks feed on the blood of a wide variety of vertebrates such as kangaroos, bandicoots, domestic stock, goannas and birds. Pseudoscorpions are rarely seen, due to their small size and cryptic habits; they resemble scorpions, but lack the characteristic scorpion tail and sting. Harvestmen are also seldom seen, and may be easily mistaken for spiders. However, they lack a medial constriction of the body which is present in all spiders.

### Myriapods

Three main myriapod groups occur in Western Australia (centipedes, millipedes and symphylans) and all possess large numbers of legs (hence the name 'myriapod').

Most centipedes are fairly small and innocuous. However, several species are quite large, sometimes with colourful bands across the body, and capable of inflicting a painful bite. Millipedes are slow moving, rounded animals, often black in colour. The introduced Portuguese Millipede (*Ommatiulius moreletti*) has been reported from several localities in Perth and other towns in the south-west. This species is a pest in South Australia where it occasionally reaches plague proportions, infesting houses and gardens. Symphylans are extremely small and agile, and rarely seen in Western Australia.

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**Invertebrates**

# Entomology in Western Australia

## With Particular Reference to Agriculture

(Contributed by the Entomology Branch, Department of Agriculture)

The entomological field in Western Australia is so vast and the number of active workers on the subject so few that much still remains to be learned about the insects found in this State.

No attempt is made here to cover all the various orders of insects which occur in the State, mention being made only of those of economic importance. Reference is also made to beneficial insects and mites which have been introduced for the control of agricultural pests. In Western Australia, the use of natural agents in pest control is an increasingly important facet of agricultural research.

### CLASS COLLEMBOLA (Springtails)

#### Order Collembola (Springtails)

This group includes the lucerne flea, *Sminthurus viridis* (Linnaeus) which was introduced into this State from eastern Australia in about 1910 and is a very serious pasture pest. Partial control is exercised by the predatory pasture snout mite, *Bdellodes lapidaria* (Kramer), and the introduced spiny snout mite *Neomolgos capillatus* (Kramer).

### CLASS INSECTA (Insects)

#### Orders Orthoptera, Mantodea, Blattodea, Phasmatodea (Grasshoppers, Locusts, Mantids, Cockroaches, etc).

The most important grasshopper form is the small plague grasshopper, *Austroicetes cruciata* (Saussure). For breeding it favours hard, bare soil and as extensive areas once utilised for wheat growing have now reverted to grazing, these uncultivated tracts periodically give rise to serious grasshopper swarms which menace the adjacent wheat lands. The Australian plague locust, *Chortoicetes terminifera* (Walker) occurs in Western Australia but rarely as a plague species.

During the past 20 years, the wingless grasshopper, *Phaulacridium vittatum* (Sjöstedt) has been causing increasing damage on pasture, lucerne, orchards, vineyards, vegetable gardens and trees.

In the Kimberley the yellow-winged locust, *Gastrimargus musicus* (Fabricius), the migratory locust, *Locusta migratoria* (Linnaeus) and the spur-throated locust, *Austracris guttulosa* (Walker) assume plague proportions.

The cockroach fauna includes a large number of native species as well as several introduced forms.

#### Order Isoptera (Termites)

The so-called white ant is a serious pest in all parts of the State. Among the most important species may be cited the giant termite, *Mastotermes darwiniensis* Froggatt of the north and the widely distributed subterranean termite, *Coptotermes acinaciformis* (Froggatt). Heavy annual losses are caused by termite damage.

#### Order Phthiraptera (Lice)

Indigenous species occur on birds and native mammals, and various introduced forms infest domestic poultry, horses, cattle and sheep.

#### Order Thysanoptera (Thrips)

The most serious native species is the plague thrips, *Thrips imaginis* Bagnall which may swarm in apple blossoms and seriously affects the crop setting. *Thrips tabaci* Lindeman, the onion thrips, is a carrier for the plant disease spotted wilt. Severe damage to tomato plants may result from this virus.

#### Order Hemiptera (Bugs, Aphids, Scale Insects)

This group contains a large number of pest species, many of them introduced. The green vegetable bug, *Nezara viridula* (Linnaeus) is now present throughout the State but is partially controlled by the introduced parasitic wasp, *Trissolcus basalis* (Wollaston). The native Rutherglen bug, *Nysius vinitor* Bergroth may at times swarm on vegetables and fruit trees. The crusader bug, *Mictis profana* (Fabricius) normally feeds on acacias and other native plants but may be troublesome to citrus. The apple dimpling bug, *Campylomma livida* Reuter is a native species which causes severe malformation of apples.

Numerous introduced aphid species occur as pests on vegetables, garden plants and fruit trees. The green peach aphid, *Myzus persicae* (Sulzer) occurs on peaches, potatoes and rape, and is a vector of virus diseases in lupins; citrus and apple trees are attacked by the black citrus aphid, *Toxoptera citricidus* (Kirkaldy) and the woolly aphid, *Eriosoma lanigerum* (Hausmann) respectively, and the cabbage aphid, *Brevicoryne brassicae* (Linnaeus) is found on cabbages, cauliflowers, rape, etc. Several introduced legume aphids, e.g. spotted alfalfa aphid, *Therioaphis trifolii* (Monell) f. *maculata*, bluegreen aphid, *Acyrtosiphon kondoi* Shinji and pea aphid, *A. pisum* (Harris) have been recorded since 1978. These are now partially controlled by introduced parasitic wasps.

Scale insects (Coccidae) are important horticultural pests. These include San Jos scale, *Comstockaspis perniciosus* (Comstock), which is a serious pest of apples; Red scale, *Aonidiella aurantii* (Maskell), which is found mainly on citrus; black scale, *Saissetia oleae* Bernard, which is found attacking citrus, stone fruits and garden shrubs; white wax scale, *Gascardia destructor* (Newstead), which is mainly a pest of citrus but also attacks cultivated shrubs; soft brown scale, *Coccus hesperidum* Linnaeus, which has a wide host range but is of greatest importance on citrus.

### Order Coleoptera (Beetles)

This order is represented in Western Australia by many and varied forms.

The ladybirds (Coccinellidae) have considerable economic importance and in addition to native species the State contains a number specially introduced to combat various scale insects and aphids. These include the mealybug ladybird, *Cryptolaemus montrouzieri* Mulsant and the common spotted ladybird, *Harmonia conformis* (Boisduval). *H. conformis*, in conjunction with the parasitic wasp, *Aphelinus mali* (Haldeman), plays an important role in combatting the woolly aphid of apple trees. Leaf-eating ladybirds of the genus *Henosepilachna* attack vegetables, especially pumpkins and melons.

The cockchafers or scarabs (Scarabaeidae) are represented by a great diversity of forms. Several species known as spring beetles may swarm on flowering fruit trees and roses in early summer. The bronze-coloured *Colymbomorpha vittata* Britton is a common pest of apple trees and the saddle-backed beetle, *Phyllotocus ustulatus* Blanchard sometimes visits citrus blossoms in

large numbers. The introduced African black beetle, *Heteronychus arator* (Fabricius) is a troublesome pest of lawns, turf, pastures and vegetables. A native species of *Heteronyx* has caused spasmodic damage to cereal crops and clover pastures in the southern portions of the State.

Other forms of scarabs are the dung beetles (subfamily Scarabaeinae). There is a large endemic fauna of some 19 species which mostly occur in undisturbed vegetation. Only 4 of these species are present in pastures. Over the last 17 years CSIRO have released a further 14 species from Southern Europe and Africa to increase the breakdown of cattle dung in pastures throughout Australia. Nine are now established in pastures in south-western Australia.

Dung beetles when present in cattle dung in sufficient numbers can also reduce survival of the Australian bush fly, *Musca ventustissima* Walker, a nuisance pest.

The longicorn beetles (Cerambycidae) are a group of wood-boring insects, but healthy trees are seldom seriously affected. They are not a pest of structural timber as they do not attack seasoned material.

The leaf beetles (Chrysomelidae) may superficially resemble ladybirds. Common pest species in the north of the State are the pumpkin beetles, *Aulacophora hilaris* (Boisduval) and *A. abdominalis* (Fabricius).

The weevil group (Curculionidae) contains a number of pest species. The lesser grain borer *Rhyzopertha dominica* (Fabricius) is our principal weevil pest of stored grain but the rice weevil *Sitophilus oryzae* (Linnaeus) and the granary weevil, *S. granarius* (Linnaeus) also occur.

Two orchard pests are the introduced apple weevil, *Otiorynchus cribricollis* Gyllenhal and Fuller's rose weevil, *Asynonychus cervinus* (Boheman). The small lucerne weevil, *Atrichonotus taeniatulus* (Berg), and the whitefringed weevil, *Graphognathus leucoloma* (Boheman) attack the roots of lucerne and potato tubers. Two other introduced pest species are the sitona weevil, *Sitona discoides* Gyllenhal, and the garden weevil, *Phlyctinus callosus* Boheman.

### Order Diptera (Flies, Mosquitoes, etc.)

This group contains a number of species, of major economic importance.

The mosquitoes are well represented, including the brown house mosquito, *Culex quinquefasciatus* Say, the common banded mosquito, *Culex annulirostris* Skuse, the saltmarsh mosquito, *Aedes vigilax* (Skuse) and the southern saltmarsh mosquito *Aedes camptorhynchus* (Thompson). The last three are either proven or suspected vectors of Ross River Virus. A significant increase in the incidence of Epidemic Polyarthritis, caused by Ross River Virus, was recorded over the summer of 1988-89 in the Perth, Mandurah and Bunbury areas. The anophelines are represented by the widely distributed *Anopheles annulipes* Walker. *A. annulipes*, together with *Aedes alboannulatus* Macquarie, have played an important part in the spread of the rabbit virus *Myxomatosis*.

Fruit fly (Tephritidae) are serious pests of fruit, especially deciduous tree fruits. Western Australia is the only Australian State with the Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann), which was first discovered in Perth in 1897. The Queensland fruit fly, *Bactrocera tryoni* (Froggatt), a native of the east coast, was discovered in Perth in February 1989. In August 1989 a large eradication program was initiated against the Queensland fruit fly, funded by the State Government. The eradication strategy involved three separate techniques, including protein baiting and culminating in the release of 30 million sterile males per week. The first sterile males releases began in January 1990 and continued into winter.

Of the introduced flies, those causing most trouble are the Australian sheep blowfly, *Lucilia cuprina* (Wiedemann), and the Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann). The western goldenhaired blowfly *Calliphora albifrontalis* Malloch and the lesser brown blowfly, *Calliphora nociva* Hardy are also important in sheep strike. The buffalo fly, *Haematobia irritans exigua* de Meijere is a serious stock pest in the Kimberley.

The common house fly, *Musca domestica* Linnaeus is widespread as is also the native bush fly, *Musca vetustissima* Walker and the stable fly, *Stomoxys calcitrans* (Linnaeus).

Of the many useful flies may be mentioned the tachinids which parasitise caterpillars, grasshoppers and other pests and the bee flies (Bombyliidae) which parasitise the eggs of other insects.

### Order Siphonaptera (Fleas)

The poultry stickfast flea, *Echidnophaga gallinacea* (Westwood) is mainly a pest of poultry and domestic animals. The oriental rat flea, *Xenopsylla cheopis* (Rothschild), the human flea, *Pulex irritans* Linnaeus and the cat and dog fleas, *Ctenocephalides felis* (Bouch) and *C. canis* (Curtis) are among the most important introduced species.

### Order Lepidoptera (Moths, Butterflies, etc.)

The caterpillars of a group of small native moths of the family Pyralidae, commonly known as pasture webworms, *Hednota pedionoma* (Meyrick), *H. crypsichroa* Lower etc. are serious pests of cereal crops (excepting oats) and grass pastures.

A family of considerable interest is the Tortricidae, in which group are included the codling moth, *Cydia pomonella* (Linnaeus) and the oriental fruit moth, *C. molesta* (Busck). Outbreaks of both insects have occurred in Western Australia but drastic eradication measures have ensured that this State remains free of these serious orchard pests.

The family Noctuidae contains several important pests, including the native budworm and the cotton bollworm, *Heliothis punctigera* Wallengren and *H. armigera* (Hübner), the cluster caterpillar, *Spodoptera litura* (Fabricius), the rough bollworm, *Earias huegeli* Rogenhofer, the brown cutworm, *Agrotis munda* Walker, the southern armyworm, *Persectania ewingii* (Westwood), the common armyworm, *Mythimna convecta* (Walker) and the northern armyworm, *Mythimna separata* (Walker). The fruit piercing moth, *Othreis materna* (Linnaeus) also belongs to this group and causes heavy losses in citrus fruit in the Kimberley and the north-west.

Other common moth pests are the cabbage moth, *Plutella xylostella* (Linnaeus), the potato moth, *Phthorimaea operculella* (Zeller) and the apple looper, *Chloroclystis laticostata* (Walker).

Two butterflies of economic importance, both introduced, are the cabbage white butterfly, *Pieris rapae* (Linnaeus) and the orange palmdart, *Cephrènes augiades sperthias* (Felder).

### Order Hymenoptera (Ants, Wasps, Bees)

Of the ants, (Formicidae) one of the best-known native species is the meat ant, *Iridomyrmex purpureus* (F. Smith), which often nests on gravel paths and roadsides.

Two important introduced ant pests are the Argentine ant, *Iridomyrmex humilis* (Mayr), and the Singapore ant, *Monomorium destructor* (Jerdon). The Argentine ant was once widespread in metropolitan and country areas, but has been reduced in recent years, as a result of a large-scale control campaign.

This campaign was terminated in 1988 as a result of an Environmental Protection Authority review which recommended the withdrawal of Heptachlor for use against Argentine ants.

The sawflies (Pergidae and Tenthredinidae) are represented locally by a number of native forms. The larvae of the genus *Perga*, often called spittfires, eat the foliage of eucalypts. An introduced sawfly, the pear and cherry slug, *Caliroa cerasi* (Linnaeus), is a common pest on pear and plum trees. Another introduced sawfly known as the leafblister sawfly, *Phylacteophaga froggatti* Riek causes severe disfigurement to various eucalypts.

The smaller parasitic wasps (ichneumonids, chalcids, braconids etc), are well represented and play an important role in combating many insect pests. Some attack insect eggs while others parasitise caterpillars, aphids and scale insects.

The social wasps (Vespidae) include the common paperwasp, *Polistes humilis synoecus* Saussure and the yellow paperwasp, *P. dominulus* (Christ). Both are introduced species and can inflict painful stings.

The European wasp, *Vespula germanica* (Fabricius) was first detected in Western Australia in January 1977. Subsequent surveys and follow-up of reports from the public resulted in a further forty nests being found in the metropolitan area, Kalgoorlie and Albany. All nests of this troublesome exotic insect are destroyed by the Agriculture Protection Board (APB).

The European wasp is similar in appearance to a honey bee but has distinct bright yellow and black markings across the body.

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## Natural Regions

(Contributed by Rex T. Prider, B.SC., PH.D., F.G.S. Emeritus Professor of Geology, University of Western Australia)

The physical features, geology, climate, flora and fauna of Western Australia have been outlined in this and the two preceding Chapters and the subdivision of the State into 'natural regions' may now be considered. A Natural Region is one

clearly marked off from neighbouring regions by topographical, geological, climatic, or biological conditions, or by combinations of these, so that, as far as human activities are concerned, they have different economic possibilities.

Many methods for the subdivision of the State have been suggested—based on climate, soil and ecology, physiography (geomorphology) and geology (including geological structure). These, together with Land and Statistical Divisions, have been dealt with in some detail by Gentilli in *Western Landscapes*, pp. 3-48. The scheme of 'natural regions' summarised on page 100, which

was first devised by E. de C. Clarke in 1926, taking note of all these variables, has stood the test of time well, although some of its details, in view of our increase in geological knowledge of the State and utilisation of light country by minor element studies, could be revised, and a finer division into subregions made.

#### CHARACTERISTICS OF THE NATURAL REGIONS OF WESTERN AUSTRALIA

The subdivision of Western Australia into Natural Regions (see Diagram 4.1) has been described by E. de C. Clarke in *J. Roy. Soc. W. Aust.*, vol. XII, 1927, pp. 117-32. A summary of the characteristics of these different Natural Regions (reprinted by courtesy of the University of Western Australia Press from Clarke, Prider and Teichert: *Elements of Geology for Western Australian Students*) is given below.

NATURAL REGION	TOPOGRAPHY	GEOLOGY	RAINFALL	WATER SUPPLY (a)	VEGETATION, ETC.
ANTRIM (geographic)	Tableland	Cambrian sediments and lavas	Summer, monsoonal, 500 to 1,000 millimetres	Catchments, wells and artesian	Grassland and savannah
NORTH KIMBERLEY (geographic)	Dissected stony tableland	Younger Precambrian	Summer, monsoonal, 750 millimetres or more	Streams, springs, catchments	Luxuriant in valleys, sparse on tableland
FITZROY (chief river)	Very wide valleys and low hills	Palaeozoic (largely Permian)	Summer, monsoonal, 500 to 750 millimetres	Catchments and artesian	Grassland and savannah
CANNING (A W Canning (Surveyor and Explorer)	Sandridges and table-top hills	Palaeozoic and Mesozoic	Summer, 375 millimetres or less	Springs, pools, artesian water (undeveloped)	'Spinifex' (species of <i>Triodon</i> ) and desert shrubs
NORTH WEST (common usage)	Rugged hills. Rivers in well defined valleys	Older and Younger Precambrian. Many economic minerals	Variable, unreliable 375 millimetres or less	Wells, catchments, pools	'Spinifex' few shrubs and trees
CARNEGIE, David Carnegie (explorer)	Sand ridges and table-top hills	Palaeozoic and Mesozoic, Younger Precambrian	Variable and unreliable, probably about 125 millimetres	Catchments, wells	'Spinifex' and desert shrubs
WARBURTON (Warburton Ranges)	Hills (some over 900 metres) separated by sandy country	Older Precambrian	Variable and unreliable, perhaps about 125 millimetres, Probably better than Carnegie Region owing to high hills	Catchments, wells, some springs	'Mulga' (species of <i>Acacia</i> ) and 'Spinifex'
MURCHISON (common usage)	Ridge hills and break-aways. Rivers in shallow beds. Salt 'lakes'	Older Precambrian. Economic minerals especially gold and nickel	Summer or winter, unreliable, 250 millimetres or less	Wells (potable groundwater)	'Mulga'. Eucalypts scarce except along rivers



CHARACTERISTICS OF THE NATURAL REGIONS OF WESTERN AUSTRALIA — *continued*

NATURAL REGION	TOPOGRAPHY	GEOLOGY	RAINFALL	WATER SUPPLY (a)	VEGETATION, ETC.
KALGOORLIE (chief town)	Less hilly than Murchison. Salt 'lakes'. No defined watercourses except salt lake system	Older Precambrian. Economic minerals especially gold and nickel	Mainly winter, unreliable, 250 millimetres or less	Catchments. Ground water too salty for use	Eucalypt forest especially Salmon Gum ( <i>E. salmonophloia</i> ), Gimlet ( <i>E. salubris</i> ) and Red Morrel ( <i>E. longicornis</i> )
WHEAT BELT (common usage)	Same as Kalgoorlie region	Older Precambrian, but few 'greenstones'	Winter, reliable 250 to 500 millimetres	Similar to Kalgoorlie Region, but ground water potable in many places; therefore wells frequent	Eucalypt forest Salmon Gum, Gimlet and Morrel
JARRAH (chief timber)	More dissected than Wheat Belt Region, especially near Darling Scarp	Like Wheat Belt Region but there is an extensive cuirass of laterite	Winter, reliable 625 to 1,000 millimetres	Streams and springs	Forest of Jarrah ( <i>E. marginata</i> ), Wandoo ( <i>E. Wandoo</i> ), Karri ( <i>E. Diversicolor</i> ) and Marri ( <i>E. caloiophylla</i> )
CARNARVON (chief town)	Elevated plain with table-top hills	Palaeozoic, Mesozoic, Tertiary and later	Summer or winter, very unreliable, about 250 millimetres	Artesian in many places. Catchments, pools	Sparse scrub in north, denser in south
GREENOUGH (river)	Sandstone tableland	Mesozoic and older	Winter, 375 to 500 millimetres	Springs, wells and catchments	Scrub
PERTH (chief town)	Coastal plain	Mesozoic and later	Winter, reliable, 500 to 875 millimetres	Springs, wells, artesian	Scrub, swamp and forest
STIRLING (prominent range)	Undulating tableland with abrupt ranges	Siliceous Tertiary sediments with inliers of Older and Younger Precambrian	Winter, 375 millimetres or less	Catchments, Stream water generally too salty for use	Heath and swamp
NULLARBOR (geographic)	Tableland, no hills	Calcareous Tertiary sediments	Winter, 250 millimetres or less	Catchments, Subartesian	Poor grassland

(a) 'Wells' refers to those that draw on ground water, but are not artesian. 'Catchments' refers to water collected on the surface naturally in gnamma holes, artificially by conserving the run-off. 'Pools' refers to pools in watercourses and includes rock holes.

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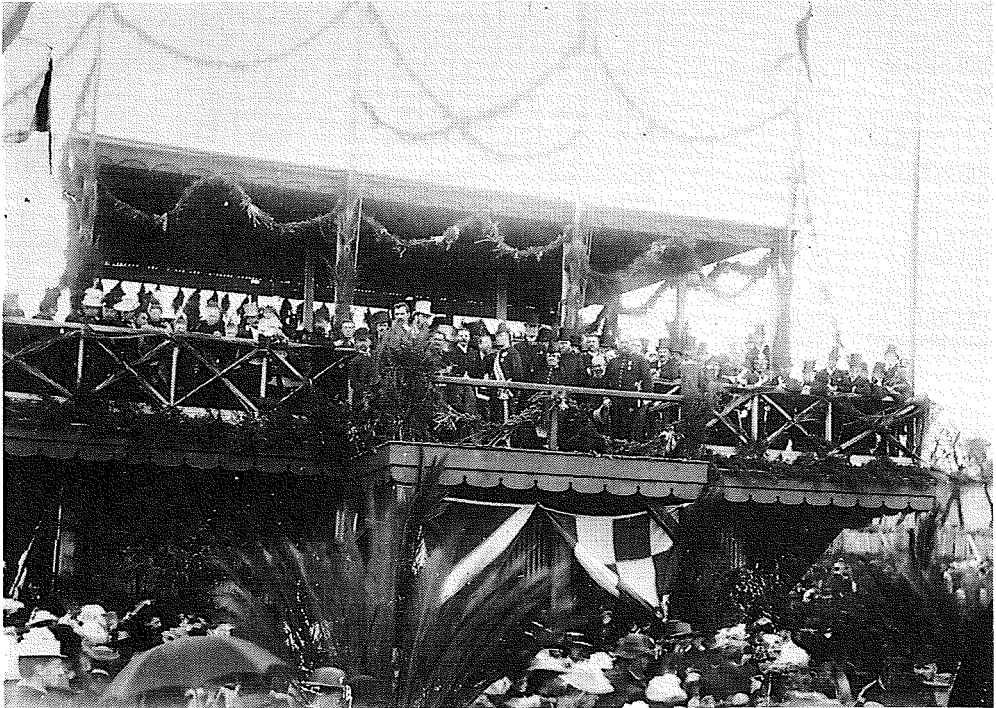
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## Chapter 5

### GOVERNMENT

#### One Hundred Years of Responsible Government in Western Australia

*Contributed by Associate Professor David Black, Curtin University*



Sir William Robinson reading the Proclamation granting Responsible Government to Western Australia at the Esplanade, Perth, 21 October 1890.

*Photograph* : Perth City Council Collection, Batty Library 3486B.

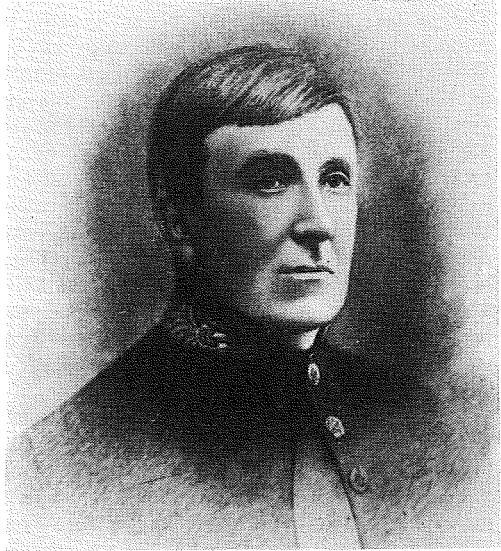
The constitutions of the six Australian States, originally adopted at the time they severally became self governing colonies within the British Empire, have varied legal origins. Nevertheless, in each case the achievement of self government went hand-in-hand with the establishment of a

bicameral legislature and the adoption of responsible government in the sense of that system of cabinet government which requires that '...the Queen's representative should act on the advice of a cabinet of ministers, headed by a chief minister; that the ministers should individually be in charge of the various departments of state; and that the ministers should be members of parliament having the support of the majority party or coalition in the lower house'.<sup>1</sup>

Responsible government in Western Australia effectively dates from 1890. On 21 October the acting Chief Justice, Sir Henry Wrensfordsley, announced the acceptance of the new constitution by reading a proclamation, subsequently published in the *Government Gazette* of 23 October. The Act proclaimed, the Constitution Act of 1889, had been agreed to by the Western Australian Legislative Council in that year but was then reserved for the Royal Assent which was not given until 15 August 1890 following the successful passage through the Imperial Parliament in London in July of a bill removing legal obstacles to the enactment of the new constitution. Proclamation Day, as it came to be known, was celebrated as a public holiday in Western Australia until 1919 when, with the festivities largely taken over by those associated with the Eight Hours movement, it became known as Labour Day.<sup>2</sup>

In legal terms the basis of Western Australia's constitution is similar to that of New South Wales and Victoria in that in each case imperial legislation was necessary to validate the constitution adopted by the local legislature. This was because these three colonies went beyond the powers authorized by Section 32 of the Australian Constitutions Act of 1850 (also known as the Australian Colonies Government Act), described by one constitutional lawyer as 'the initial charter of self government for the colonies'.<sup>3</sup>

Essentially the 1850 Act allowed those colonies which had Legislative Councils with a majority of members elected by the inhabitants (a condition not met by Western Australia until 1870) to establish bicameral legislatures. Western Australia's Constitution Bill of 1889 was passed pursuant to that power but the wish to obtain control of Crown lands then necessitated the passage of the enabling legislation in London.



Sir Henry Wrensfordsley, Chief Justice of Western Australia.

*Photograph : Battye Library 5244P.*



Sir William Robinson, Governor of Western Australia.

*Photograph : Battye Library 667P.*

1 G. Saver, *Australian Government Today*, 12th ed. (Melbourne University Press:Melbourne,1977), p89.  
 2 C.T. Stannage, *The People of Perth, A Social History of Western Australia's Capital City* (Perth City Council: Perth, 1979), pp 210-212.  
 3 R.D. Lamb, *The Constitution of the Australian States*, 3rd ed. (University of Queensland Press: St Lucia, 1972, p. 41 (see pp. 40ff for a discussion of this issue)

The actual implementation of a system of responsible government was undertaken by Sir William Robinson, who commenced his third term as Governor of Western Australia (having previously been Governor from 1875 to 1877 and 1880 to 1883) the day before the reading of the proclamation. Sir William delayed his decision as to whom to commission as the first Premier until elections had been held for the thirty Legislative Assembly districts, polling for which took place between 27 November and 12 December. Even after the election, in the absence of an established party system, there was not the obvious basis there would be today for choosing between the leading candidates—

John Forrest, the only MP who had previously been a member of the colonial Executive, and Stephen Henry Parker, formerly the colony's leading advocate of constitutional change—but behind-the-scenes discussions cleared the way for Forrest to be commissioned as Premier on 22 December. The five member Forrest ministry was sworn in on 29 December in time for the Governor a day later to open Western Australia's first parliament under responsible government.

#### **EVOLUTION OF RESPONSIBLE GOVERNMENT – THE ACHIEVEMENT OF REPRESENTATIVE GOVERNMENT 1829-1870**

The process by which Western Australia proceeded from virtually autocratic rule by a Governor between 1829 and 1832 to the establishment of a system of parliamentary self government on the British model of responsible cabinet government was broadly speaking typical of that followed by the other Australian colonies. At the same time, there were some significant differences arising from the circumstances of the original settlement of the Swan River Colony by the British in 1829 and from the colonists' decision to accept convicts transported from Britain commencing June 1850. Since Western Australia was, with South Australia, one of the only two of the Australian colonies not to have been at one time or other part of the colony of New South Wales, it owed its constitutional origin to a separate Imperial Act providing for the government of the new colony. Moreover, it was not until May 1829, well after the expedition had departed from England carrying the first British settlers to the Swan River, that a bill was passed

through the Imperial Parliament providing 'for the Government of His Majesty's Settlements in Western Australia on the west coast of New Holland' with the King-in-Council empowered to authorize any three or more persons to make laws for the colony. There was then a further delay until March 1831 when Sir James Stirling received a commission in terms of this Act appointing him Governor and Commander-in-Chief: previously he had acted as Lieutenant Governor on somewhat doubtful legal grounds on the basis of a letter of appointment and instructions dated December 1828.

Parliamentary government in the colony commenced with the inaugural meeting of the colony's first Legislative Council on 7 February 1832. An Order-in-Council issued in November 1830 under the authority of the 1829 Act—though it was not received in the colony until December 1831—provided for the establishment of a Legislative Council 'to make all necessary laws and to constitute all necessary courts for the peace, order and good government of the settlement'. This also provided the basis for instructions leading to the establishment of an Executive Council consisting of the Governor and four senior officials—the Colonial Secretary, Commandant, Surveyor-General and Attorney-General and these officials along with the Governor also constituted the Legislative Council. This first 'parliament', although small and without any elected members, adopted as much as possible of the pomp and ceremony and formality associated with the parliament at Westminster—perhaps in an attempt to maintain morale and respect for authority amongst the colonists at large.<sup>4</sup> Surprisingly the Legislative Council in the 1830s was often intransigent in its dealings with the Governor, possibly because the officials usually held property in the colony and saw their long term future and that of the colony as closely linked.

The next step on the road to responsible government, albeit a small one, was the inclusion in the Legislative Council of four non-official nominated members dating from early in 1839. In practice the distinction between the official and non-official members was rather less than might have been expected given the officials' propensity to spend long terms in the colony and the fact that those nominated as non-officials more often than not also held government appointments. One such was William Mackie, the Commissioner of the

Civil Court and effectively the colony's judge throughout his sixteen years on the Council. In 1847 the make-up of the Executive Council underwent its first modification with the inclusion of the Collector of Revenue, who also became a member of the Legislative Council.

Membership of the Legislative Council in these years was often regarded as more of a burden than a privilege. Resignations and refusals to be nominated were frequent in an era when members were not paid and travelling was difficult while dissatisfaction with the policies of the Governor also produced resignations and boycotts from time to time. Officials were equally under pressure with senior appointees including the Colonial Secretary and Surveyor-General often having to handle much of the detailed work personally, but at least these were paid positions.

During the 1840s two developments occurred which were to have a significant impact on the progress of the colony towards self government. The first, the effective granting of responsible government to the British possessions in Canada, led in its train to the eventual cession of the same right to New Zealand by 1852 and all of the then Australian colonies except Western Australia by the end of the 1850s. The second was the decision of the Western Australian colonists by 1849 to accept convicts from Britain at a time when convict transportation was coming to an end in the eastern colonies.

During a parliamentary debate in the House of Lords in 1846 on a bill to continue the operation of the 1829 Act with regard to the government of Western Australia, remarks made by the British Secretary of State for the Colonies, Earl Grey, appeared to foreshadow the granting of responsible government to the Australian colonies. At this time moves were being made within Western Australia for the appointment of additional non-official members to counterbalance the official domination of the Legislative Council and for a review of the situation whereby 'the initiation of Bills, the option of putting Bills to the vote, and the power of veto'<sup>5</sup> were all vested in the Governor alone. By 1848 a committee appointed to prepare a statement upon the constitution for submission to the British government had proposed that henceforth a unanimous vote of the non-official members against any proposition brought before the

Legislative Council should amount to an effective veto.

Notwithstanding the views of the colonists and the support of acting Governor Frederick Irwin for increasing the number of non-official members in the Legislative Council the British government, backed by the new Governor, Charles Fitzgerald, refused to make any change until the colony could end its dependence on an annual grant-in-aid from Britain and become self supporting financially. Originally it had been envisaged that this would have occurred relatively quickly in what was intended from the outset to be a government-controlled rather than a government-financed British colony.<sup>6</sup> Instead the decision to accept further British aid in the form of expenditure on convicts—made official by an Order-in-Council of May 1849 nominating Western Australia as a place to which convicts could be sent from the United Kingdom—ensured that Western Australia, alone among the Australian colonies, would not be able to take immediate advantage of the concessions granted in 1850 in the Australian Constitutions Act.

The 1850 Act had developed out of the report of a committee of the Privy Council from which Earl Grey had sought advice on the constitutional position of the Australian colonies. This committee noted that colonies of the British Empire prior to the nineteenth century had been granted bicameral legislatures similar to that in Britain but this had not occurred in those acquired since 1800. In making its recommendations the committee observed that 'Western Australia was unable to comply with the conditions upon which representative institutions must necessarily be based' but (with the separation of the Port Phillip District to form Victoria) the other four—New South Wales, Victoria, South Australia and Tasmania—could be granted such a concession. The latter three were therefore empowered to constitute a Legislative Council with a majority of elected members, as was already the case with New South Wales, and all four received the right to draw up their own amended constitutions providing for bicameral legislatures. Although the notion of having members of the Executive responsible to the Legislature was not implicit in the Act this was conceded soon afterwards in a despatch from the Secretary of State issued in December 1852. Thus from 1859 when

5 J.S. Batty, *Western Australia, A History from its Discovery to the Inauguration of the Commonwealth* (Clarendon Press: Oxford, 1924 – facsimile edition, University of Western Australia Press: Nedlands, 1978), p. 189.

6 de Garis, 'Political Tutelage', pp. 302-303

Queensland was separated from New South Wales all five colonies had internal self government (though with some restrictions on their legislative power, which in any case was subject to disallowance by the Imperial Government), a bicameral legislature—in each case with an elected lower House but in two of the colonies with a nominated upper House—and a system of responsible cabinet government.

Earl Grey did include in the 1850 Act a clause empowering the Western Australian Legislative Council to transform itself into a predominantly elected body but only after the colony became self supporting financially and had received a petition from one-third of the householders requesting such a change. Although the first condition was met in 1856 and the second in 1865, the householders' petition was rejected by the members of the existing Legislative Council though they did support the appointment of additional non-official members. This was in line with the continuing agitation for such appointments, especially following the addition of a sixth official member, the Comptroller-General of Convicts, to the Legislative Council 1852 while the number of non-officials still remained at four. Governor Hampton in 1867 went a step further when he agreed to the request of a public meeting in October to nominate those individuals who were returned at elections held in each of the colony's six districts—Perth, Fremantle, Swan (Guildford), Eastern Districts, Murray and Champion Bay (Geraldton). Notwithstanding the refusal of the residents of Champion Bay to participate, the elections, the first in the colony's history, were held towards the end of 1867 and the five successful candidates (plus one person to represent Champion Bay) were nominated to the Legislative Council in May 1868.

These informal elections failed to satisfy the proponents of constitutional reform. Convict transportation ended in 1868 and there was sustained agitation over the next two years for the establishment of a parliament with a majority of elected members. During this period both Governor Hampton and his successor Frederick Weld supported the principle of representative government and Weld suggested to the Secretary of State that if the principle were not conceded forthwith 'an influx of population and riches, such

a "rush" as has heretofore taken place in almost every other portion of the Australian colonies, would, did it find us under the present system, result in an almost irresistible demand for universal suffrage and responsible government at a time when such a concession would be unsafe and pregnant with disastrous consequences.'<sup>7</sup>

In a despatch forwarded in March 1870 the Secretary of State gave way and legislation was passed providing for the establishment of a Legislative Council with eighteen members—twelve elected, three officials (the Colonial Secretary, Surveyor-General and Attorney-General) and three nominee non-official members. Subsequent increases in size were to be such as would retain a ratio of 2:1 elected to non-elected members and by 1889, on the eve of responsible government, there were twenty-six members including seventeen elected members, four officials and five non-official nominees.

#### **EVOLUTION OF RESPONSIBLE GOVERNMENT – FROM REPRESENTATIVE TO RESPONSIBLE GOVERNMENT : 1870-1890**

The elections for Western Australia's first parliament with an elected majority were held in October and November 1870. In the light of Weld's warning it is hardly surprising that although all adult males had been eligible to vote in 1867, provision was now made for a property franchise for both electors and intending candidates. Elected and nominee members were given five year terms, though of the six parliaments elected in the 1870s and 1880s only two ran for the full duration. Initially Perth and Fremantle with two members each provided 40 per cent of the elected membership while a fifth member represented the Guildford area. However, as additional elected members were added to represent the new agricultural areas and the pastoral and mining districts in the north, the proportion of metropolitan members declined to less than one-third.

Under the system of representative government the Governor was no longer a member of the Legislative Council—which was now presided over by an elected Speaker—and he was required to transmit for the consideration of members such

<sup>7</sup> Battye, *Western Australia*, p.282.

bills as he desired to introduce. In these circumstances the Colonial Secretary tended to become virtually a *de facto* Premier.<sup>8</sup> At the same time the Governor remained primarily responsible to the Secretary of State in London, retained a power of veto and could prorogue and dissolve the Council at any time. Furthermore, although the Legislative Council had general legislative authority it was denied the crucial power to make laws for the appropriation of Crown lands, and bills affecting certain other matters including amendments to the Constitution had to be reserved for assent by the Crown.

Representative government also meant that membership of the Executive Council no longer tended to coincide with official membership of the Legislative Council though there was still a high proportion of overlapping membership. Executive Councillors who did not sit in Parliament after 1870 included the Commandant, the Colonial Treasurer and (from the first appointment in 1879 until 1884) the Director of Public Works. From 1878 the Governor also received the power to appoint up to two non-official Executive Councillors but only one such appointment was made—G. Lee Steere in 1884. Lee Steere, had been prominent during the first half of the 1870s as the unofficial leader of the elected members and the group agitating for the extension of responsible government but he was basically a conservative who had only sought more power for Parliament when he could not secure particular tariff policies. If anything he strengthened the position of the Governor against recalcitrant officials in the Executive Council<sup>9</sup> before becoming Speaker of the Legislative Council in June 1886.

Manifestly the major difference between executive government in this period and that under responsible government after 1890 was that the Executive branch of government 'was in no way responsible or subordinate to the Legislature save that the latter did have the power to obstruct the government's revenue and expenditure proposals' and this latter proved to be a 'fertile source of conflict'.<sup>10</sup> Commentators on the period suggest that the Governor more often than not had a difficult job balancing the wishes of the Colonial Office and the various groups within the colony while contending with an elected Council and officials who from time to time could be trenchant

critics of the vice regal representative. Another to give problems was Chief Justice A.C. Onslow whose suspension from office in 1887 after a long running feud with Governor Broome brought the system into such disrepute as to advance significantly the cause of those advocating responsible government.

The movement for responsible government had its highs and lows during the period of representative government. After four years of agitation over tariff policies the Legislative Council in 1874 passed a resolution requesting the Governor to introduce a bill embodying the principle of responsible self government and an election was held on the issue but disputes over the form of the constitution and the intervention of the Colonial Office aborted the moves. The agitation then died away until the emergence of Stephen Henry Parker, a lawyer and from 1878 one of the members for Perth, whose radicalism for a time earned him the nickname 'The People's Harry'. The Reform League which he organised in turn lapsed into inactivity and suggestions that self government might lead to the separation of the northern districts as had happened in New South Wales also tended to diminish enthusiasm. However, by the end of 1886 the Reform League had been reconstituted as the Reform Association and in July 1887 its supporters within Parliament, having formed their own 'party' within the Legislative Council, secured the passage of a resolution seeking an Executive 'responsible to the Legislature of the Colony' and with Western Australia 'one and undivided under the new Constitution'. Moreover, the rapidly increasing influx of migrants and the first gold discoveries in the north convinced many conservatives that a new constitution should be devised before the radicals secured control.

Despite a discouraging reply from England to the July resolution a constitution bill drafted by Governor Broome was debated in 1888 and in the wake of strong popular support for the adoption of responsible government indicated at the election held in January 1889 the bill was finalised by April and sent to England for the Royal Assent. There, after initial support from the Colonial Office and the House of Lords, the draft constitution ran into strong opposition in the

8 de Garis, 'Self Government and Political Parties' in Stannage (ed.), *A New History of Western Australia*, pp328-329.

9 *Ibid.*, p325.

10 *Ibid.*, p.327.



House of Commons and the consequential delays led to the appointment of a delegation of three—Governor Broome, Parker and Sir Thomas Cockburn-Campbell, Chairman of Committees in the Legislative Council and part-owner of *The West Australian*—to argue the case for allowing the colony, with a thinly scattered population which had not yet reached 50,000, to take control of a million square miles of land<sup>11</sup>

In England much of the debate centred on the argument that Crown lands were the 'heritage of the British People' and should be available and retained for settlement by the surplus population of the mother country. For his part the British Secretary of State, Lord Knutsford, repeated earlier proposals that control should be vested in the colony only over lands situated south of the 26th parallel of latitude; an attempt was also made to veto any colonial act aimed at the exclusion of immigrants. After the enabling bill had been given a second reading it was referred to a Select Committee, chaired by the Under Secretary, Baron de Worms, to which the three delegates gave evidence. Others to come to the aid of the colony were the Governor-designate Sir William Robinson, and a deputation of Agents-General of the other Australian colonies. With the Select Committee recommending the deletion of most of the clauses which caused concern the bill completed its passage through Parliament in July.

One restriction on colonial autonomy, insisted on in Britain because of the colony's poor reputation for its handling of Aboriginal affairs and accepted by the colonists to secure passage of the bill, provided for the annual payment of 5,000 pounds to an Aborigines Protection Board. This money was to be used 'for the amelioration of the condition of aborigines', the amount to become 1 per cent of the gross revenue when that would produce a larger sum. As early as 1894 a constitutional amendment removing the provision was passed through both houses in Western Australia but vetoed by the Crown: this would have had allowed instead for moneys for Aboriginal welfare (at whatever level proposed by the government) to be appropriated and expended under the direction of a responsible Minister. Three years later after protracted correspondence with the Colonial Office the same amendment was passed, this time without opposition in Britain, and

proclaimed in 1898. The Premier himself then took responsibility for Aboriginal matters and it was not until 1947 that a Minister of State was separately designated as Minister for Native Affairs.

### RESPONSIBLE GOVERNMENT IN THE 1890s

In two respects at least the Western Australian experience was unique during its first decade under responsible government.

On the one hand, by contrast with the eastern colonies which all experienced considerable political instability leading to numerous changes of government during the first decade after self government, Western Australia's first Premier, John Forrest, remained at the helm throughout the entire decade. Only Sir David Brand (1959-1971) has served longer as Premier in the hundred years of responsible government.

Secondly, within three months of Forrest's inauguration the first of a number of conventions was held in an endeavour to draw up a draft bill to establish a constitution for the proposed federal Commonwealth of Australia. Although the labours of the delegates to the first Convention seemed to have proved abortive the movement was revived in the mid 1890s and then proceeded rapidly to its culmination with the establishment of the Commonwealth on 1 January 1901.

By contrast with the establishment of the various colonial constitutions the Commonwealth Constitution was only adopted after a referendum had been held on the issue in each of the six colonies. Specifically the electors were asked to vote on whether or not to accept the draft constitution drawn up at the federal Conventions held at Adelaide and Sydney in 1897 and Melbourne in 1898. The draft constitution submitted to Western Australian electors on 31 July 1900 also embodied amendments arising out of a Premiers' Conference held at Melbourne in 1899, after the level of support from NSW electors at the first referendum held in four of the colonies in June 1898 (Queensland did not participate) had fallen short of the level required by its own parliament. With all of the other colonies voting in favour at a second round of referenda in 1899 the electors in Western Australia were faced with a

11 For discussions of the debate in Britain on the proposed Constitution see Batty, *Western Australia*, pp. 388ff. and de Garis, *'Self-Government and Political Parties'*, p.336.

*fait accompli* which would have gone ahead with or without their support.

The delay in holding the federation referendum in Western Australia reflected both the lack of enthusiasm for federation amongst many of the older settled regions of the colony and the wish of Premier Forrest and his colleagues to secure more favourable terms for entry. The eventual decision to allow the voters their say came both because of Forrest's realistic acceptance that federation was necessary and inevitable and because of the strong pressure from the residents of the goldfields, a large proportion of whom had migrated from the eastern colonies and believed that they were receiving less than their due from the Forrest administration. The eventual vote in favour of entry was clear-cut: 67 per cent of the electors cast valid votes and of these almost 70 per cent supported the proposal. At the same time the regional variations were significant with a 'Yes' vote of over 92 per cent in the goldfields, 82 per cent in the north and 60 per cent in the metropolitan area compared with barely 38 per cent in the farming areas.

in common with that of the United Kingdom. In the first place its legislative power was virtually unfettered in terms of Section 2 of the Constitution Act which gave to Parliament the power to make laws for 'the peace, order, and good Government of the Colony of Western Australia and its Dependencies' though there was for a time the restriction arising from the provisions relating to the Aborigines Protection Board and, until the passage of the Australia Act in 1986, certain bills had to be reserved for the Royal Assent in the United Kingdom. Secondly, as in Britain, Parliament could amend its own Constitution of its own volition and without any requirement for a referendum, though it was provided in Section 73 that the support of an absolute majority of the members in each House was required to effect 'any change in the Constitution of the Legislative Council or of the Legislative Assembly'. Thirdly, parliamentary control of the Executive was to be ensured through provisions for a Consolidated Revenue Fund into which state moneys were to be paid and for Parliament to prescribe purposes for which the Fund should be appropriated.

A further major point of similarity with Britain arose from the lack of specification with reference to the concept of responsible government. The intention was clear enough in that Section 71 of the Constitution Act provided for the payment of annual retiring allowances to those members of the Executive Council displaced by the Act including the Colonial Secretary, Attorney General, Colonial Treasurer and Surveyor-General and for the Governor to have the sole power to appoint holders of executive office 'liable to retire from office on political grounds'.<sup>12</sup> Further to this Section 37 of the Constitution Acts Amendment Act 1899 specified that the necessity for persons holding offices of profit under the Crown to vacate such offices when elected to the Legislature would not apply to those holding political executive office. At the same time the Constitution did not provide any guidance as to how the Governor should exercise his prerogative to commission the Premier and appoint the other Ministers, for example in the case of two parties each commanding the support of the same number of lower House members. Nor was there any constitutional requirement that Ministers of State need also be members of Parliament except that at least one had to be a member of the Legislative Council. This contrasts with Section 64 of the Constitution of the Commonwealth of Australia

YES		NO		YES		NO	
YES	NO	YES	NO	YES	NO	YES	NO
				44,394 18,135			
ALEXANDRIA 914	67	MELBOURNE 3314	151	GREENOUGH 16	411	MURRAY 345	476
ASHGTON 32	17	DE GREY 94	57	IRWIN 8	41	NELSON 555	326
BEVERLEY 87	466	DUNDAS 417	16	E.KIMBLEY 31	1	NORTHAM 610	759
BUNBURY 493	802	FREMANTLE 532	277	WINBLEY 1	3	PERTH 2385	328
CANNING 298	192	E.MANTLE 1322	804	MOORE 77	539	E.PERTH 126	22
CLGARDIE 2917	117	N.MANTLE 1288	678	MURCHISON 21	174	N.PERTH 145	991
ELGARDIE 1802	853	S.MANTLE 1524	1366	MURCHISON 701	53	N.PERTH 2077	138
H.CLGARDIE 3958	121	CASCOYNE 33		MURCHISON 340	57	PILBARRA 274	9
		GERALDTON 253	648	MURCHISON 810	174	YALGOO 498	17
				PIACENET 359	513	YILGARN 438	114
						YORK 130	524

Results of the Federation Referendum for Western Australia, 2 August 1900.

Photograph : Battye Library 1214B.

By entering the Commonwealth as an original state Western Australia had enjoyed its status of a self governing colony within the British Empire for barely a decade and Forrest was the only person to serve as Premier of Western Australia when it possessed such a degree of autonomy. In fact during the 1890s Western Australia's constitutional system can be seen as having much

which provides that 'no Minister of State shall hold office for a longer period than three months unless he is or becomes a senator or member of the House of Representatives'.

Over the years the lack of constitutional specification concerning the requirements for Ministers to sit in Parliament has never really been put to the test. In 1919 when Hal Colebatch MLC became Premier an attempt was made unsuccessfully to have one of his colleagues vacate a lower House seat for him. If this had occurred it would have been necessary for Colebatch to have resigned his Legislative Council seat to contest the Legislative Assembly election and he would have been the first Premier ever to hold office while not a member of Parliament: subsequently Sir James Mitchell occupied the position for 16 days after losing his parliamentary seat in the 1933 election and Brian Burke resigned his parliamentary seat in February 1988 one week before handing in his ministerial commission. In the case of ordinary Ministers too the necessity to obtain a parliamentary seat has always been accepted. Thus, for example, while John Scaddan was appointed to the Mitchell ministry on 17 May 1919 while not a member of either House, he was at the time contesting a vacant seat in the Legislative Assembly for which he was elected two weeks later.

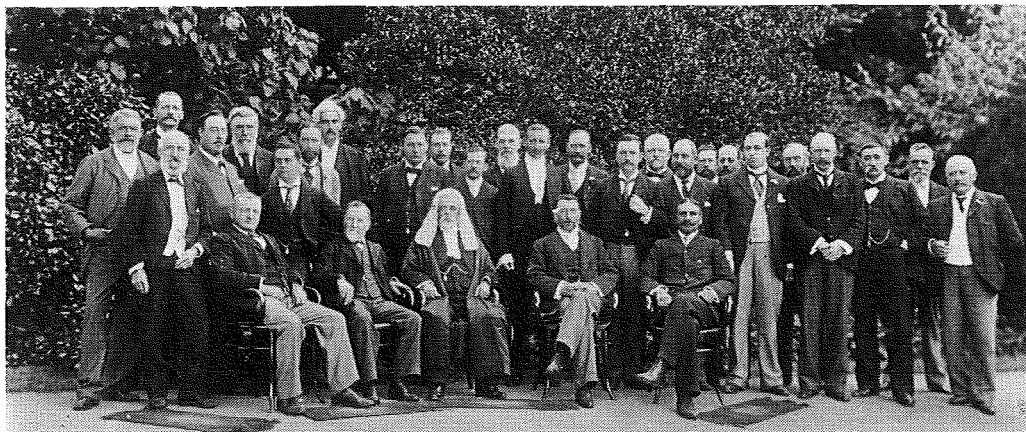
One complication for those elevated to ministerial rank was that until 1947 they were obliged to resign their parliamentary seats and recontest them at a by-election. Over the years only nineteen such ministerial by-elections were ever contested and only four Ministers—Frank Wilson, F.W. Moorhead and M.L. Moss MLC in 1901 and Scaddan in 1917—actually lost their seats in this way. In the case of the first three their defeat led to the fall of the Morgans government while Scaddan on losing the by-election in his goldfields seat in 1917 immediately resigned from the Lefroy ministry.

Another respect in which the essence of British-style responsible government was clearly meant to operate is apparent from Sections 66 and 67 of the original Constitution Act dealing with money bills. In brief bills 'appropriating any part of the Constitutional Revenue Fund or for imposing, altering or repealing any rate, tax, duty or impost' could only originate in the Legislative Assembly or lower House and, along with related

votes or resolutions, required first a message from the Governor ensuring that the initiative came from the responsible ministers. The intended power of the Executive was confirmed by the provisions in the Standing Orders prohibiting private members from, for example, proposing increases to amounts proposed to be expended. Furthermore, in 1893 the Constitution was altered to provide that while the Legislative Council or upper House could not actually make amendments to money bills it could request such amendments at any stage. This in turn became Section 46 of the 1899 Constitution Act Amendment Bill; and was subject to further substantial amendment in 1921 including the addition of the provision that the Council could not amend any bill 'so as to increase any proposed charge or burden on the people'. Despite these changes, disputes continued over the years as to whether the Council was exceeding its powers when it attempted to 'press' requests for amendments to money bills to the extent of jeopardising the passage of the relevant bill.

One rather unusual feature of the constitutional system in Western Australia arose from the decision to embody the constitutional changes made during the 1890s in a separate act, the Constitution Acts Amendment Act 1899, rather than consolidating the changes into the original Constitution Act. Based ostensibly, according to Forrest, on the desire to preserve the original Act as intact as possible,<sup>13</sup> this has produced a situation where the State has most of its effective Constitution embodied in two quite separate Constitution Acts.

The basis of the Western Australian parliamentary system and of its political make-up also gradually took shape during the 1890s. Initially the Legislative Assembly consisted of 30 elected members while the Legislative Council had 15 members all nominated by the Governor (which nomination in practice took place only after consultation with the government). However, under the provisions of the Constitution the Legislative Council was to become an elected House after six years or when the population exclusive of Aboriginal natives reached 60,000, whichever came first: this latter target was attained by July 1893. Dating from the 1894 election both houses were fully elected with Council members serving fixed six-year terms, one-third retiring every two years. Progressive



Western Australia's first Parliament

Photograph : Battye Library 6022B.

increases in size saw the membership of the Legislative Assembly reach 50 by 1899 while the number of members in the Legislative Council rose from 21 in 1894 to 30 by 1900 but no further additions were then made until the 1960s. In 1990 the two Houses had 57 and 34 members respectively.

Democratic reforms came rapidly during the 1890s with the introduction of universal manhood suffrage for the lower House in 1893, votes for women and triennial parliaments in 1899, and payment of members in 1900. To counterbalance this there was the impact of electoral distributions. During the 1880s there had emerged what one historian has described as a 'marked estrangement of town and country'.<sup>14</sup> Thus, one newspaper of the day referred to 'the democratic and urban influences of the town, influences for which few of the country constituencies feel much tenderness',<sup>15</sup> and another to the need for 'increased country representation' which would have a check on 'the aggrandisement of those more populous parts where so much money has already been spent and prevent the evil of centralization which would seek to advance the Capital City ... at the expense of the country districts, which latter are really the backbone and mainstay of the Colony'.<sup>16</sup> These concerns were evident in the decision to give the metropolitan districts with 40 per cent of the population only 6 of the 30 members in the Legislative Assembly in 1890 while the 8 per cent of the electorate living in the north were represented by 7 members. At

one extreme West Perth in 1890 had an enrolment of 587 voters, at the other Murchison had 24.

During the life of the Forrest government the population explosion in the goldfields, combined with the alleged siphoning off the wealth generated by mining to serve the interests of the agricultural and south-west regions, led to ongoing political demands for increased goldfields representation. This was conceded only slowly but by 1901 there were 12 goldfields seats (and 14 in 1904) out of 50 in the lower House in addition to Pilbara and Murchison which had a substantial mining component within their boundaries. While the number of additional seats in the north had been reduced to three the metropolitan area with 13 seats in 1904 was still substantially under-represented.

#### RESPONSIBLE GOVERNMENT IN THE TWENTIETH CENTURY

With the entry of Western Australia into the Commonwealth of Australia the State Constitution became subordinate in terms of the provisions in Chapter V of the Commonwealth Constitution in that henceforth it would at all times be subject to the specific provisions of the latter. Powers exclusively vested in the Commonwealth were no longer able to be the subject of State legislation, and whenever there was an inconsistency between a law of the State and a law of the Commonwealth the latter would, to the extent of the inconsistency, prevail. In this regard the most immediate impact

14 Stannage, *The People of Perth*, p. 204.

15 *Ibid.*

16 *Ibid.*, p. 205.

of Federation was with respect to customs duties since like the other States Western Australia was to become subject to Section 92 which provided that 'trade, commerce and intercourse among the States, whether by means of internal carriage or ocean navigation shall be absolutely free'. To minimise the impact of the loss of revenue, however, Western Australia did at least receive a concession under Section 95 that for the first five years after federation the State could continue to impose its own duties though on a reducing sliding scale. By contrast the State's capacity to borrow overseas was left undisturbed constitutionally until the increasing indebtedness of the States by the 1920s paved the way via a constitutional amendment for the Commonwealth in the course of taking over State debts to establish the Loan Council to coordinate future borrowings.

During the 1930s in an unique constitutional event the Western Australian Parliament enacted legislation providing for a referendum within the State seeking electors' views on a proposal for the State to secede from the Commonwealth. At the poll taken on 8 April 1933, the same day as the general election for the Legislative Assembly, the electors paradoxically voted in favour of secession but rejected Sir James Mitchell's non-Labor coalition government in favour of the Opposition Labor party which officially opposed leaving the Commonwealth. The voting on secession itself was 138,653 (66.23 per cent) in favour and 70,706 against with a 'Yes' vote of 73 per cent in the farming areas and 65 per cent in the city contrasting with a 55 per cent 'No' vote on the goldfields. In the wake of the referendum Premier Collier arranged for a delegation of pro-secessionists to take the case to Westminster but the Imperial Parliament refuse to entertain the petition. While undoubtedly grounded on long-standing grievances amongst West Australians concerning the impact of federation and especially tariff policies, the outcome of the referendum must be seen primarily as a response to the financial hardships of the depression.<sup>17</sup>

Other referendums held this century have been either in the category of seeking public opinion on an issue causing controversy within Parliament or, as in the case of the Prohibition polls of 1925 and 1950—both of which were heavily defeated—and the local option poll of 1921, in terms of the requirements of the Licensing Act. Those in the former category included the two daylight saving

referenda held in 1975 and 1984 respectively with the percentage rejecting the proposition rising marginally from 53.7 per cent to 54.4 per cent on the second occasion. Since 1978 there has been a requirement for a constitutional referendum to be held on certain matters 'entrenched' by Parliament in 1978: these include *inter alia* amendments seeking to abolish the office of Governor, abolish or reduce the number of members in either House of the Western Australian Parliament or include in either House members not elected directly by the people. As yet no referendum has been held under these provisions.

With popular plebiscites few and far between the operation of responsible government in Western Australia in the twentieth century has primarily been reflected in the interaction between the Governor and his advisers and Parliament respectively.

Since 1890 there have been no major public crises and few issues of consequence involving the use of the personal prerogative of the viceregal representative. Until 1933 all the appointees came from the United Kingdom but in that year Labor Premier Philip Collier nominated his defeated parliamentary opponent, James Mitchell, who served as Lieutenant-Governor until 1948 and then as Governor until shortly before his death in 1951. The only other persons chosen as Governor directly from the local community have been Air Commodore Hughie Edwards V.C. in the 1970s, Politics Professor Gordon Reid in 1984 and former Chief Justice, Sir Francis Burt, in 1990.

One factor contributing to the relatively straightforward nature of role of the Governor in Western Australia has been the fact that since 1905 there has been no premature dissolution of the Legislative Assembly and as yet no threat to Supply from the Legislative Council sufficient to require decision-making on his part. Since 1905 too the party situation has meant that the choice of Premier, whether after or between elections, has been self-evident though in the previous four years dating from the retirement of Forrest there had been six changes of government. In February 1917 Liberal Premier Frank Wilson did approach the Governor, Sir Harry Barron, requesting a dissolution after Country party defections resulted in his government being defeated in committee on the floor of the House. On that occasion the Governor refused the request leaving the situation

17 D. Black, 'The Era of Labor Ascendancy', in Stannage (ed.), *A New History of Western Australia*, pp. 421-422.

to be resolved by inter-party negotiation only for Wilson to be overthrown at a party meeting soon afterwards.

On four occasions in the postwar era a problematical situation has threatened to embroil the Governor in a constitutional crisis but in only one of these was the Governor directly involved. In the first in 1955 the death of the Labor MLA for Bunbury and the loss of the resultant by-election left the Hawke Labor government with a minority on the floor of the House but the government secured the support of one Opposition member allowing it to survive until the general election the following year when it was returned with an increased majority. Similarly in October 1971 the Tonkin Labor government also lost its majority with the death of Speaker Toms but on that occasion the Governor, Sir Douglas Kendrew, agreed to prorogue Parliament until a by-election could be held at which the government regained its majority. Thirdly, in 1973 after Labor had narrowly retained its stronghold of Balcatta at a by-election there was considerable speculation that the Liberals might block Supply in the upper House but such a move did not eventuate. Finally, at the end of 1989 a specific attempt was made to block the budget in the upper House but this was narrowly defeated.

With reference to the latter two occurrences the composition and role of the Legislative Council has been an ongoing source of political controversy. Prior to 1965 one-third of the upper House members had to face the electors at biennial elections for which a property franchise applied. As from the 1965 election, in conjunction with changes providing for half the members to seek re-election every three years, universal suffrage was introduced for the upper House elections but the maintenance of a very substantial degree of vote weighting in distributing the seats contributed to a continuing conservative ascendancy. Even after the sweeping reforms of 1988, providing for the whole House to be elected every four years by a system of proportional representation applying in six regions ( three metropolitan and three country), it is still the case that the Labor party has never enjoyed a majority in its own right in the Second Chamber.

Nor has any Labor administration, notwithstanding its majority in the Legislative Assembly, been able to reduce the power of the Legislative Council, and there is still no constitutional procedure for overcoming a deadlock between the two Houses. Over the years, and particularly when the government of the day has lacked a majority in the

Legislative Council, there have been constant disputes concerning the actions of the upper House in rejecting or making substantial amendments to bills for which the government claimed to have a mandate from the people. For many years when such deadlocks arose use was made of provisions in the Standing Orders for a conference of managers representing each House. Inevitably this meant that the government of the day had to accept those compromises which the upper House members were prepared to make or else abandon the bill in question.

In this regard too the members of the Legislative Assembly have never been prepared to concede the right of the upper House to press requests on money bills. Instead they have consistently argued that, in the absence of any provision for the dissolution of the Legislative Council such as can be utilised under Section 57 of the Australian Constitution to hold the Senate accountable, the Legislative Council is exceeding its prerogative in asserting that its powers on money bills should be virtually the same as those of the lower House except for the right of initiating such legislation. The Legislative Council for its part has never been prepared to concede the claim but as at the beginning of the centenary year had still to exercise its ultimate power of depriving such administrations of the money needed to finance 'the ordinary annual services of government'.

In parliamentary terms a great deal of controversy and debate during the twentieth century has centred on the issue of vote weighting, which has remained a feature of the electoral arrangements for both Houses throughout. Between 1911 and 1947 substantial over-representation of the goldfields areas, due both to differential vote weighting and the failure to have more than one electoral redistribution throughout the whole period, contributed to Labor's success in holding office for 25 of the 36 years. Subsequently, changes in the zonal arrangements introduced by non-Labor governments and the continuing relative decline of population in the older mining areas produced a greater relative bias to south-west and outer metropolitan seats favouring the Liberal party while the number of metropolitan seats in both houses (and especially in the Legislative Council) consistently lagged behind their strict numerical entitlement on a one-vote-one-value basis. Thus in 1982 voters in the metropolitan area with 63 per cent of the population were represented by only 44 per cent of the members in the Legislative Assembly and 33 per cent in the Legislative Council though subsequent reforms meant that from the 1989 election members

representing the metropolitan area (albeit enlarged by comparison with 1982) accounted for 60 per cent of the total membership of the Legislative Assembly and 50 per cent for the Legislative Council. In an effort to make the whole process less political three independent Electoral Commissioners were appointed in 1987 though the Commissioners are still obliged to work under the vote weighting principles set in parliamentary legislation.

Other electoral changes have been less controversial including the adoption of preferential voting in 1911, compulsory enrolment in 1919 and compulsory voting in time for the 1939 election, and extending the vote to the 18-21 year olds in 1971. Generally speaking elections dating from 1971 have been far more competitive than was previously the case and it is now rare for a member of either house to be returned unopposed. However, as late as 1971 only five women had been elected to the Western Australian Parliament even though women had been eligible to seek election since 1920 and Australia's first woman MP, Edith Cowan was elected the following year. By contrast by 1989 the number had risen to 21 and four women were included in the Dowding ministry when prior to 1986 only two—Dame Florence Cardell-Oliver and June Craig—had held a cabinet post at any time. A year later Dr Carmen Lawrence became Australia's first woman Premier with four female colleagues in her first ministry.

A further source of controversy in recent years has been the question of whether or not an absolute majority is required for certain bills apparently amending the Constitution. This applies particularly to the provision in Section 73 of the Constitution Act requiring the concurrence of an absolute majority for 'any Bill by which any change in the Constitution of the Legislative Council or the Legislative Assembly shall be effected'. In general, decisions both by the High Court of Australia and the Supreme Court of Western Australia (as in the *Wilsmore Case* 1982), have narrowed the meaning of the word 'Constitution' in Section 73 to the point where it seems to mean little more than the number of members in each House and would not encompass, for example, proposals seeking to increase the number of Ministers of the Crown. With reference to the provisions added to Section

73 in 1978 'entrenching' certain constitutional provisions, there has not been the necessity for a ruling from the Chair as to whether or not a proposal for amendment would or would not require a referendum before the constitutional amendment could be made.<sup>18</sup>

In the current environment one area of growing concern among parliamentary practitioners has been the steady increase in the proportion of members of the Western Australian Parliament who are also members of the Executive. Thus in 1901, of the fifty members of the Legislative Assembly and thirty of the Legislative Council, six were Ministers of State (five from the Legislative Assembly and one from the Legislative Council), that is 7.5 per cent of the total membership of both Houses and 10 per cent of the lower House. By contrast in 1989 there were seventeen Ministers (including three in the Legislative Council), that is ministers comprised 18.7 per cent of the total membership of 91 and almost 25 per cent of the lower House. The growing predominance of the Executive has also been reinforced by the practice since the early 1970s whereby Oppositions appoint shadow ministries with each Opposition frontbencher assigned to 'shadow' particular ministerial portfolios.

Within the practice of relations between the Executive and the Legislature too there has been a significant growth of concern in recent years over the adequacy or otherwise of the processes designed to ensure appropriate levels and forms of accountability. At the parliamentary level there has been a marked increase in the number of parliamentary questions, urgency motions and the like designed to maintain pressure on the Executive. Moreover, the growth of the public service proper and the mushrooming of governmental and semi-governmental agencies and the resultant political controversy have led, for example to the establishment in 1982 of the Standing Committee on Government Agencies in the Legislative Council, the implementation of reforms designed to make the public service more efficient and accountable to the political Executive, and the appointment of the Burt Commission on Accountability in 1988. In addition the Official Corruption Commission was set up in 1989 in an effort to enhance honesty and probity in government and politics.



Admittedly cases involving the actual resignation of Ministers when the tenets of ministerial responsibility have apparently been breached were few and far between in Western Australian politics prior to the resignation of Premier Dowding and one of his Ministers, Julian Grill in February 1990 along with the decision of David Parker to step down from the post of Deputy Premier, though not from the ministry. Those who did resign in earlier years included Norbert Keenan in 1931 in protest against the Mitchell government's decision to sell the State Savings bank during the depression; R.T. Robinson in 1919 on the basis of his belief that the Mitchell as Premier was interfering with the administration of his department; and W.L. Grayden in 1978 arising out of an incident when he was convicted on charges of unlawful assault and unlawful damage. Of the three Grayden was subsequently reinstated in 1980.

In its present uncodified form, and in the absence of any requirements for or attempts to utilise popular referenda or open hearings to achieve constitutional change, the State Constitution of Western Australia is characterised by a low level of public awareness of its very existence let alone of its major provisions. With the onset of the centenary of constitutional self government and responsible government both Houses of the Western Australian parliament have agreed to the appointment of a Joint Select Committee -

(a) to create opportunities for community discussion concerning possible areas of constitutional reform and to provide the parliament with a reasoned summary of proposals for reform;

(b) to give consideration to consolidating the law, practice and Statutes comprising the Constitution of Western Australia; and

(c) to make recommendations concerning making this body of law and practice more readily accessible by the citizens of this State.

This represents the first formal proposal in a hundred years for a comprehensive re-evaluation of the structure and provisions of the various constitutional acts and associated practices which underpin responsible government in Western Australia.

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## System of Government

Western Australia is one of the six federated sovereign States which, together with the Northern Territory and the Australian Capital Territory, constitute the Commonwealth of Australia. Thus, in addition to having its own Parliament and executive government, it is represented in the federal legislature. As well as government at the Federal and State levels, there is a third system, that of local government, which functions through City Councils, Town Councils and Shire Councils.

### VICE-REGAL REPRESENTATION

#### The Governor-General of Australia

Under the Commonwealth Constitution, ultimate executive power is vested in the Crown and is exercised by the Governor-General as the direct representative of the Sovereign. Appointment to the office is made by the Crown after consultation with the Prime Minister of the Commonwealth. The present Governor-General is His Excellency the Honourable Bill Hayden, AC who was sworn in on 16 February 1989. During the absence from Australia of the Governor-General it is usual for the senior among the State Governors to be appointed Administrator.

#### The Governor of Western Australia

The Governor of Western Australia is the personal representative of the Sovereign in the State and exercises the powers of the Crown in State matters. He is the titular head of the Government and performs the official and ceremonial functions attaching to the Crown. In the event of the Governor's absence from Western Australia the Lieutenant-Governor of the State is appointed Administrator. If there is no Lieutenant-Governor it is customary for the Chief Justice of Western Australia to be appointed Administrator. The present Governor of Western Australia, Sir Francis Burt, KCMG, was appointed on 27 February 1990. He had been Acting Governor since June 1989 and had served as Lieutenant-Governor since 1977. Chief Justice David Malcolm was sworn in as Lieutenant-Governor on the same date, 27 February 1990.

The last Governor of Western Australia as a Colony was Lieutenant-Colonel Sir Gerard Smith, KCMG, whose term of office expired on 29 June 1900 and the first Governor of the State was Captain Sir Arthur Lawley, KCMG, who was sworn in on 1 May 1901.

**The Late Governor, of Western Australia, Professor Gordon Reid, AC.** Professor Gordon Reid was sworn in as the 25th Governor of Western Australia on 2 July 1984 and his term of

office was extended for a second time in December 1988. His resignation of commission was accepted on 22 September 1989 following a disclosure of illness. Professor Reid died on 26th October 1989.

Professor Reid began his public service career in 1946 following a period with the RAAF (1942-1946) where he served with Bomber Command. On joining the public service Professor Reid was appointed to the staff of the House of Representatives; he rose to become Sergeant-at-Arms and Clerk of Committee whilst completing his degree in commerce. After studying for a doctorate through London University, Professor Reid went on to become a reader in politics at Adelaide University in 1965. In 1966 he was appointed to the newly created Chair in Politics at the University of Western Australia and was re-appointed to that position in 1974 following a brief sojourn as professor of political science at the Australian National University; four years later he became Deputy Vice Chancellor.

In 1983 the Commonwealth Parliament commissioned Professor Reid to write a 200,000 word history of the Australian Parliament. Designed to coincide with the Bicentennial this work went to press in 1988 and was titled *Australia's Commonwealth Parliament 1901-1986*. For this work and for services to learning and the Crown Professor Reid was admitted as a Companion in the Order of Australia in the 1986 Queen's birthday honours list. Two years earlier the Senate of the University of Western Australia had also honoured him by making him an emeritus professor.

### THE FEDERAL PARLIAMENT

The legislative power of the Commonwealth is vested in a Federal Parliament which consists of Her Majesty the Queen (represented by the Governor-General), a Senate and a House of Representatives. Subject to the Constitution, the Federal Parliament is empowered to make laws concerning, among other things, defence, external affairs, customs and excise, trade and commerce

with other countries and among the States, taxation, borrowing of money on public credit, currency and coinage, banking, insurance, navigation, fisheries, quarantine, posts and telegraphs, census and statistics, immigration, naturalisation and aliens, copyrights and trademarks, bankruptcy, marriage, divorce and matrimonial causes, social services, and conciliation and arbitration for the prevention and settlement of industrial disputes extending beyond the limits of any one State. The Constitution provides that, when a law of a State is inconsistent with the law of the Commonwealth, the Commonwealth law shall prevail and the State law shall, to the extent of the inconsistency, be invalid.

The qualifications necessary for membership of the Federal Parliament and for voting at federal elections are described in *Year Book Australia*. Under the provisions of the *Commonwealth Electoral Act 1973*, which was proclaimed operative from 21 March 1973, the age qualification for enrolment, voting and candidature for federal parliamentary elections was lowered from twenty-one years to eighteen years.

The payment of allowances to Senators and Members of the House of Representatives is provided for in the Constitution and a superannuation scheme is established under the provisions of the *Parliamentary Retiring Allowance Act 1984*.

### The Senate

The Senate consisted originally of thirty-six members, six Senators being returned from each State. The Parliament is authorised by the Constitution to increase or decrease the number of members. The growth of the population since Federation having been such as to warrant a considerable enlargement of the Parliament, a Representation Act was passed in 1948 to provide for increased membership by raising from six to ten the number of Senators from each State. A further Representation Act was passed in 1983 increasing the number of Senators for each State from ten to twelve. The counting of votes in elections for the Senate is one of proportional representation. A summary of the procedure is given in the *Western Australian Year Book* No. 24—1986 and earlier issues..

Members are elected on the basis of adult suffrage by the people of the State which they represent. As provided by the *Commonwealth Electoral Act 1918*, enrolment as an elector is compulsory for all qualified persons except those who are Aboriginal

natives of Australia. Aborigines, although entitled to enrol, are not required to do so. Voting is compulsory for all enrolled persons in terms of an amendment of 1924 which operated for the first time at elections held on 14 November 1925. The term of office of a Senator is normally six years and commences on the first day of July following his election. One-half of the members retire at the end of every third year and are eligible for re-election.

Elections for the Senate were last held on 24 March 1990. Table 5.1 shows the Western Australian membership of the Senate at 10 April 1990.

One Senate seat is currently vacant, following the resignation of the Hon. F. Chaney who was elected to the House of Representatives.

TABLE 5.1— WESTERN AUSTRALIAN MEMBERS OF THE SENATE

Member	Political party	Year of retirement
M.E. Beahan	A.L.P.	1990
Hon. P.F.S. Cook	A.L.P.	1993
N.A. Crichton-Browne	Lib.	1990
Hon. P.D. Durack, QC	Lib.	1993
P.J. Giles	A.L.P.	1993
J.A. Jenkins	A.D.	1990
S.C. Knowles	Lib.	1993
J.P. McKiernan	A.L.P.	1990
J.H. Panizza	Lib.	1990
J. Vallentine	Ind.	1990
Hon. P.A. Walsh	A.L.P.	1993

A.L.P. = Australian Labor Party. Lib. = Liberal Party. A.D. = Australian Democrats. Ind. = Independent.

### The House of Representatives

State membership of the House of Representatives is on a population basis with the proviso that each State shall have at least five members. The Constitution provides further that the number of members of the House of Representatives shall be, as nearly as practicable, double the number of Senators. With the enlargement of the Senate from thirty-six to sixty members, the membership of the House of Representatives was increased, from the date of the 1949 elections, from seventy-four to 121, not including a member for the Australian Capital Territory, which achieved representation for the first time at this election, and a member for the Northern Territory, which had been represented since 1922.

TABLE 5.2 – WESTERN AUSTRALIAN MEMBERS OF THE HOUSE OF REPRESENTATIVES

Member	Political party	Electorate
W.F. Fatin	A.L.P.	Brand
G. Gear	A.L.P.	Canning
C.A. Jakobsen	A.L.P.	Cowan
A.C. Rocher	Lib.	Curtin
G.D. Prosser	Lib.	Forrest
Hon. J.S. Dawkins	A.L.P.	Fremantle
G. Campbell	A.L.P.	Kalgoorlie
P. Filing	Lib.	Moore
C.W. Tuckey	Lib.	O'Connor
F. Chaney	Lib.	Pearce
Dr R.I. Charlesworth, AM	A.L.P.	Perth
R.F. Edwards	A.L.P.	Stirling
Hon. K.C. Beazley	A.L.P.	Swan
P.D. Shack	Lib.	Tangney

A.L.P. = Australian Labor Party. Lib. = Liberal Party of Australia.

Subsequent redistributions have increased the number of members of the House of Representatives in line with population growth. At the last election in March 1990, the following numbers of members of the House were elected:

New South Wales 51; Victoria 38; Queensland 24; Western Australia 14; South Australia 13; Tasmania 5; plus the Australian Capital Territory 2 and the Northern Territory 1, making a total of 148 seats. Diagram 5.1 shows House of Representatives electorates in Western Australia.

Members of the House of Representatives are elected for the duration of the Parliament—which is limited to three years—by the people of the electorate whom they represent. As provided by the *Commonwealth Electoral Act 1918*, enrolment for electors is the same as for the Senate. Voting is on the preferential system.

Elections for the House of Representatives were last held on 24 March 1990. Table 5.2 shows the Western Australian membership of the House of Representatives at 10 April 1990.

### THE STATE PARLIAMENT

The Crown, represented by the Governor, and the Parliament, comprising a Legislative Council and a Legislative Assembly, constitute the legislature of Western Australia.

TABLE 5.3 – MINISTRIES FROM 1890

Name of Premier	Political party	Date of assumption			Duration		
		Year	Day	Month	Years	Months	Days
Forrest	(a)	1890	29	December	10	1	17
Throssell		1901	15	February	-	3	12
Leake		27	May	-	5	25	
Morgans		21	November	-	1	2	
Leake		23	December	-	6	8	
James	Labour	1902	1	July	2	1	9
Daglish		1904	10	August	1	-	15
Rason	Liberal	1905	25	August	-	8	12
Moore	Liberal	1906	7	May	4	4	9
Wilson	Liberal	1910	16	September	1	-	21
Scaddan	Labour	1911	7	October	4	9	20
Wilson	Liberal	1916	27	July	-	11	1
Lefroy	Liberal	1917	28	June	1	9	20
Colebatch	Liberal	1919	17	April	-	1	-
Mitchell	Nat. and C.P. (coalition)	1917	17	May	4	10	30
Collier	Labour	1924	16	April	6	-	8
Mitchell	Nat. and C.P. (coalition)	1930	24	April	3	-	-
Collier	Labour	1933	24	April	3	3	27
Wilcock	Labour	1936	20	August	8	11	11
Wise	Labour	1945	31	July	1	8	1
McLarty	L.C.L. and C.P. (coalition)	1947	1	April	5	10	22
Hawke	Labour	1953	23	February	6	1	10
Brand	L.C.L. and C.P. (coalition)	1959	2	April	11	11	1
Tonkin	A.L.P.	1971	3	March	3	1	5
Court	Lib. and C.P. (coalition)	1974	8	April	7	9	17
O'Connor	Lib. and C.P. (coalition)	1982	25	January	1	1	-
Burke	A.L.P.	1983	25	February	5	-	-
Dowding	A.L.P.	1988	25	February	1	11	12
Lawrence	A.L.P.	1990	12	February			Still in office (b)

A.L.P. = Australian Labor Party. C.P. = Country Party. (c) L.C.L. = Liberal and Country League. (d) Lib = Liberal. (e) Nat. = Nationalist.

Executive government is based, as in the case of the Commonwealth and other States, on the system which evolved in Great Britain in the eighteenth century and which is generally known as the 'cabinet' system. The cabinet consists of Ministers of the Crown chosen for the Ministry from members of Parliament belonging to the political party, or coalition of parties, which is in the majority in the Legislative Assembly. The Constitution requires that at least one of the Ministers be selected from members of the Legislative Council. In Western Australia, as in the other Australian States, the office of principal Minister is designated 'Premier'.

Since 1890, when responsible government was granted to Western Australia, there have been twenty-nine separate Ministries. No organised political party existed in the Colony until the formation of a Labour party in the 1890s. A Labour Ministry assumed office in 1904.

The Constitution Act of 1889 provided for a Ministry of five members. This number was increased by subsequent amendments to the Act to seventeen and is currently sixteen Ministers.

The right to vote at parliamentary elections was extended to women by the *Constitution Acts*

*Amendment Act 1899* and membership of either House was provided for by the Parliament (Qualification of Women) Act 1920. The first woman member of any Australian Parliament was Mrs Edith Dircksey Cowan, OBE, who was elected to the Legislative Assembly in March 1921 as member for West Perth. Mrs A.F.G. (later Dame Florence) Cardell-Oliver, MLA for Subiaco became the first woman Cabinet Minister in Australia when she joined the McLarty Ministry in 1947.

Payment of members was introduced in 1900 by a Payment of Members Act and a superannuation fund operates under the *Parliamentary Superannuation Act 1970*.

Under the provisions of the *Acts Amendment (Electoral Reform) Act 1987*, which came into operation on 30 October 1987, three Electoral Distribution Commissioners were appointed to divide the State into fifty-seven electoral districts—thirty-four comprising the Metropolitan Area (as described in the *Metropolitan Region Town Planning Scheme Act 1959*, as at 1 January 1987) and twenty-three the remainder of the State. These districts return one member each to the Legislative Assembly.

TABLE 5.5 - ELECTORAL REGIONS AND ELECTORAL DISTRICTS

<i>Electoral region</i>	<i>Electoral districts</i>	<i>Electoral region</i>	<i>Electoral districts</i>
North Metropolitan	Balcatta	East Metropolitan (continued)	Maylands
	Cottesloe		Morley
	Dianella		Roleystone
	Florat		Swan Hills
	Glendalough	South-west	Thornlie
	Kingsley		Albany
	Marrangaroo		Bunbury
	Marmion		Collie
	Nedlands		Mandurah
	Nollamarra		Mitchell
	Perth		Murray
	Scarborough		Stirling
	Wanneroo		Vasse
	Whitford		Warren
South Metropolitan	Applecross	Agricultural	Wellington
	Cockburn		Avon
	Fremantle		Geraldton
	Jandakot		Greenough
	Melville		Merredin
	Peel		Moore
	Riverton		Roe
	Rockingham		Wagin
	South Perth		Mining and Pastoral
Victoria Park	Eyre		
East Metropolitan	Armadale	Kalgoorlie	
	Belmont	Kimberley	
	Darling Range	Northern Rivers	
	Helena	Pilbara	
	Kenwick		

The State is also divided into six regions—three Metropolitan regions consisting of the Metropolitan electoral districts, a South-West region, an Agricultural region and a Mining and Pastoral region consisting of the electoral districts comprising the remainder of the State. The North Metropolitan Region and the South-West Region each return seven members to the Legislative Council, and the other electoral regions return five Council members.

The division process, which included opportunities for public submissions and comment, was completed on 29 April 1988, when the final division was gazetted. This division was applied to the election held in February 1989 and will apply to subsequent general elections for the Legislative Assembly.

A further provision of the Act extends the terms of members of both Houses of Parliament to four years, commenced from the Thirty-third Parliament.

TABLE 5.4 – THE MINISTRY AT 24 APRIL 1990

<i>Minister</i>		<i>Title of office</i>
C.M. Lawrence, B Psych, PhD,	MLA	Premier; Treasurer; Minister for Public Sector Management; The Family; Aboriginal Affairs; Multicultural and Ethnic Affairs; Women's Interests.
I.F. Taylor, B Econ (Hons), JP	MLA	Deputy Premier; Minister for Finance and Economic Development; Trade; Goldfields.
J.M. Berinson, QC	MLC	Attorney General, Minister for Corrective Services; Resources; Leader of the Government in the Legislative Council.
E.K. Hallahan, BSW, JP	MLC	Minister for Planning; Lands; Heritage; Minister assisting the Minister for Women's Interests; The Arts; Deputy Leader of the Government in the Legislative Council.
JP Carr, BA, JP	MLA	Minister for Mines; Fuel and Energy; Mid-West; Small Business.
R.J. Pearce, BA, Dip Ed, JP	MLA	Minister for Environment; Leader of the House in the Legislative Assembly.
K.J. Wilson	MLA	Minister for Health.
G.J. Troy, B Bus, FAIM, JP	MLA	Minister for Productivity and Labour Relations; Minister assisting the Minister for Education with TAFE; Minister assisting the Minister for Public Sector Management.
P.A. Beggs, JP	MLA	Minister for Transport; Racing and Gaming; Tourism.
E.F. Bridge, JP	MLA	Minister for Agriculture; Water Resources; North-West.
G.L. Hill, JP	MLA	Minister for Local Government; Fisheries; Sport and Recreation; Youth; Minister assisting the Minister for Multicultural and Ethnic Affairs.
G.J. Edwards	MLC	Minister for Police; Emergency Services; The Aged.
Y.D. Henderson, BA, Dip Ed, JP	MLA	Minister for Housing; Consumer Affairs.
D.L. Smith, LLB, JP	MLA	Minister for Community Services; Justice; South-West.
P.A. Buchanan, JP	MLA	Minister for Works; Services; Regional Development; Minister assisting the Minister for Aboriginal Affairs.
G.J. Gallop, B Econ, MA, M Phil, D Phil	MLA	Minister for Education; Parliamentary and Electoral Reform.
W.J. Thomas, BA	MLA	Parliamentary Secretary of the Cabinet.

## ELECTIONS

### The Federal Parliament

General elections for the Federal Parliament were held on 24 March 1990. The Australian Labor Party, led by R.J.L. Hawke, AC, was elected to office with seventy-eight seats in the House of Representatives.

Final distribution of Senate seats resulting from the election has not been announced at time of publication.

### The State Parliament

At the conjoint election for the Legislative Council and the Legislative Assembly held on 4 March 1989, the Australian Labor Party, led by Peter Dowding, MLA, was elected to office with a majority in the Legislative Assembly of five seats. Mr Dowding stood down from the Premiership on 24 February 1990; he was succeeded by Dr Carmen Lawrence MLA, who became the first woman Premier in Australian history.

**LEGISLATION DURING 1989**

During the first session of the thirty-third Parliament, which lasted from 29 March to 21 December 1989, the Western Australian legislature enacted forty-four Public Statutes and dealt with 110 Bills which were introduced but not passed.

The full text of the legislation enacted is contained in the volumes of The Acts of the Parliament of Western Australia.

**TABLE 5.5 - MEMBERS OF THE LEGISLATIVE COUNCIL : MAY 1990**

<i>Name</i>	<i>Political party</i>	<i>Electoral region</i>
J.M. Berinson	A.L.P.	North Metropolitan
J.M. Brown	A.L.P.	Agricultural
T.G. Butler	A.L.P.	East Metropolitan
J.N. Caldwell	N.P.A.	Agricultural
S.G.E. Cash	Lib.	North Metropolitan
E.J. Charlton	N.P.A.	Agricultural
C. Davenport	A.L.P.	South Metropolitan
R.E. Davies	Lib.	North Metropolitan
G.J. Edwards	A.L.P.	North Metropolitan
G.M. Evans	Lib.	North Metropolitan
P.G. Foss	Lib.	East Metropolitan
C.E. Griffiths	Lib.	South Metropolitan
S.J. Halden	A.L.P.	Metropolitan
E.K. Hallahan	A.L.P.	East Metropolitan
T.R. Helm	A.L.P.	Mining & Pastoral
B.J. House	Lib.	South-West
B.L. Jones	A.L.P.	South West
G.K. Kelly	A.L.P.	South Metropolitan
P.H. Lockyer	Lib.	Mining & Pastoral
M. McAleer	Lib.	Agricultural
F.E. McKenzie	A.L.P.	East Metropolitan
M.S. Montgomery	N.P.A.	South-West
N.F. Moore	Lib.	Mining & Pastoral
M.W. Nevil	A.L.P.	Mining & Pastoral
M.G. Patterson	Lib.	South-West
P.G. Pandal	Lib.	South Metropolitan
S.M. Piantadosi	A.L.P.	North Metropolitan
R.G. Pike	Lib.	North Metropolitan
T.G. Stephens	A.L.P.	Mining & Pastoral
W.N. Stretch	Lib.	South West
R.J. Thomas	A.L.P.	South-West
D. Tomlinson	Lib.	East-Metropolitan
D.W. Wenn	A.L.P.	South-West
D.J. Wordsworth	Lib.	Agricultural

**SUMMARY**

Australian Labor Party (A.L.P.)	16
The Liberal Party of Australia (Western Australian Division) Incorporated (Lib.)	3
National Party of Australia (N.P.A.)	15

**TABLE 5.6 - MEMBERS OF THE LEGISLATIVE ASSEMBLY : MARCH 1990**

<i>Name</i>	<i>Political party</i>	<i>Electoral district</i>
R.A. Ainsworth	N.P.A.	Roe
Dr I.C. Alexander,	A.L.P.	Perth
Hon. M. Barnett	A.L.P.	Rockingham
Hon. P.A. Beggs	A.L.P.	Whitford
B.R. Blaikie	Lib.	Vasse
J.L. Bradshaw	Lib.	Wellington
Hon. E.F. Bridge	A.L.P.	Kimberley
P.A. Buchanan.	A.L.P.	Ashburton
Hon. J.P. Carr	A.L.P.	Geraldton
N.M. Catania	A.L.P.	Balcatta
J.G. Clarko.	Lib.	Marmion
R.F. Court.	Lib.	Nedlands
H.J. Cowan	N.P.A.	Merredin
E.J. Cunningham	A.L.P.	Marangaroo
F.A. Donovan	A.L.P.	Morley
Hon. P.M. Dowding,	A.L.P.	Maylands
C.L. Edwards	Lib.	Kingsley
Dr G.I. Gallop	A.L.P.	Victoria Park
L. Graham	A.L.P.	Pilbara
Hon. W.L. Grayden,	Lib.	South Perth
Hon. J.F. Grill	A.L.P.	Eyre
W.R.B. Hassell.	Lib.	Cottesloe
Hon. Y.D. Henderson	A.L.P.	Thornlie
Hon. G.L. Hill	A.L.P.	Helena
M.G. House	N.P.A.	Stirling
G.D. Kierath	Lib.	Riverton
J.C. Kobelke	A.L.P.	Nollamara
Hon. C.M. Lawrence	A.L.P.	Glendalough
K.J. Leahy	A.L.P.	Northern Rivers
K.R. Lewis	Lib.	Applecross
B.J. MacKinnon	Lib.	Jandakot
W.J. McNee	Lib.	Moore
N.R. Marlborough,	A.L.P.	Peel
Hon. A. Mensaros	Lib.	Floreat
K.J. Minson	Lib.	Greenough
R.K. Nicholls	Lib.	Mandurah
P.D. Omodei	Lib.	Warren
Hon. D.C. Parker.	A.L.P.	Fremantle
Hon. R.J. Pearce	A.L.P.	Armadale
J.B. Read	A.L.P.	Murray
E.S. Ripper	A.L.P.	Belmont
D.J. Shave	Lib.	Melville
D.L. Smith	A.L.P.	Mitchell
P.J. Smith.	A.L.P.	Bunbury
G.J. Strickland	Lib.	Scarborough
Hon. I.F. Taylor	A.L.P.	Kalgoorlie
W.I. Thomas	A.L.P.	Cockburn
Hon. I.D. Thompson	Ind.	Darling Range
M.W. Trenorden,	N.P.A.	Avon
Hon. G.J. Troy	A.L.P.	Swan Hills
F.C. Tubby	Lib.	Roleystone
Dr H. Turnbull	N.P.A.	Collie
J.P. Watkins	A.L.P.	Wanneroo
Dr J. Watson	A.L.P.	Kenwick
L.H. Watt,	Lib.	Albany
R.L. Wiese,	N.P.A.	Wagin
Hon. K.J. Wilson,	A.L.P.	Dianella

**SUMMARY**

Australian Labor Party (A.L.P.)	31
The Liberal Party of Australia (Western Australian Division) Incorporated (Lib.)	19
National Party of Australia (N.P.A.)	5
Independent	1



## GOVERNMENT ADMINISTRATION

### Australian Government

A comprehensive guide to the organisation and functions of the Australian Government is given in the Commonwealth Government Directory, including an outline of the activities of each Department of State together with similar information concerning Boards, Committees, Councils, Commissions and other Instrumentalities. A list of Australian Government Departments, the principal matters dealt with by each Department, and details of the statutes

administered by the relevant Federal Minister are published from time to time in the Commonwealth of Australia Gazette.

### State Government

The Public Service of Western Australia operates under the provisions of the *Public Service Act 1978* and consists of a number of Departments established in accordance with the Act. The establishment, abolition or alteration of Departments is subject to the approval of the Governor.

TABLE 5.7 - SELECTED WESTERN AUSTRALIAN GOVERNMENT DEPARTMENTS  
(Public Service Act 1978)

Department	Address	Department	Address
Aboriginal Affairs Planning Authority	35 Havelock Street West Perth 6005	Department of Land Administration	Cathedral Avenue Perth 6000
Department of Agriculture	Baron-Hay Court South Perth 6151	Local Government Department	32 St George's Terrace. Perth 6000
Department for the Arts	Perth Cultural Centre Stirling Street Perth 6000	Department of Marine and Harbours	1 Essex Street Fremantle 6160
Auditor General for Western Australia	815 Hay Street Perth 6000	Department of Mines	100 Plain Street East Perth 6004
Authority for Intellectually Handicapped Persons	53 Ord Street West Perth 6005	Department of Occupational Health, Safety and Welfare	600 Murray Street West Perth 6005
Building Management Authority of Western Australia	2 Havelock Street West Perth 6005	Police Service	2 Adelaide Terrace East Perth 6004
Department for Community Services	189 Royal Street East Perth 6000	Department of the Premier and Cabinet	197 St George's Terrace Perth 6000
Department of Computing and Information Technology	32 St Georges's Terrace Perth 6000	Public Service Commission	469-489 Wellington Street Perth 6000
Department of Conservation and Land Management	Hackett Drive Crawley 6009	Office of Racing and Gaming	3 Plain Street East Perth 6004
Ministry of Consumer Affairs	251 Hay Street East Perth 6004	Department of Regional Development and the North West	32 St George's Terrace Perth 6000
Corporate Affairs Department	565 Hay Street Perth 6000	Department of Resources Development	170 St George's Terrace Perth 6000
Department of Corrective Services	441 Murray Street Perth 6000	Department of Services	3 Havelock Street West Perth 6005
Crown Law Department	109 St George's Terrace. Perth 6000	Ministry of Sport and Recreation	Sir Thomas Meagher Pavilion Perry Lakes Stadium Floreat 6014
Ministry of Education	151 Royal Street East Perth 6004	State Government Insurance Commission	170 St George's Terrace Perth 6000
Department of Employment and Training	18-20 Howard Street Perth 6000	State Planning Commission	22 St George's Terrace Perth 6000
Environmental Protection Authority	1 Mount Street Perth 6000	State Taxation Department	20 Barrack Street Perth 6000
Department of Fisheries	108 Adelaide Terrace. Perth 6000	Department of Transport	136 Stirling Highway Nedlands 6009
Government Employees Superannuation Board	10 Kings Park Road Perth 6000	Treasury Department of Western Australia	197 St George's Terrace Perth 6000
Health Department of Western Australia	189 Royal Street East Perth 6004	Water Authority of Western Australia	629 Newcastle Street Leederville 6007
Homeswest	99 Plain Street East Perth 6004	Worker's Compensation and Rehabilitation Commission	15 Rheola Street West Perth 6005
		Western Australian Electoral Commissionx	480 Hay Street Perth 6000

Other parts of the State Public Service normally referred to as Statutory Authorities or Instrumentalities, function under separate Acts although they largely follow the conditions prescribed in the Public Service Act.

### THE JUDICATURE

The two major factors in the development of the Australian legal system have been its British origin and the Commonwealth Constitution of 1900. This Statute, an Act of the Imperial Parliament in London, limited the legislative power of State parliaments in some respects and created a federal legislature. Since 1942, however, the Imperial Parliament can legislate for Australia only at Australia's request. The sources of Australian law of today are, therefore, found in Commonwealth and State legislation, in some Imperial legislation, and in the common law. Independence of the judiciary is an essential part of the Australian legal system.

Particulars of Western Australian courts and Commonwealth courts appear in Chapters 9 and 21.

### STATE REPRESENTATION OVERSEAS AND IN OTHER STATES

Western Australia has been represented in the United Kingdom by an Agent General since 1892, the first appointment to the post being that of Sir Malcolm Fraser. An Office is maintained at Western Australia House, 115 Strand, London, W.C.2. Its functions include the representation of all Government Departments which have business in Britain and Europe, the purchase of government stores and equipment, the attraction of migrants, the encouragement of overseas private investment in Western Australia, and the provision of various types of assistance to visitors from Western Australia. In addition, the Office acts as agent for the State Treasury and as a receiving agency for The Rural and Industries Bank of Western Australia. Western Australia's European Public Relations Office and its tourist officer for the United Kingdom and Europe also operate from Western Australia House. The Agent General for Western Australia, Mr R. Davies, is the personal representative in Britain of the State Premier.

The State is also represented in Japan, an Office being maintained by the Western Australian Government at Sankaido Building, 9-13 Akasaka, 1-CHOME, Minato-Ku 107, Tokyo.

The Western Australian Tourism Commission has travel centres in the Eastern States and overseas. Those offices are located at:

Cnr King William and Grenfell Streets, Adelaide;

243 Edward Street, Brisbane;

35 Elizabeth Street, Melbourne;

92 Pitt Street, Sydney;

505 Commercial House, 35 Queens Road, Hong Kong Central, Hong Kong;

8th Floor, Sankaido Building, 9-13 Akasaka, 1-CHOME, Minato-Ku 107, Tokyo, Japan;

6th Floor, UBN Tower Letterbox 51, 10 Jalan P Ramlee 50250, Kuala Lumpur, Malaysia;

13th Floor, 44-48 Emily Place, Auckland, New Zealand;

Unit 03-03, Thong Sia Building 30 Bideford Road, Singapore;

Kiangwan House, 140 Wireless Road, Bangkok 10330, Thailand;

Western Australia House, 115 Strand, London W.C. 2, United Kingdom;

2121 Avenue of the Stars, Suite 1210, Century City, Los Angeles, U.S.A.;

Moltkestrasse 3, 5300 Bonn 2, West Germany.

Whilst primarily concerned with promoting and facilitating travel to Western Australia, travel centre managers also provide liaison on behalf of Government Departments which have business in these cities.

There are thirty countries represented in Western Australia by a consular agent, vice-consul, consul, consul-general, or trade representative.

TABLE 5.8 - OVERSEAS REPRESENTATION IN WESTERN AUSTRALIA

<i>Country</i>	<i>Address of representative</i>	<i>Country</i>	<i>Address of representative</i>
Austria	T.A. Holmes, Honorary Consul, 95 St George's Terrace Perth 6000.	Mexico	R.C. Hemery, Honorary Consul 16 Gladstone Rd Rivervale 6103
Belgium	L Baece, Honorary Consul, 16 St George's Terrace Perth 6000	Nepal	H.L. Roberts, Honorary Consul-General 195 Adelaide Terrace Perth 6000.
Canada	J. Lyall, Hon. Consul 11/11 St George's Terrace Perth 6000	Netherlands	T.C. Dercksen, Honorary Consul, 83 Mill Point Rd. South Perth 6151.
Denmark	S.L. Jørgensen, Honorary Consul, 19 Phillimore St Fremantle 6160.	New Zealand	D. Robertson, Consul, 16 St George's Terrace Perth 6000.
Finland	P.K. Howard, Honorary Consul, 1/85 MacLeod St Applecross 6153.	Norway	P.G. Lynn, Honorary Consul, 11 Cliff St Fremantle 6160.
France	P. Choard, Honorary Consul, 231 Adelaide Terrace Perth 6000.	Philippines	B.V. Richards, Honorary Consul, 16 Cavella Court Willeton 6155
Germany, Federal Republic of	A.E. Blankensee, Honorary Consul, 16 St George's Terrace Perth 6000.	Portugal	J.M. Do Rosario E Silva, Honorary Consul 242 Soult Terrace Fremantle 6160
Greece	I. Raptakis, Consul, 16 St George's Terrace Perth 6000.	Seychelles	G.F. Robert, Honorary Consul, 271 Canning Rd. Lesmurdie 6076
Honduras	E. de Tapero de Newmann, Honorary Consul, 44 Troy Terrace Daglish 6008.	Spain	A. Quintela, Honorary Consul, 140 St George's Terrace Perth 6000.
Indonesia	R.C.H. Manser, Honorary Consul, 4 Judd St South Perth 6151.y	Sweden	H. Morgan, Honorary Consul, 23 Walters Drive herdsman 6106.
Ireland	G.M. Nolan, Honorary Consul-General, 10 Lilika Rd City Beach 6015.	Switzerland	R. Abplanalp, Honorary Consul, 5 Marie Way Kalamunda 6076.
Italy	V Schioppa, Consul, 31 Labouchere Rd. South Perth 6151.	Thailand	Brigadier W.D. Jamieson, Honorary Consul-General, 135 Victoria Avenue Dalkeith 6009.
Japan	H. Sakuma, Consul-General, 221 St George's Terrace Perth 6000.	United Kingdom	L Boyes, Consul-General, 95 St George's Terrace Perth 6000.
Malaysia	A.B. Junnus, Consul, 195 Adelaide Terrace Perth 6000.	United States of America	W.H. Itoh, Consul-General, 16 St George's Terrace Perth 6000
Malta	Dr. A.V. Scibberras M.D., Honorary Consul, Bassendean Medical Centre 1 Old Perth Rd. Bassendean 6054.	Yugoslavia	D Tomisic, Consul, 24 Colin St West Perth 6005.

### THE LOCAL GOVERNMENT SYSTEM

The function of local government in Western Australia is performed by a number of Councils (or, in special circumstances, by Commissioners appointed by the Governor) exercising powers conferred by the Parliament of the State. Each of the Councils consists of members elected by a local community and is responsible for the provision of many of the services necessary for the

organisation and welfare of the community which it represents.

#### Local government districts

On presentation of a petition signed by a prescribed minimum number of electors, the Governor may, by Order, constitute any part of the State as a Town; constitute as a new Shire any part of an existing Shire; divide a Shire into two

or more Shires; sever a portion of a district and annex the portion to an adjoining district, or constitute the portion as a new Town or Shire; divide a district into wards; or abolish a district and dissolve the local governing authority. In some cases the electors of a district have the right to demand that a poll be held on the question of boundary changes.

On the petition of the local authority concerned, the Governor may by Order declare to be a City any district which satisfies certain specified requirements. These requirements are that during the three years immediately preceding the declaration, it shall have maintained a population of not less than 30,000 persons if situated in the metropolitan area as declared for the purposes of the Act, or not less than 20,000 persons if situated outside that area; and have maintained a gross revenue of \$200,000 for each of the three years. In addition the district must be clearly distinguishable as a centre of population having a distinct civic centre with adequate halls and cultural facilities, and must have sufficient residential, commercial, and industrial centres to justify its declaration as a separate city.

On 14 April 1990 Mandurah became a city. There are now nineteen cities, ten towns and 109 Shires in Western Australia.

The *Local Government Act 1960* establishes a Local Government Boundaries Commission of three members. The Minister may refer to the Commission any question concerning the constitution or alteration of the constitution of local government districts. Every case where authorities are unable to agree on a matter of amalgamation or severance of territory must be referred to the Commission.

The boundaries of local government districts as they existed at 30 June 1989 are delineated on the maps of the State inside the back cover and the names and designations as at that date are given in the lists at the end of this Chapter.

#### **Constitution and electoral provisions**

The provisions of the Local Government Act relating to the composition of a Council require that the minimum number of members be five with no limit set for the maximum number.

Provision is made for local government elections to be held on the first Saturday in May of each year but in specified circumstances the Governor may, by proclamation, appoint a Saturday in May,

later than the first Saturday, to be the election date. Voting is not compulsory. Membership of a Council is elective in all cases, the qualified electors being adult Australian citizens, resident in the district and enrolled for the Legislative Assembly, or who own or occupy rateable land in the district. The preferential system of voting is used and representation is generally on the basis of wards into which the district may be divided. Each elector is entitled to one vote. Subject to disqualification on certain specified grounds, all electors, other than corporation nominees, are eligible for election to the Council of the district whether as Mayor, President or councillor.

The term of office of a Mayor or a President is three years if elected by the electors of the district, or one year if elected by the Council. Councillors are elected for a term of three years, as near as practicable to one-third of their number retiring each year. On the expiration of their term of office all members, including the Mayor and the President, are eligible for re-election if not subject to any of the disqualifications contained in the Act.

#### **Functions of Local Authorities**

The functions and powers of local authorities are extremely diverse in character. They are prescribed in detail in the Local Government Act and some of the more important of them are referred to in later Chapters of the Western Australian Year Book. For example, reference to local government activity in the fields of road construction and maintenance will be found in Chapter 23; the provision of parks, gardens and recreation grounds in Chapter 11; libraries in Chapter 11; public transport facilities in Chapter 19; water supplies in Chapter 12; and town planning and building control in Chapter 18. Among the many other powers of local authorities are those relating to hospitals and nursing services, kindergartens, hostels for school children, community centres, dental clinics, infant and maternal health centres, day nurseries, control of dogs, jetties, swimming pools, sanitation and disposal of refuse, fire prevention, eradication of noxious weeds and vermin, aerodromes, abattoirs, quarries, pounds and cemeteries. Under the provisions of the Health Act local authorities are responsible for certain aspects of health administration.

#### **Financial Provisions**

Local government authorities have four major sources of finance. They are moneys received from rates, loans, government grants and personal

income tax entitlements. Financial powers of local authorities, although derived mainly from the Local Government Act, are also provided by other Statutes, including the Health Act, the Fire Brigades Act, the Cemeteries Act, and the Library Board of Western Australia Act.

**Rates.** The general rate for a local government district in any year is determined by dividing the sum required to make up the difference between anticipated expenditure and estimated revenue from sources other than rates for that year by the total value of rateable property in the district. However, a Council may impose a rate which would yield less than the amount required to balance its budget, subject to approval by the Minister. In assessing the value of rateable property, every local authority must adopt valuations made by the Valuer-General under the provisions of the *Valuation of Land Act 1979*. The *Land Valuation Tribunals Act 1978* provides for the constitution of Land Valuation Tribunals, to which appeals may be made on matters concerning valuations of property.

Valuations may be on the basis of either 'unimproved value' or 'gross rental value'. The unimproved value generally represents the price which the rated land might be expected to realise if sold on the open market and, as the term implies, excludes any improvements. The gross rental value is an estimate of the gross rental value of the property including improvements. Generally, City Councils and Town Councils are required to assess the general rate on the basis of gross rental value, and Shire Councils on unimproved value. Councils may charge a penalty on unpaid rates or offer a discount for early payment. The prescribed maximum percentage for penalty or discount is 10 per cent.

**Loans.** Local authorities are authorised to raise loans for works and undertakings and for the liquidation of existing loan debts. A Council may, with the written consent of the Minister, obtain advances from a bank for a budget deficiency, for the installation of sewerage connections and septic tanks, and for other work approved by the Governor.

Certain of the works and undertakings for which loan moneys may be used are specified in the Local Government Act. They include the construction of streets, roads and bridges, sewers, drains and water works; the erection or purchase of electric lighting plant, gas works and stone quarries; the provision of hostels for school children, libraries and other recreational facilities;

the construction of civic and other buildings; and the purchase of land, materials and equipment. Where a particular work or undertaking is not specified in the Act the Governor may approve of it as a project for which money may be borrowed.

**Government grants.** Government grants constitute an important source of revenue for local government authorities. These are mainly specific purpose payments for road works, further details of which are provided in Chapter 23.

**Personal income tax entitlements.** The *Local Government (Personal Income Tax Sharing) Act 1976* requires each State to allocate not less than 30 per cent of the funds among local government authorities on a population basis, but account may also be taken of the area of the authority, population density or any other matter agreed upon between the Commonwealth and the State. The remaining funds are to be allocated having regard to the special needs and disabilities of local authorities.

**General.** The financial transactions of local government authorities are subject to annual audit either by an auditor (or auditors) appointed by the Council or by the Auditor-General or persons appointed by him. To qualify for the office of auditor, a person must be a member of a specified institute or society of accountants and be registered as an auditor under the Companies Act. Appointment is for a term not exceeding two years, at the end of which time the holder of the office is eligible for reappointment.

The financial year for all Councils ends on 30 June.

Details of the revenue and expenditure of local authorities during the three year period ending with the financial year 1987-88 are given in the section Local Government Finance in Chapter 23.

## STATISTICAL DIVISIONS

The local government districts are used as the basis of presentation of data derived not only from the population census but also from many of the regular statistical collections. Information presented in this way is valuable when considering activities in particular local government areas but is often more detailed than is required for a broader geographical assessment. For this reason, the local government districts are combined into statistical divisions which provide significant areas for the publication of statistics in a convenient summary form.

**STATISTICAL DIVISIONS**  
with component Statistical Local Areas: at 30 June 1989

<i>PERTH</i>	<i>SOUTH-WEST (continued)</i>	<i>UPPER GREAT SOUTHERN (continued)</i>	<i>CENTRAL</i>
<b>CENTRAL METROPOLITAN</b>	<b>PRESTON</b>	<b>LAKES</b>	<b>GASCOYNE</b>
Claremont (T)	Bunbury (C)	Corrigin (S)	Carnarvon (S)
Cottesloe (T)	Capel (S)	Kondinin (S)	Exmouth (S)
Mosman Park (T)	Collie (S)	Kulin (S)	Shark Bay (S)
Nedlands (C)	Dardanup (S)	Lake Grace (S)	Upper Gascoyne (S)
Peppermint Grove (S)	Donnybrook-Balingup (S)	<b>MIDLANDS</b>	<b>CARNEGIE</b>
Perth (C) – Inner	Harvey (S)	<b>MOORE</b>	Cue (S)
Perth (C) – North	<b>VASSE</b>	Chittering (S)	Meekatharra (S)
Perth (C) – Outer	Augusta-Margaret River (S)	Dandaragan (S)	Mount Magnet (S)
Perth (C) – South	Busselton (S)	Gingin (S)	Murchison (S)
Perth (C) – Wembley-Coastal	<b>BLACKWOOD</b>	Moora (S)	Sandstone (S)
<b>EAST METROPOLITAN</b>	Boyup Brook (S)	Victoria Plains (S)	Wiluna (S)
Bassendean (T)	Bridgetown-	<b>AVON</b>	Yalgoo (S)
Bayswater (C)	Greenbushes (S)	Beverley (S)	<b>GREENOUGH RIVER</b>
Kalamunda (S)	Manjimup (S)	Cunderdin (S)	Carnamah (S)
Mundaring (S)	Nannup (S)	Dalwallinu (S)	Chapman Valley (S)
Swan (S)	<b>LOWER GREAT SOUTHERN</b>	Dowerin (S)	Coorow (S)
<b>NORTH METROPOLITAN</b>	<b>PALLINUP</b>	Goomalling (S)	Geraldton (C)
Stirling (C) – Central	Broomehill (S)	Koorda (S)	Greenough (S)
Stirling (C) – West	Gnowangerup (S)	Northam (T)	Irwin (S)
Stirling (C) – South-Eastern	Jerramungup (S)	Northam (S)	Mingenew (S)
Wanneroo (C)	Katanning (S)	Quairading (S)	Morawa (S)
<b>SOUTH-WEST METROPOLITAN</b>	Kent (S)	Tammin (S)	Mullewa (S)
Cockburn (C)	Kojonup (S)	Toodyay (S)	Northampton (S)
East Fremantle (T)	Tambellup (S)	Wongan-Ballidu (S)	Perenjori (S)
Fremantle (C) – Inner	Woodanilling (S)	Wyalkatchem (S)	Three Springs (S)
Fremantle (C) – Remainder	<b>KING</b>	York (S)	<b>PILBARA</b>
Kwinana (T)	Albany (T)	<b>CAMPION</b>	<b>DE GREY</b>
Melville (C)	Albany (S)	Bruce Rock (S)	East Pilbara (S)
Rockingham (S)	Cranbrook (S)	Kellerberrin (S)	Port Hedland (T)
<b>SOUTH-EAST METROPOLITAN</b>	Denmark (S)	Merredin (S)	<b>FORTESCUE</b>
Armadale (C)	Plantagenet (S)	Mount Marshall (S)	Roebourne (S)
Belmont (C)	<b>UPPER GREAT SOUTHERN</b>	Mukinbudin (S)	Ashburton (S)
Canning (C)	<b>HOTHAM</b>	Narembeen (S)	<b>KIMBERLEY</b>
Gosnells (C)	Boddington (S)	Nungarin (S)	<b>ORD</b>
Serpentine-Jarrahdale (S)	Brookton (S)	Trayning (S)	Halls Creek (S)
South Perth (C)	Cuballing (S)	Westonia (S)	Wyndham-East
<b>SOUTH-WEST DALE</b>	Dumbleyung (S)	Yilgam (S)	Kimberley (S)
Mandurah (T)	Narrogin (T)	<b>SOUTH-EASTERN LEFROY</b>	<b>FITZROY</b>
Waroona (S)	Narrogin (S)	Coolgardie (S)	Broome (S)
Murray (S)	Pingelly (S)	Kalgoorlie-Boulder (C)	Derby-West
	Wagin (S)	Laverton (S)	Kimberley (S)
	Wandering (S)	Leonora (S)	
	West Arthur (S)	Menzies (S)	
	Wickepin (S)	<b>JOHNSTON</b>	
	Williams (S)	Dundas (S)	
		Esperance (S)	
		Ravensthorpe (S)	

Statistical divisions are indicated thus: *SOUTH-WEST*; sub-divisions thus: *BLACKWOOD*; statistical local areas thus: Manjimup (S). Cities are marked (C), Towns (T) and Shires (S).

## LOCAL GOVERNMENT AREAS (a) AT 30 JUNE 1989

<i>Local government area (a)</i>	<i>Statistical division in which situated</i>	<i>Local government area (a)</i>	<i>Statistical division in which situated</i>
Albany (T)	Lower Great Southern	Lake Grace	Upper Great Southern
Albany	Lower Great Southern	Laverton	South-Eastern
Armadale (C)	Perth	Leonora	South-Eastern
Ashburton	Pilbara	Mandurah (T)	South-West
Augusta-Margaret River	South-West	Manjimup	South-West
Bassendean (T)	Perth	Meekatharra	Central
Bayswater (C)	Perth	Melville (C)	Perth
Belmont (C)	Perth	Menzies	South-Eastern
Beverley	Midlands	Merredin	Midlands
Boddington	Upper Great Southern	Mingenew	Central
Boyup Brook	South-West	Moora	Midlands
Bridgetown-Greenbushes	South-West	Morawa	Central
Brookton	Upper Great Southern	Mosman Park (T)	Perth
Broome	Kimberley	Mount Magnet	Central
Broomehill	Lower Great Southern	Mount Marshall	Midlands
Bruce Rock	Midlands	Mukinbudin	Midlands
Bunbury (C)	South-West	Mullewa	Central
Busselton	South-West	Mundaring	Perth
Canning (C)	Perth	Murchison	Central
Capel	South-West	Murray	South-West
Carnamah	Central	Nannup	South-West
Carnarvon	Central	Narembeen	Midlands
Chapman Valley	Central	Narrogin (T)	Upper Great Southern
Chittering	Midlands	Narrogin	Upper Great Southern
Claremont (T)	Perth	Nedlands (C)	Perth
Cockburn (C)	Perth	Northam (T)	Midlands
Collie	South-West	Northam	Midlands
Coolgardie	South-Eastern	Northampton	Central
Coorow	Central	Nungarin	Midlands
Corrigin	Upper Great Southern	Peppermint Grove	Perth
Cottesloe (T)	Perth	Perenjori	Central
Cranbrook	Lower Great Southern	Perth (C)	Perth
Cuballing	Upper Great Southern	Pingelly	Upper Great Southern
Cue	Central	Plantagenet	Lower Great Southern
Cunderdin	Midlands	Port Hedland (T)	Pilbara
Dalwallinu	Midlands	Quairading	Midlands
Dandaragan	Midlands	Ravensthorpe	South-Eastern
Dardanup	South-West	Rockingham (C)	Perth
Denmark	Lower Great Southern	Roebourne	Pilbara
Derby-West Kimberley	Kimberley	Sandstone	Central
Donnybrook-Balingup	South-West	Serpentine-Jarrahdale	Perth
Dowerin	Midlands	Shark Bay	Central
Dumbleyung	Upper Great Southern	South Perth (C)	Perth
Dundas	South-Eastern	Stirling (C)	Perth
East Fremantle (T)	Perth	Subiaco (C)	Perth
East Pilbara	Pilbara	Swan	Perth
Esperance	South-Eastern	Tambellup	Lower Great Southern
Exmouth	Central	Tammin	Midlands
Fremantle (C)	Perth	Three Springs	Central
Geraldton (C)	Central	Toodyay	Midlands
Gingin	Midlands	Trayning	Midlands
Gnowangerup	Lower Great Southern	Upper Gascoyne	Central
Goomalling	Midlands	Victoria Plains	Midlands
Gosnells (C)	Perth	Wagin	Upper Great Southern
Greenough	Central	Wandering	Upper Great Southern
Halls Creek	Kimberley	Wanneroo (C)	Perth
Harvey	South-West	Waroona	South-West
Irwin	Central	West Arthur	Upper Great Southern
Jerramungup	Lower Great Southern	Westonia	Midlands
Kalamunda	Perth	Wickepin	Upper Great Southern
Kalgoorlie-Boulder (C)	South-Eastern	Williams	Upper Great Southern
Katanning	Lower Great Southern	Wiluna	Central
Kellerberrin	Midlands	Wongan-Ballidu	Midlands
Kent	Lower Great Southern	Woodanilling	Lower Great Southern
Kojonup	Lower Great Southern	Wyalkatchem	Midlands
Kondinin	Upper Great Southern	Wyndham-East Kimberley	Kimberley
Koorda	Midlands	Yalgoo	Central
Kulin	Upper Great Southern	Yilgam	Midlands
Kwinana (T)	Perth	York	Midlands

(a) Shire, unless marked (C) indicating city, or (T) indicating Town.



## Chapter 6

# POPULATION AND VITAL STATISTICS

## Population

The State of Western Australia, although comprising almost one third of the total area of Australia, contains only about one eleventh of the population.

At the end of 1829, the year of establishment of the Colony, there were 1,000 non-Aboriginal persons in Western Australia. Estimates of the number of Aborigines in the State at colonisation vary. Crawford<sup>1</sup>, in the *Western Australian Year Book*, No. 24—1984, Chapter 1, notes that 'There has, therefore, been some consensus that the population prior to European settlement was in the 50,000 to 60,000 bracket.' Progress in the early years was slow, and in 1849 the non-Aboriginal population was still less than 5,000. Transportation of convicts, begun in the following year, resulted in some acceleration, but it was not until the discovery of gold in the Kimberley in 1885 and the rich finds at Coolgardie in 1892 and at Kalgoorlie in 1893 that any marked increase took place. This development was so rapid that, in the last decade of the century, the non-Aboriginal population was almost quadrupled, from 48,500 at the end of 1890 to 180,000 in 1900, representing an average annual rate of increase of 14.01 per cent. The rate of growth in those years has never been approached in the present century, but the average annual rate of increase of Western Australia's population from the Census of 1901 to June 1988, 2.48 per cent, has been higher than that of any other State and of Australia as a whole (1.71 per cent).

TABLE 6.1 – POPULATION OF WESTERN AUSTRALIA AND AUSTRALIA (a)

References: *Catalogue Nos. 3101.0, 3201.0*

Year ended 30 June	Western Australia	Australia	Proportion of Australia	Western Australia	
				Masculinity ratio (b)	Annual growth rate
	persons	persons	per cent		per cent
1971 (c)	1,053,834	13,067,265	8.06	104.83	6.30
1976 (c)	1,178,342	14,033,083	8.40	103.73	2.03
1981 (c)	1,300,056	14,923,260	8.71	102.25	2.44
1986 (c)	1,459,019	16,018,350	9.11	101.83	2.85
1987	1,500,507	16,263,319	9.23	101.94	2.84
1988	1,544,806	16,538,153	9.34	102.05	2.95

(a) Estimated resident population. (b) Number of males per 100 females. (c) Census date.

1 I.M. Crawford, *A History of the Aboriginal Population*.

In the decade from 30 June 1978 to 30 June 1988 the State's average annual rate of increase has been 2.30 per cent compared with a national figure of 1.42 per cent.

**ESTIMATES OF POPULATION**

The conceptual basis for population estimation in Australia changed in June 1981. Estimates since this date, together with revisions back to June 1971, have been made on the basis of the State of usual residence of persons. Census date estimates are derived by adjusting census count, place of usual residence data for under enumeration and adding residents who are temporarily overseas on census night.

For dates other than those of the periodic censuses of population, estimates are based on records of births and deaths and movements of population interstate and overseas. Estimates of the population of Australia and of each of the States and Territories are prepared by the Australian Statistician at 31 March, 30 June, 30 September and 31 December in each year. Because the available records of interstate movement are

incomplete, these intercensal estimates as they apply to States and Territories are approximate and are revised when the results of the next census become known.

Further information on estimated resident population is contained in the publication *Population Estimates: An outline of the New Conceptual Basis of ABS Population Estimates* (Catalogue No. 3216.0) issued by the Australian Statistician, Canberra.

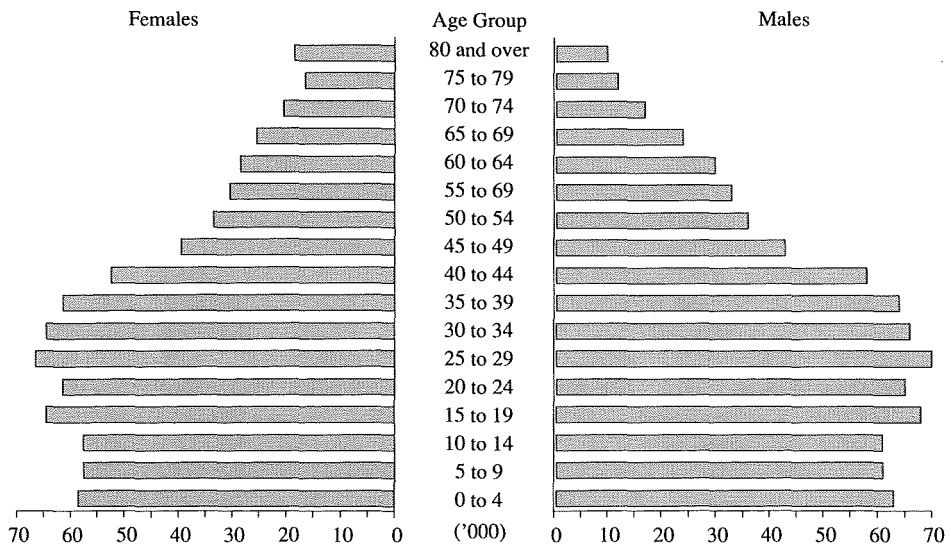
**MEAN POPULATION**

It is often useful to relate a given characteristic to population in order to express it in *per capita* terms or as 'per head of population.' Mean population is used for this purpose. The formula to calculate mean population is:

$$\frac{1}{2} (a + 4b + 2c + 4d + e)$$

where *a* represents the population at the beginning of the year and *b*, *c*, *d* and *e* the populations at the end of the first, second, third and fourth quarters respectively.

**DIAGRAM 6.1  
ESTIMATED RESIDENT POPULATION  
AGE LAST BIRTHDAY, BY SEX: 30 JUNE 1988**



**TABLE 6.2 – ESTIMATED RESIDENT POPULATION**  
(\*000)

Reference: Catalogue No. 3101.0

Year	Population at end of year			Increase during year			Mean population		
	Males	Females	Persons	Natural increase (a)	Estimated net migration (b)	Estimated total increase (c)	Males	Females	Persons
YEAR ENDED 30 JUNE									
1982	676.9	662.0	1,338.9	14.1	21.7	38.8	667.0	652.2	1,319.2
1987	757.5	743.0	1,500.5	14.7	26.8	41.5	746.7	733.0	1,479.8
1988	780.3	764.5	1,544.8	15.1	29.2	44.3	768.6	753.5	1,522.1
YEAR ENDED 31 DECEMBER									
1982	684.8	670.2	1,355.0	14.1	17.6	36.0	676.8	661.9	1,338.7
1987r	767.6	752.7	1,520.3	14.4	26.4	40.8	757.2	742.9	1,500.2
1988p	792.3	776.4	1,568.7	15.7	23.1	48.4	780.5	764.8	1,545.2

(a) Excess of births registered over deaths registered by State of usual residence. (b) Interstate and overseas. (c) Differences between the sum of natural increase and net migration, and total increase are due to distribution of the intercensal discrepancy.

### POPULATION IN STATISTICAL LOCAL AREAS

Table 6.3 shows the estimated resident population in statistical local areas. The names and designations are as they existed at 30 June 1988. The Cities of Fremantle, Perth and Stirling are comprised of a number of statistical local areas. Statistical local areas are marked (C) for City, (T) for Town or (S) for Shire.

**TABLE 6.3 – ESTIMATED RESIDENT POPULATION IN STATISTICAL LOCAL AREAS : AT 30 JUNE**  
(persons)

Reference : Catalogue No. 3203.5

Statistical local area	1982(a)	1987(b)	1988(b)
Albany (S)	8,120	8,750	8,966
Albany (T)	13,890	14,755	14,791
Armadale (C)	37,970	45,200	45,890
Ashburton(S)	8,990	8,658	8,754
Augusta-Margaret River (S)	4,080	5,251	5,508
Bassendean (T)	12,380	13,673	13,788
Bayswater (C)	40,380	44,666	45,524
Belmont (C)	30,430	29,540	29,623
Beverly (S)	1,550	1,485	1,477
Boddington (S)	790	1,059	1,219
Boulder (S)	11,720	13,707	14,439
Boyup Brook (S)	2,040	1,850	1,860
Bridgetown-Greenbushes (S)	3,360	3,601	3,679
Brookton (S)	1,210	1,060	1,054
Broome (S)	4,480	6,505	6,926
Broomehill (S)	620	593	587
Bruce Rock (S)	1,410	1,306	1,312
Bunbury (C)	23,130	25,370	25,838
Busselton (S)	10,100	12,376	12,963
Canning (C)	57,260	66,576	67,823

**TABLE 6.3 – ESTIMATED RESIDENT POPULATION IN STATISTICAL LOCAL AREAS : AT 30 JUNE – continued**  
(persons)

Reference : Catalogue No. 3203.5

Statistical local area	1982(a)	1987(b)	1988(b)
Capel (S)	3,190	4,177	4,366
Carmanah (S)	1,310	1,433	1,435
Camarvon (S)	6,660	7,590	7,676
Chapman Valley (S)	850	773	775
Chittering (S)	1,210	1,485	1,581
Claremont (T)	8,480	8,652	8,697
Cockburn (C)	33,250	44,692	47,388
Collie (S)	9,410	9,715	9,744
Coolgardie (S)	5,880	5,157	5,247
Coorow (S)	1,290	1,431	1,472
Corrigin (S)	1,620	1,440	1,439
Cottesloe (T)	6,950	7,273	7,286
Cranbrook (S)	1,350	1,256	1,252
Cuballing (S)	680	644	652
Cue (S)	340	579	688
Cunderdin (S)	1,640	1,462	1,457
Dalwallinu (S)	1,900	1,801	1,812
Dandaragan (S)	1,850	2,281	2,383
Dardanup (S)	3,740	4,522	4,592
Denmark (S)	2,390	2,887	2,973
Derby-West Kimberley (S)	6,540	7,138	7,301
Donnybrook-Balingup (S)	3,500	3,827	3,885
Dowerin (S)	1,000	961	967
Dumbleyung (S)	1,000	1,004	988
Dundas (S)	2,530	2,305	2,334
East Fremantle (T)	6,330	6,098	6,161
East Pilbara (S)	10,310	9,902	10,083
Esperance (S)	9,990	9,931	9,988
Exmouth (S)	2,180	2,505	2,543
Fremantle (C) (c)—			
Inner	n.a.	691	691
Remainder	n.a.	23,059	23,168
Total	23,360	23,750	23,859
Geraldton (C)	19,300	20,222	20,660
Gingin (S)	2,030	2,756	2,842

**TABLE 6.3 – ESTIMATED RESIDENT POPULATION IN STATISTICAL LOCAL AREAS : AT 30 JUNE – continued**  
(persons)

Reference : Catalogue No. 3203.5

Statistical local area	1982(a)	1987(b)	1988(b)
Gnowangerup (S)	3,770	2,180	2,083
Goomalling (S)	1,270	1,194	1,174
Gosnells (C)	55,740	66,399	69,157
Greenough (S)	4,730	5,985	6,204
Halls Creek (S)	2,670	2,918	2,931
Harvey (S)	8,470	10,595	10,901
Irwin (S)	1,650	1,878	1,984
Jerramungup (S)	n.a.	1,345	1,348
Kalamunda (S)	37,910	45,410	47,340
Kalgoorlie (T)	9,420	11,152	11,664
Katanning (S)	5,250	4,852	4,846
Kellerberrin (S)	1,650	1,420	1,411
Kent (S)	1,040	977	972
Kojonup (S)	2,810	2,439	2,404
Kondinin (S)	1,280	1,155	1,148
Koorda (S)	790	685	678
Kulin (S)	1,280	1,176	1,181
Kwinana (T)	14,220	15,193	15,711
Lake Grace (S)	2,040	2,114	2,110
Laverton (S)	1,190	1,409	1,465
Leonora (S)	2,070	2,259	2,380
Mandurah (T)	14,810	20,375	21,729
Manjimup (S)	9,530	9,618	9,670
Meekatharra (S)	1,250	1,654	1,947
Melville (C)	64,870	76,066	81,015
Menzies (S)	350	335	374
Merredin (S)	4,560	4,159	4,150
Mingenew (S)	740	702	690
Moora (S)	2,140	2,812	2,802
Morawa (S)	1,360	1,165	1,168
Mosman Park (T)	7,240	7,467	7,488
Mount Magnet (S)	810	1,262	1,349
Mount Marshall (S)	920	869	857
Mukinbudin (S)	880	828	805
Mullewa (S)	1,650	1,425	1,403
Mundaring (S)	22,150	27,102	28,249
Murchison (S)	170	144	144
Murray (S)	6,630	7,084	7,215
Nannup (S)	1,060	1,157	1,186
Narembeen (S)	1,320	1,188	1,194
Narrogin (S)	810	668	661
Narrogin (T)	5,240	5,062	5,068
Nedlands (C)	20,350	19,947	20,050
Northam (S)	2,570	2,517	2,591
Northam (T)	6,990	6,917	6,928
Northampton (S)	2,410	3,084	3,127
Nungarin (S)	350	318	328
Peppermint Grove (S)	1,610	1,612	1,648
Perenjori (S)	1,010	807	787
Perth (C) (c)—			
Inner	n.a.	929	929
North	n.a.	21,474	21,560
Outer	n.a.	14,582	14,612
South	n.a.	24,708	24,787
Wembley-Coastal	n.a.	20,187	20,277
<b>Total</b>	<b>81,950</b>	<b>81,880</b>	<b>82,165</b>
Pingelly (S)	1,410	1,369	1,364
Plantagenet (S)	4,310	4,161	4,150

**TABLE 6.3 – ESTIMATED RESIDENT POPULATION IN STATISTICAL LOCAL AREAS : AT 30 JUNE – continued**  
(persons)

Reference : Catalogue No. 3203.5

Statistical local area	1982(a)	1987(b)	1988(b)
Port Hedland (S)	13,820	13,623	13,757
Quairading (S)	1,300	1,257	1,264
Ravensthorpe (S)	1,410	1,400	1,424
Rockingham (S)	26,850	34,271	36,561
Roebourne (S)	15,640	17,741	17,787
Sandstone (S)	130	151	184
Serpentine-Jarrahdale (S)	5,230	6,891	7,198
Shark Bay (S)	650	1,097	1,125
South Perth (C)	32,600	34,439	34,674
Stirling (C) (c)—			
Central	n.a.	100,753	102,255
West	n.a.	55,463	55,937
South-Eastern	n.a.	21,449	21,583
<b>Total</b>	<b>169,380</b>	<b>177,665</b>	<b>179,775</b>
Subiaco (C)	14,160	15,544	15,634
Swan (S)	34,250	41,252	44,138
Tambellup (S)	990	827	820
Tammin (S)	590	552	547
Three Springs (S)	1,080	1,005	992
Toodyay (S)	1,510	1,945	2,067
Trayning (S)	630	555	552
Upper Gascoyne (S)	210	256	257
Victoria Plains (S)	1,330	1,225	1,220
Wagin (S)	2,400	2,159	2,147
Wandering (S)	490	397	396
Wanneroo (C)	103,550	142,191	151,930
Waroona (S)	2,460	2,584	2,605
West Arthur (S)	1,290	1,089	1,079
Westonia (S)	450	500	528
Wickepin (S)	1,020	928	912
Williams (S)	1,180	1,131	1,126
Wiluna (S)	1,550	1,832	1,879
Wongan-Ballidu (S)	2,090	1,909	1,902
Woodanilling (S)	460	433	430
Wyalkatchem (S)	950	766	742
Wyndham-East Kimberley (S)	4,990	6,180	6,289
Yalgoo (S)	290	285	324
Yilgarn (S)	2,130	2,069	2,227
York (S)	2,180	2,302	2,373
<b>Total</b>	<b>1,336,910</b>	<b>1,500,507</b>	<b>1,544,806</b>

(a) Based on the 1981 Census of Population and Housing. (b) Based on the 1986 Census of Population and Housing. (c) Cities of Fremantle, Perth and Stirling are comprised of a number of statistical local areas.

## CHARACTERISTICS OF THE POPULATION

**Age.** Table 6.4 shows the numbers and proportions of the population of Western Australia in selected age groups at 30 June 1982, 1987 and 1988. The age groups have been chosen as representing, in a general sense sectors such as the pre-school population, children of school age, minors, the economically active population and those beyond normal working age.

**TABLE 6.4 - POPULATION IN SELECTED AGE GROUPS (a) : AT 30 JUNE**  
(persons)

Reference: Catalogue No. 3201.0

Age last birthday (years)	Number in each age group			Per cent of total		
	1982	1987	1988	1982	1987	1988
Under 6	129,498	142,966	146,141	9.67	9.53	9.46
6 - 12	166,777	161,721	165,344	12.46	10.78	10.70
6 - 15	237,997	237,676	239,366	17.78	15.84	15.49
Under 18	413,276	433,772	440,612	30.87	28.91	28.52
Under 21	484,588	507,795	517,330	36.19	33.84	33.49
15 - 44	643,525	738,172	763,162	48.06	49.19	49.40
15 - 64	877,340	1,007,103	1,039,663	65.53	67.12	67.30
65 and over	117,175	139,578	145,198	8.75	9.30	9.40
<b>All ages</b>	<b>1,338,899</b>	<b>1,500,507</b>	<b>1,544,806</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

(a) Estimated resident population.

**Religion and birthplace.** The religion and birthplace of the population as recorded at the censuses of 1976, 1981 and 1986 are shown in Tables 6.5 and 6.6. The *Census and Statistics Act 1905* provides that there shall be no penalty for failure to answer the question on religion, and a statement to this effect is contained in the census schedule.

**TABLE 6.5 - RELIGION OF THE POPULATION (a)**  
CENSUS 30 JUNE  
(\*000 persons)

Religion	1976	1981	1986
Christian—			
Anglican	360.3	375.8	371.3
Baptist	14.4	15.9	16.9
Catholic	283.2	316.3	347.7
Churches of Christ	12.6	14.2	14.4
Methodist	77.0	51.2	(b)
Presbyterian	42.6	32.0	31.6
Uniting	(b)	(b)	82.9
Other	85.0	131.6	113.3
<b>Total Christian</b>	<b>875.2</b>	<b>937.1</b>	<b>978.0</b>
Non-Christian—			
Buddhist	(c)	(c)	7.2
Hebrew	2.9	3.2	3.9
Muslim	1.9	3.6	5.5
Other	3.3	4.9	6.4
<b>Total Non-Christian</b>	<b>8.1</b>	<b>11.6</b>	<b>23.0</b>
Non-classifiable	5.5	8.0	6.0
No religious denomination	119.5	172.1	235.3
Not stated	136.6	144.8	164.3
<b>Total</b>	<b>1,144.9</b>	<b>1,273.6</b>	<b>1,406.9</b>

(a) Figures as counted. (b) The Uniting Church in Australia, which was formed in June 1977 by the union of all the Methodist Churches and most of the Congregational and Presbyterian Churches, replaced the Methodist Church as a major category in the 1986 Census. (c) Included in Other, Non-Christian.

**TABLE 6.6 - BIRTHPLACE OF THE POPULATION (a)**  
CENSUS 30 JUNE  
(\*000 persons)

Birthplace	1976	1981	1986
Australia	832.4	911.0	997.8
Europe—			
United Kingdom and Eire	176.6	186.1	194.0
Italy	29.3	29.2	27.8
Netherlands	10.6	11.3	11.6
Yugoslavia	10.4	11.0	11.2
Germany	7.4	8.1	9.5
Poland	4.4	5.0	6.5
Greece	4.5	4.3	4.0
Other	15.3	15.8	17.3
<b>Total Europe</b>	<b>258.6</b>	<b>270.9</b>	<b>281.8</b>
Asia—			
India	9.9	10.1	10.6
Malaysia	4.0	5.4	8.7
Vietnam	-	2.8	5.9
Burma	4.0	4.4	4.5
Singapore	2.5	3.4	4.7
Other	8.9	11.4	16.0
<b>Total Asia</b>	<b>29.3</b>	<b>37.6</b>	<b>50.5</b>
Oceania—			
New Zealand	8.9	18.5	25.2
Other	1.1	1.6	3.4
<b>Total Oceania</b>	<b>9.9</b>	<b>20.0</b>	<b>28.6</b>
Africa—			
Republic of South Africa	2.3	4.2	6.3
Other	5.2	7.2	9.1
<b>Total Africa</b>	<b>7.6</b>	<b>11.4</b>	<b>15.4</b>
America—			
United States of America	3.6	4.1	5.1
Other	3.4	4.4	5.1
<b>Total America</b>	<b>7.1</b>	<b>8.5</b>	<b>10.1</b>
<b>Total (b)</b>	<b>1,144.9</b>	<b>1,273.6</b>	<b>1,406.9</b>

(a) Figures as counted. (b) Includes those born at sea and not stated.

### Aborigines and Torres Strait Islanders

The 1986 Census of Population and Housing counted 37,789 Aborigines and Torres Strait Islanders in Western Australia compared with 31,351 in 1981. The 1986 figure represented 2.7 per cent of all persons counted in the State.

Table 6.7 shows the age distribution of Aborigines and Torres Strait Islanders at 30 June 1976, 1981 and 1986. At 30 June 1986 nearly 63 per cent were less than 25 years of age and 3.5 per cent were 65 years of age or older. Equivalent figures for the total State population were 41.2 per cent and 9.3 per cent respectively. There were relatively fewer Aborigines and Torres Strait Islanders in each age group above 20-24 years than for the total State population.

**TABLE 6.7 - AGE DISTRIBUTION - ABORIGINES AND TORRES STRAIT ISLANDERS  
CENSUS 30 JUNE  
(persons)**

<i>Age last birthday</i>	<i>1976</i>	<i>1981</i>	<i>1986</i>
Years			
0 - 4	3,890	4,108	5,349
5 - 9	4,146	4,580	4,702
10 - 14	3,823	4,616	4,866
15 - 19	3,006	3,827	4,712
20 - 24	2,298	3,089	4,098
25 - 29	1,836	2,367	3,182
30 - 34	1,347	1,772	2,472
35 - 39	1,157	1,421	1,933
40 - 44	1,029	1,259	1,499
45 - 49	885	1,099	1,193
50 - 54	657	910	1,025
55 - 59	501	575	800
60 - 64	457	590	615
65 - 69	479	478	523
70 and over	612	666	818
<b>Total</b>	<b>26,126</b>	<b>31,351</b>	<b>37,789</b>

Most Aborigines and Torres Strait Islanders—22,605 or 60 per cent of the total in Western Australia—were located in urban centres at 30 June 1986. The principal urban and remote community population centres in which Aborigines and Torres Strait Islanders were counted in the 1986 Census are shown in Table 6.8.

**TABLE 6.8 - ABORIGINES AND TORRES STRAIT ISLANDERS - MAJOR POPULATION CENTRES  
CENSUS 30 JUNE 1986**

<i>Locality</i>	<i>Persons</i>
URBAN CENTRES	
Albany	377
Broome	1,359
Bunbury	590
Carnarvon	878
Derby	946
Fitzroy Crossing	662
Geraldton	1,290
Halls Creek	719
Kalgoorlie-Boulder	929
Kununurra	748
Kwinana	354
Meekatharra	373
Mullewa	318
Northam	301
Perth	8,830
Port Hedland	1,407
Roebourne	597
Wyndham	539
REMOTE AREA COMMUNITIES	
Balgo	443
Beagle Bay	241
Billiluna/Lake Gregory	256
Central Reserves	629
Gogo	259
Jigalong	353
La Grange	410
Looma	207
One Arm Point/Lombardina	413
Turkey Creek	258
Warburton	361

## Vital Statistics

Registration of births, deaths and marriages in Western Australia is compulsory. Particulars reported to District Registrars are sent to the Registrar General at Perth, where a central registry is maintained. Local registers are kept at each district office.

Births are required to be registered within sixty days of the event, and a fetal death (stillbirth) must

be registered both as a birth and a death. Deaths are required to be registered within fourteen days. Marriage certificates must be lodged for registration within fourteen days of the date of marriage.

Statistics of births, deaths and marriages are prepared from registration documents.

## BIRTHS

Table 6.9 shows that there were more males than females born in 1982, 1987 and 1988. The percentage of females born in these years however has increased steadily. The percentage of total births in relation to mean resident population was 1.67 in 1982, this decreased to 1.56 in 1987 and increased again to 1.63 in 1988. The proportion of births that are ex-nuptial has increased over the period shown.

TABLE 6.9 – BIRTHS REGISTERED (a)  
Reference: Catalogue No. 3301.0

	1982	1987	1988
Births(b)–			
Males	11,401	12,044	12,874
Females	10,860	11,288	12,269
Persons	22,261	23,332	25,143
Ex-nuptial	3,322	4,623	5,314
Proportion of total persons (per cent)	14.9	19.8	21.1

(a) Figures relate to state of usual residence of mother. (b) Includes ex-nuptial births.

Table 6.10 shows total and ex-nuptial births registered according to age of mother. The figures show an overall decrease in the proportion of both total and ex-nuptial births to mothers under the age of 25 years, and an increase in the proportion of births to mothers in the age groups from 25 to 39 years. The most significant increase since 1982 has been in ex-nuptial births to mothers in the 25-34 year age group. The proportion of ex-nuptial births to mothers in the under 25 years age groups is consistently higher than the proportion of total births to mothers in the same age groups. In all other age groupings the situation is reversed.

**Ex-nuptial live births.** A birth is registered as ex-nuptial if the parents are not married to each other at the time of the confinement. Ex-nuptial births in 1988 comprised 21.1 per cent of all live births registered.

**Legitimations.** Under the provisions of the *Marriage Act 1961* (Commonwealth) which came into operation on 1 September 1963, a child whose parents are not married to each other at the time of its birth becomes legitimised on the subsequent marriage of its parents. The legitimisation takes place whether or not there was a legal impediment to the marriage of the parents at the time of the

child's birth and whether or not the child was still living at the time of the marriage, or in the case of a child born before 1 September 1963, at that date.

TABLE 6.10 – BIRTHS REGISTERED (a)  
AGE OF MOTHER  
Reference: Catalogue No. 3301.0

Age of mother (years)	1982	1987	1988
TOTAL BIRTHS (b)			
Under 20	1,639	1,381	1,534
20 - 24	6,586	5,435	5,601
25 - 29	8,586	9,237	9,737
30 - 34	4,189	5,467	6,141
35 - 39	1,085	1,585	1,875
40 - 44	142	211	248
45 and over	9	11	4
Not stated	-	5	3
<b>Total</b>	<b>22,236</b>	<b>23,332</b>	<b>25,143</b>
EX-NUPTIAL BIRTHS			
Under 20	1,020	1,083	1,224
20 - 24	1,196	1,587	1,851
25 - 29	683	1,167	1,285
30 - 34	293	555	654
35 - 39	101	201	251
40 - 44	26	22	45
45 and over	3	3	-
Not stated	-	5	4
<b>Total</b>	<b>3,322</b>	<b>4,623</b>	<b>5,314</b>

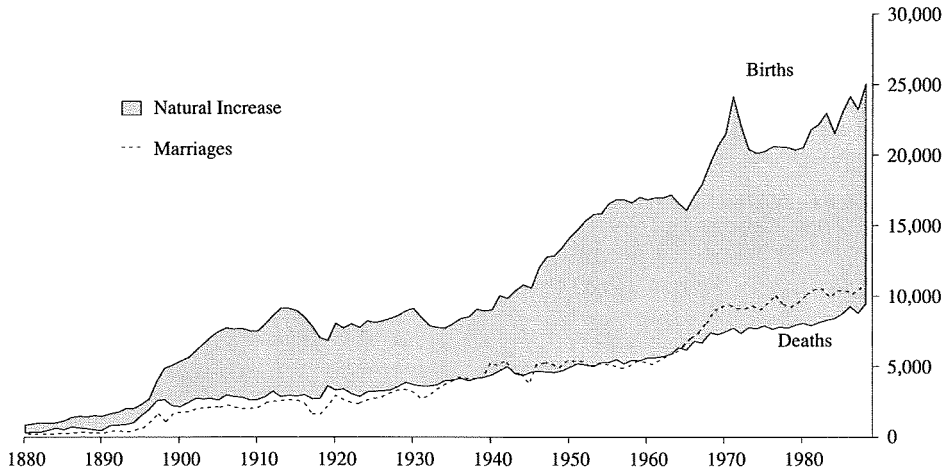
(a) Figures relate to State of usual residence of mother. (b) Includes ex-nuptial births.

**Age-specific birth rates.** As a measure of fertility, the crude birth rate has the advantage of simplicity in calculation. The data necessary for its computation are usually readily available from published statistics and it is therefore useful in comparing the fertility of the populations of regions for which no additional data are available. However, it is of limited use since it does not take into account the important factors of age and sex composition of the population. Age-specific birth rates, which do have regard to these factors, therefore provide a better measure of fertility. Age-specific birth rates represent the number of live births to women of specified ages per thousand women of those particular ages and thus take cognisance of the variations in fertility experienced by women at the successive stages of their child-bearing life.

**Gross and net reproduction rates.** The gross reproduction rate is derived from fertility rates and represents the number of *female* births to women of specified ages per thousand women of those particular ages. It provides a measure of the



DIAGRAM 6.2  
BIRTHS, DEATHS AND MARRIAGES, 1880 TO 1988  
(From 1 January 1966 includes particulars of persons of predominantly Aboriginal descent)



number of female children who would be born, on the average, to every woman assuming that she lives through the whole of the child-bearing period and that the basic fertility rates remain unaltered throughout.

The gross reproduction rate assumes that all females survive to the end of their child-bearing capacity. A more accurate measure, which takes into account the effect of mortality among women during this period, is the net reproduction rate. This rate represents the average number of female children who would be born to women during their lifetime, if they were subject in each succeeding year of life to the fertility and mortality rates on which the calculation is based. The net reproduction rate is a measure of the number of women who, in the next generation, will replace the women of reproductive age in the current generation. It provides a useful indication of likely future population trends. A rate remaining stationary at unity indicates an ultimately static population. If a rate greater than unity is maintained, an ultimate increase of population will result, while a continuing rate less than unity will lead to an ultimate decline.

Table 6.11 provides comparative data for Western Australia and Australia on number of births, birth rates and reproductive rates for 1988. The figures show that the crude birth rate (the number of total births per thousand mean resident population) for Western Australia (16.3 per cent) is higher than

for Australia as a whole (14.9 per cent). The percentage of ex-nuptial to total births in Western Australia is also higher (21.1 per cent) than the figure for Australia (19.0 per cent).

TABLE 6.11 - BIRTHS, WESTERN AUSTRALIA IN RELATION TO AUSTRALIA : 1988  
Reference: Catalogue No. 3301.0

	Western Australia	Australia
Number of births—		
Nuptial	19,829	199,425
Ex-nuptial	5,314	46,768
<b>Total</b>	<b>25,143</b>	<b>246,193</b>
Crude birth rate (a)	16.3	14.9
Age-specific birth rate (b)—		
15 - 19	23.8	20.2
20 - 24	90.0	81.8
25 - 29	145.8	137.2
30 - 34	95.0	93.4
35 - 39	30.4	30.5
40 - 44	4.7	4.6
45 - 49	0.1	0.2
Gross reproduction rate (c)	0.950	0.897
Net reproduction rate (d)	0.936	0.881

(a) Per 1,000 mean resident population. (b) Live births per 1,000 women in each age group. Births to mothers under 15 are included in the 15-19 age group, and births to mothers aged 50 and over are included in the 45-49 age group. (c) Sum of the female age-specific fertility rates multiplied by 5 and divided by 1,000. (d) Based on Annual Life Tables calculated by the Australian Statistician. Because of the method of calculation, these figures are subject to annual fluctuations which may not be indicative of a longer term trend.

## DEATHS

**Causes of death.** Statistics in Tables 6.11 and 6.12 are classified according to the Ninth (1975) Revision of the World Health Organisation's *International Classification of Diseases* which was adopted for world-wide use from 1979. The term 'cause of death', as used in these tables and elsewhere in this Chapter, means '(a) the disease or injury which initiated the train of morbid events leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury'.

**Perinatal deaths.** Since deaths within the first four weeks of life (neonatal deaths) are mainly due

to conditions originating before or during birth and the same conditions can cause fetal death (stillbirth), special tabulations are prepared combining the two. These are termed 'perinatal deaths.' The statistical definition of perinatal deaths in Australia was amended in 1979 and now includes all fetuses and infants delivered weighing at least 500 grams or, when birthweight is unavailable, the corresponding gestational age (22 weeks) or body length (25cm crown-heel). The rates for fetal deaths and perinatal deaths are calculated per thousand live births only. The live births figure used to calculate these rates excludes those infants known to have weighed less than 500 grams at delivery.

Table 6.12 - PRINCIPAL CAUSES OF DEATH, 1988 (a)  
Reference: Catalogue No. 3304.0

Causes of death and International number(b)	Western Australia			Australia		
	Persons	Per cent of all deaths	Rate (c)	Persons	Per cent of all deaths	Rate (c)
Infectious and parasitic diseases (000-139)	43	0.4	2.78	733	0.6	4.43
Neoplasms (140-239)—						
Malignant (140-208)—						
Digestive organs and peritoneum (150-159)	678	7.1	43.87	8,575	7.2	51.84
Trachea, bronchus and lung (162)	536	5.6	34.68	6,169	5.2	37.29
Genito-urinary organs (179-189)	369	3.9	23.87	4,600	3.8	27.81
Other	891	9.4	57.66	10,218	8.5	61.77
Benign, other and unspecified (210-239)	24	0.2	1.55	325	0.3	1.96
Endocrine, nutritional and metabolic diseases (240-279)	195	2.0	12.61	2,764	2.3	16.71
Diseases of blood and blood-forming organs (280-289)	26	0.3	1.68	424	0.4	2.56
Mental disorders (290-319)	151	1.6	9.77	1,970	1.6	11.91
Diseases of the nervous system and sense organs (320-389)	226	2.4	14.62	2,157	1.8	13.04
Diseases of the circulatory system (390-459)—						
Ischaemic heart disease (410-414)	2,528	26.5	163.59	31,584	26.3	190.95
Cerebrovascular disease (430-438)	923	9.7	59.73	12,441	10.4	75.21
Other	728	7.6	47.11	11,055	9.2	66.83
Diseases of the respiratory system (460-519)—						
Chronic obstructive pulmonary disease (490-496)	477	5.0	30.86	6,348	5.3	38.37
Other	248	2.6	16.04	2,688	2.2	16.25
Diseases of the digestive system (520-579)	338	3.6	21.87	4,154	3.5	25.11
Diseases of the genito-urinary system (580-629)	145	1.5	9.38	1,850	1.5	11.18
Complications of pregnancy, childbirth and the puerperium (630-676)	1	(d)	0.06	12	(d)	0.07
Diseases of the skin and subcutaneous tissue (680-709)	-	-	-	127	0.1	0.76
Diseases of the musculoskeletal system and connective tissue (710-739)	43	0.4	2.78	655	0.5	3.96
Congenital anomalies (740-759)	77	0.8	4.98	864	0.7	5.22
Certain conditions originating in the perinatal period (760-779)	90	0.9	5.82	894	0.7	5.40
Symptoms, signs and ill-defined conditions (780-799)	85	0.9	5.50	783	0.6	4.73
Accidents, poisonings and violence (800-999)—						
Motor vehicle traffic accidents (810-819)	248	2.6	16.04	3,078	2.6	18.60
Suicide and self inflicted injury (950-959)	207	2.2	13.39	2,197	1.8	13.28
Other	255	2.7	16.50	3,201	2.7	19.35
<b>All causes</b>	<b>9,532</b>	<b>100.0</b>	<b>616.85</b>	<b>119,866</b>	<b>100.0</b>	<b>724.69</b>

(a) Based on State of usual residence. Fetal deaths are excluded. (b) Classified in accordance with the *International Classification of Diseases* (Ninth revision, 1975), operative from 1 January 1979. (c) Per 100,000 of mean resident population. (d) Less than 0.1.

TABLE 6.13 – INFANT DEATHS – CAUSES OF DEATH, 1988 (a)

Causes of death and International number (b)	Western Australia		Australia	
	Number	Per cent of all infant deaths	Number	Per cent of all infant deaths
Causes mainly of prenatal and natal origin (740-779)—				
Congenital anomalies (740-759)	51	23.8	559	26.2
Immaturity (765)	28	13.1	263	11.1
Birth trauma (767)	3	1.4	31	1.4
Hypoxia and birth asphyxia (768)	9	4.2	88	4.1
Respiratory distress syndrome (769)	27	12.6	146	6.8
Other respiratory conditions (770)	12	5.6	166	7.8
Infections specific to the perinatal period (771)	4	1.9	59	2.8
Fetal and neonatal haemorrhage (772)	1	0.5	74	3.5
Other	6	2.8	60	2.8
<b>Total</b>	<b>141</b>	<b>65.9</b>	<b>1,446</b>	<b>67.8</b>
Causes mainly of postnatal origin—				
Sudden death, cause unknown (798)	54	25.2	468	22.0
All other causes	19	8.9	218	10.2
<b>Total</b>	<b>73</b>	<b>34.1</b>	<b>686</b>	<b>32.2</b>
<b>All causes</b>	<b>214</b>	<b>100.0</b>	<b>2,132</b>	<b>100.0</b>

(a) Based on State of usual residence. Fetal deaths are excluded. (b) Classified in accordance with the *International Statistical Classification of Disease, Injuries and Cause of Death* (Ninth revision), operative from 1 January 1979.

TABLE 6.14 – PERINATAL DEATHS –  
NUMBER AND RATES 1988  
Reference: Catalogue No. 3304.0

	Western Australia		Australia	
	Number	Rate	Number	Rate
Fetal deaths	120	4.8	1,473	6.0
Neonatal deaths—				
Under 1 day	77	3.1	722	2.9
1 day and under 7 days	31	1.2	341	1.4
7 days and under 28 days	20	0.8	232	0.9
<b>Total</b>	<b>128</b>	<b>5.1</b>	<b>1,295</b>	<b>5.3</b>
<b>Total perinatal deaths</b>	<b>248</b>	<b>9.9</b>	<b>2,768</b>	<b>11.2</b>

Table 6.15 provides comparative data for deaths in Western Australia and Australia on number of deaths and death rates for 1988. The figures show that the crude death rate (the number of deaths per thousand of mean resident population) in Western Australia (6.2) is lower than the Australian figure of 7.2. The age-specific death rates for Western Australia are lower than for Australia, with the exception of the under 1, 15-19 and 80-84 years age groups.

TABLE 6.15 – DEATHS, WESTERN AUSTRALIA  
IN RELATION TO AUSTRALIA, 1988  
Reference: Catalogue No. 3302.0

	Australia	Western Australia
Number of deaths	9,530	119,866
Crude death rate (a)	6.2	7.2
Infant death rate (b)	8.4	8.7
Age-specific death rate (years) (c)—		
Under 1 year	8.79	8.68
1 - 4	0.42	0.44
5 - 9	0.08	0.20
10 - 14	0.18	0.23
15 - 19	0.79	0.78
20 - 24	1.01	1.07
25 - 29	0.91	0.98
30 - 34	0.74	1.00
35 - 39	1.05	1.16
40 - 44	1.50	1.75
45 - 49	2.62	2.77
50 - 54	4.15	4.68
55 - 59	6.86	7.83
60 - 64	12.17	12.95
65 - 69	18.25	20.09
70 - 74	31.57	32.97
75 - 79	52.26	53.48
80 - 84	89.13	85.70
85 and over	148.17	172.90

(a) Per 1,000 mean resident population. (b) Infant deaths per 1,000 live births. (c) Number of deaths per 1,000 persons in each age group. Excludes fetal deaths.

## LIFE EXPECTANCY

A life table is a life history of a hypothetical group, or cohort, of people, as it is diminished gradually by deaths. It forms the basis for the *stationary population* which is the population that would result from a constant number of births each year which had been subject at each age to the life table mortality rates

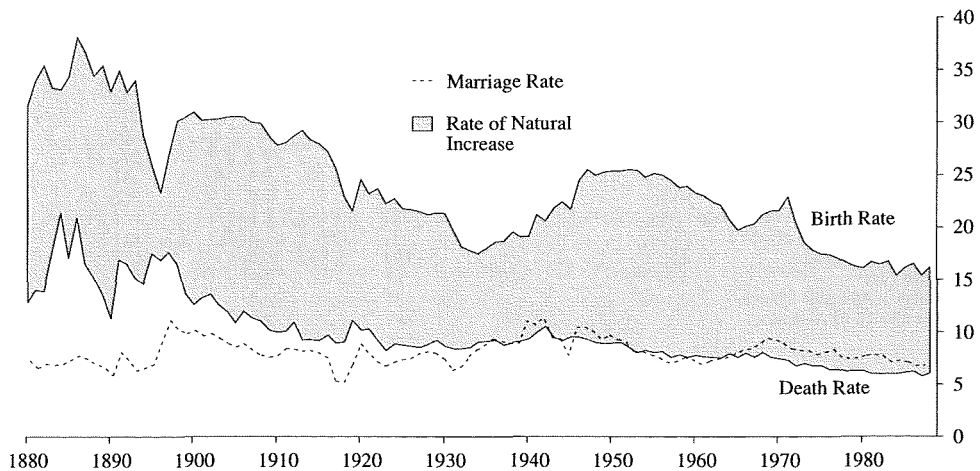
A key value in life tables is the expectation of life remaining at each age. Expectation of life in Australia, particularly at birth, improved at every age in the first half of this century. Between 1953-55 and 1970-72 there was little change in expectation of life. However, since 1970-72 there have been significant improvements, particularly in expectation of life at birth which has increased between 1970-72 and 1988 from 68.1 years to 73.1 for males and from 74.8 years to 79.4 for females.

TABLE 6.16 - COMPLETE EXPECTATION OF LIFE AT SELECTED AGES (a): AUSTRALIA (years)

Age	Expectation of life (b)		
	1982	1987	1988
Birth—			
Males	71.25	73.03	73.08
Females	78.24	74.46	79.45
1 year—			
Males	71.08	72.75	72.79
Females	77.96	79.05	79.05
20 years—			
Males	52.83	54.35	54.40
Females	59.36	60.40	60.43
40 years—			
Males	34.12	35.60	35.76
Females	39.95	40.97	41.03
60 years—			
Males	17.18	18.27	18.36
Females	21.98	22.76	22.81

(a) Based on annual life tables calculated by the Australian Statistician. These figures are based on estimated resident population. (b) The average number of additional years a person of given age and sex might expect to live if the age-specific death rates of the given period continued throughout their lifetime.

DIAGRAM 6.3  
RATES OF BIRTH, DEATH AND MARRIAGE,  
Per Thousand of Mean Population, 1880 to 1988  
(From 1 January 1966 includes particulars of persons of predominantly Aboriginal descent)



## MARRIAGES

Marriages may be celebrated either by ministers of religion registered for the purpose with the Registrar of Ministers of Religion in each State or Territory, by the Registrar-General, the Deputy Registrar-General or other State officers appointed under the *Registration of Births, Deaths and Marriages Act, 1961* (State), or since 1973, by other persons authorised by the Commonwealth Attorney-General.

TABLE 6.17 – MEDIAN(a) AGES OF BRIDEGROOMS AND BRIDES  
(years)

Reference: Catalogue No. 3306.0

Marital Status	1982	1987	1988
Bridegrooms—			
Never married	24.8	25.9	26.2
Widowed	52.5	58.8	62.7
Divorced	34.4	38.6	39.5
<b>All bridegrooms</b>	<b>26.1</b>	<b>27.8</b>	<b>28.2</b>
Brides—			
Never married	22.3	23.7	23.9
Widowed	52.7	51.3	53.2
Divorced	30.9	34.7	35.4
<b>All brides</b>	<b>23.3</b>	<b>25.3</b>	<b>25.6</b>

(a) The median age is that age which divides the reference population into two halves, one half being below the median age and one half above.

TABLE 6.18 – RELIGIOUS AND CIVIL MARRIAGES, 1988

Reference: Catalogue No. 3306.0

Category of authorised celebrant	Western Australia		Australia	
	Number	Per cent of total marriages	Number	Per cent of total marriages
Registered ministers of recognised religious denominations (a)—				
Christian denominations (a)—				
Anglican Church of Australia	1,250	11.8	15,661	13.4
Assemblies of God in Australia	50	0.5	813	0.7
Baptist Union of Australia	171	1.6	1,944	1.7
Christian Bretheren	19	0.2	222	0.2
Church of Jesus Christ of Latter Day Saints	30	0.3	299	0.3
Church of the Four Square Gospel in Australia	25	0.2	67	0.1
Churches of Christ in Australia	197	1.9	1,274	1.1
Jehovah's Witnesses	-	-	398	0.3
Lutheran Church of Australia Incorporated	57	0.5	1,228	1.0
New Church in Australia	71	0.7	81	0.1
Orthodox Churches (b)	84	0.8	2,726	2.3
Potter's House Christian Fellowship	21	0.2	44	-
Presbyterian Church of Australia	-	-	1,852	1.6
Roman Catholic Church	1,887	17.8	23,975	20.5
Salvation Army	87	0.8	774	0.7
Seventh-day Adventist Church	33	0.3	371	0.3
Uniting Church of Australia	841	8.0	12,550	10.7
Other	271	2.6	2,890	2.5
<b>Total</b>	<b>5,094</b>	<b>48.2</b>	<b>67,169</b>	<b>57.5</b>
Non Christian denominations—				
Jewish	53	0.5	305	0.3
Islam, Muslim	32	0.3	652	0.6
Other	17	0.2	427	0.4
<b>Total</b>	<b>102</b>	<b>1.0</b>	<b>1,384</b>	<b>1.2</b>
<b>Total</b>	<b>5,196</b>	<b>49.1</b>	<b>68,553</b>	<b>58.7</b>
Civil officers—				
Registrar-General, etc.	974	9.2	12,407	10.6
Civil celebrants	4,408	41.7	35,856	30.7
<b>Total</b>	<b>5,382</b>	<b>50.9</b>	<b>48,263</b>	<b>41.3</b>
<b>TOTAL MARRIAGES</b>	<b>10,578</b>	<b>100.0</b>	<b>116,816</b>	<b>100.00</b>

(a) Under authority of the Marriage Act. (b) Includes denominations grouped under this heading in the proclamation made under the Marriage Act.

## DIVORCES

*The Family Law Act 1975* (Commonwealth), which came into operation on 5 January 1976, repealed the Matrimonial Causes Act and made new provisions relating to divorce. It also established the Family Court of Australia.

In Western Australia, jurisdiction relating to the *Family Law Act 1975* (Commonwealth) is vested in the Family Court of Western Australia constituted by the *Family Court Act 1975* (State).

The Family Law Act provides that an application by a party to a marriage, for a decree of dissolution of the marriage shall be based on the grounds that the marriage has broken down irretrievably. A decree of dissolution is made if and only if, the Court is satisfied that the parties

separated and thereafter lived separately and apart for a period of not less than twelve months immediately preceding the date of the filing of the application for dissolution of marriage, provided that the Court is satisfied that there is no reasonable likelihood of cohabitation being resumed.

The Family Court of Western Australia also exercises jurisdiction in matters concerning the adoption of children, and the guardianship, custody or maintenance of children.

In both Western Australia and Australia almost one half of marriage dissolutions occurred when the duration of the marriage was 9 years or less. Dissolutions were highest in marriages with a duration of between 5 and 9 years.

**TABLE 6.19 – DISSOLUTIONS OF MARRIAGE, 1988**

*Reference: Catalogue No. 3307.0*

Duration (years)	Marriages dissolved			
	Western Australia		Australia	
	Number	Per cent of total dissolutions	Number	Per cent of total dissolutions
Under 5	616	15.5	8,771	21.4
5 - 9	1,127	28.4	11,521	28.1
10 - 14	781	19.7	7,098	17.3
15 - 19	620	15.6	5,803	14.2
20 - 24	387	9.8	3,810	9.3
25 - 29	228	5.8	2,084	5.1
30 and over	205	5.2	1,920	4.7
Not stated	-	-	-	-
<b>Total</b>	<b>3,964</b>	<b>100.0</b>	<b>41,007</b>	<b>100.0</b>

## REFERENCES

### ABS publications

*Census 86—Catalogue of 1986 Census Tables* (2175.0).

*Estimated Resident Population by Age and Sex in Statistical Local Areas, Western Australia* (3203.5).

*Births, Australia* (3301.0).

*Deaths, Australia* (3302.0).

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*Perinatal Deaths, Australia* (3304.0).

*Marriages, Australia* (3306.0).

*Divorces, Australia* (3307.0).

## Chapter 7

### SOCIAL WELFARE

The Commonwealth and State Governments and a large number of voluntary agencies provide social welfare services for the population. The Commonwealth Government is concerned largely with providing fixed monetary pensions and benefits and repatriation services. It also provides, either directly or through State and local government authorities and voluntary agencies, a wide range of welfare services for people with special needs. During 1988-89, \$23,802 million were expended in Australia on social security and welfare by the Commonwealth, which is 29.0 per cent of the total Government outlay. State agencies operate in the field of child welfare and distribute emergency relief in circumstances where Commonwealth Government assistance is not available. The voluntary agencies, many of which receive government aid, provide a wide range of services in various fields of social welfare. At the end of March 1990 there were 506 licensed charitable organisations in Western Australia.

#### INCOME SUPPORT THROUGH THE DEPARTMENT OF SOCIAL SECURITY

The introduction of a pension for aged persons in 1909 began Australia's national provision of social security payments. Since then a number of other regular income payments have been introduced to meet specific cases of perceived need for people incapacitated for work, for spouses of age or invalid pensioners and for sole supporting parents. In addition, disability and service pensions have been provided through the Department of Veterans' Affairs for returned servicemen and women and their dependants.

The Department of Social Security administers income support legislation for the aged, the disabled, the sick, widows and sole parents, the unemployed and families with children. The conditions relating to payment of the pensions and benefits described in this section are intended only as a general guide and more detailed information about the eligibility criteria and current rates of benefit should be obtained from the Department of Social Security.

In 1988-89 Western Australians were paid more than \$1,229 million in the form of pensions and

benefits through the Department of Social Security.

TABLE 7.1 – MAIN BENEFITS PAID UNDER THE SOCIAL SECURITY ACT: 1988-89

<i>Pension/benefit type</i>	<i>Number of beneficiaries</i>	<i>Expenditure</i>
		\$m
Age Pension (a)	107,047	584.5
Family Allowance	(b)186,988	127.7
Invalid Pension (a)	39,068	230.5
Sole Parent's Pension (c)	23,357	73.4
Unemployment Benefit (d)	(e)35,621	257.8

(a) Includes wife/carer. (b) Number of families. (c) Figures relate to the period commencing March 1989 when sole parent's pension replaced the previous class A widow's pension and supporting parent's benefit. (d) Excludes an average of 1,664 job search allowees on benefit at the end of each week; expenditure totalled \$4.4 million. (e) Average number on benefit at end of each week during year.

#### Age pension

Women aged 60 years and over and men aged 65 years and over are eligible for the age pension subject to income and assets conditions and residential qualifications.

There were 107,047 persons (including wives and carers) on age pension at 30 June 1989, an increase of one per cent on the previous year. Outlays amounted to over \$584 million. The average weekly rate of pension at the end of June 1989 was \$201.56 for married couples (combined) and \$120.37 for the standard rate.

### **Invalid pension**

An invalid pension is payable to persons aged 16 years and over who are permanently blind or 85 per cent permanently incapacitated for work. The invalid pension cannot be paid unless a major part of the person's incapacity for work is directly caused by physical or mental impairment. Non-medical factors cannot predominate in the assessment of eligibility. At 30 June 1989, 39,068 persons were receiving this pension, an increase of 4.1 per cent on the number at June 1988. The total amount paid was \$230 million.

### **Sheltered employment allowance**

A sheltered employment allowance is payable to disabled people who are employed in approved sheltered workshops and are otherwise qualified to receive an invalid pension or would become so qualified if they ceased to be provided with sheltered employment. At June 1989, there were 785 sheltered employment allowees and 72 wives of these allowees. This total of 857 is a decrease of 1.2 per cent on the June 1988 figure. The total value of allowances paid was nearly \$6 million.

### **Rehabilitation allowance**

Persons undertaking a rehabilitation program with the Commonwealth Rehabilitation Service and otherwise eligible for a social security pension or benefit can receive a non-taxable rehabilitation allowance equivalent to the invalid pension, subject to the same income and assets tests conditions. The allowance is paid during treatment or training. At June 1989, 189 persons were receiving rehabilitation allowances and 70 wives/carers were receiving a wife's pension.

Recipients of the invalid pension, sheltered employment allowance and rehabilitation allowance, may also be eligible for supplementary payments—additional payment for each child, mother's/guardian's allowance, rent assistance, remote area allowance and special temporary allowance on the death of a pensioner spouse.

### **Mobility allowance**

Severely disabled people aged 16 years or more who are gainfully employed or undertaking vocational training and who, because of their disabilities, cannot use public transport without substantial assistance may be eligible for an allowance of \$11 a week. At 21 June 1989, 789 persons were in receipt of this allowance with \$472,000 being paid during 1988-89.

### **Wife's pension**

The wife of an aged or invalid pensioner or of a sheltered employment allowee may be paid a pension if she does not qualify for a pension in her own right.

### **Carer's pension**

A carer's pension may be paid to a person who provides a 'severely handicapped' age or invalid pensioner or rehabilitation allowee with substantial personal care and attention or constant supervision in the home where they both live. Persons already in receipt of a social security payment or service pension are not eligible to receive a carer's pension.

### **Sole parent's pension**

The sole parent's pension was introduced from 1 March 1989. It amalgamates the former Class A widow's pension and the supporting parent's benefit. The sole parent's pension is subject to the income and assets test and is taxable.

The Jobs, Education and Training (JET) scheme to assist sole parent pensioners enter the workforce was announced in the 1988-89 Budget. Although the scheme is open to all sole parent pensioners, it is especially targeted at those with school-age children; those who may lose their pension within two years when their youngest child turns 16 years; and teenage sole parents. The scheme is entirely voluntary.

An amount of \$73 million was paid to 23,357 sole parent pensioners between March and June 1989.

### **Widow's pension**

The widow's pension was introduced in 1942 to provide a regular income for women who had lost the support of their partner.



Prior to 1 March 1989, there were three classes of widow pensioners: Class A—a widow with at least one qualifying dependent child; Class B—a widow of at least 50 without a qualifying child, or a widow who was at least 45 when her Class A widow's pension ceased because she no longer had a qualifying child in her care; Class C—any widow under 50 with no child and in needy circumstances within 26 weeks of her husband's death.

From 1 March 1989, Class A pension was amalgamated with supporting parent's benefit to form the sole parent's pension.

Class B pension commenced to be phased out from 1 July 1987 and most cases should cease to be payable by the year 2002.

From 1 March 1989, Class C pension was extended to widowed males in needy circumstances, and became the 'widowed person's allowance'.

At June 1989, there were 6,887 Class B widows and 14 widowed person's allowance recipients.

### **Unemployment benefit**

To be eligible for unemployment benefit a person must:

- have been unemployed for the period covered by the benefit;

- be capable of undertaking and willing to undertake suitable paid work;

- be taking reasonable steps to obtain work;

- not be unemployed due to industrial action; and

- be registered for work with the Commonwealth Employment Service.

Unemployment benefit may be paid to people aged between 18 and 64 years in the case of men, or under 60 years in the case of women, subject to income and assets conditions and residency qualifications.

To assist the long-term unemployed back to work, a three-year project called Newstart began on 1 February 1989.

Key elements of the project involve personalised assessment, counselling and referral to jobs or training, new transition to work incentives for long-term unemployment beneficiaries including a \$100 payment to those who take up full-time work, allowing a wider range of job-related activity to improve employability while still retaining unemployment benefits, and waiving the waiting period where the person reclaims unemployment benefit within three months.

On average there were 35,621 persons on unemployment benefit at the end of each week during the 1988-89 year.

### **Job search allowance**

From 1 January 1988 unemployment benefit for 16 to 17 year-olds was replaced by a job search allowance which is subject to a parental income test, an unemployment benefit work test, and after six months of continuous registration with the Commonwealth Employment Service, to the activity test. This initiative was designed to encourage unemployed 16 to 17 year-olds to take up training and employment opportunities rather than become dependent on long-term unemployment benefits, and to remove any financial incentive to leave school early. On average there were 1,664 job search allowance recipients at the end of each week during 1988-89.

### **Young homeless allowance**

A young homeless allowance may be paid to single unemployment, sickness and special beneficiaries under 18 years of age who are 'homeless' and without parental or custodial support.

There were 188 young homeless allowance recipients at June 1989.

### **Sickness benefit**

A sickness benefit is paid to people who have been temporarily incapacitated for work because of sickness or injury and who have suffered a loss of income as a result of the incapacity or who, but for the incapacity, would qualify for the unemployment benefit.

Outlays on sickness benefit amounted to \$38 million and was paid to an average 5,374 persons each week in 1988-89.

### Family allowance

The family allowance is paid to a person caring for a child or children under sixteen years of age or full-time dependent students aged 16 to 24 years who are not in receipt of a prescribed education scheme payment. For those aged 18 to 24 years additional qualifications must be met.

Payment is usually made to the mother and subject to an income test. The family allowance may only be paid to Australian citizens or people who have been granted permanent entry. Payment ceases once a parent or child has been temporarily overseas for three years. Approved charitable, religious or government establishments may be paid family allowances for children in their care.

At 30 June 1989, 186,988 families were receiving the family allowance.

### Family allowance supplement

Claimants for the family allowance supplement must be qualified to receive the family allowance.

This payment is an income and assets tested non-taxable supplement for families not in receipt of other pension/benefit for the child.

At 30 June 1989, there were 16,628 families receiving \$40 million in family income supplement for 41,364 children.

### Multiple births payment

Additional payments for multiple births are subject to the same parental income test as family allowance. Payments are made in addition to family allowances until the children reach six years.

### Child disability allowance

The child disability allowance is payable to parents or guardians of a physically, intellectually or psychiatrically disabled child under 16 years who is cared for at home and is in need of constant care and attention. The allowance continues to be payable for a dependent full-time student aged 16 to 24 years except where the student is in receipt of certain other social security payments. A monthly allowance of \$112 is payable free of income test and tax.

At 30 June 1989 there were 3,707 recipients of the allowance in respect of 3,932 disabled children. The amount paid was \$6 million.

### Double orphan's pension

A guardian or an institution may be paid a double orphan's pension for a child under 16 years, or a dependent full-time student aged 16 to 24 years inclusive, whose parents are dead. The pension is also payable if one parent is dead and:

the whereabouts of the other parent are not known to the claimant;

the other parent has been convicted of an offence and sentenced to imprisonment for at least ten years and is serving that sentence; or

the other parent is an inmate of a mental hospital or a nursing home patient and will require care and treatment in that or a similar hospital for an indefinite period.

A double orphan's pension may also be paid for a refugee child whose parents are both outside Australia or if their whereabouts are unknown.

The pension is paid free of any income test and is not subject to income tax.

### Special benefit

A special benefit may be paid to people ineligible for a pension or unemployment or sickness benefit, but who are unable to earn a sufficient livelihood for themselves and their dependants, and are in hardship.

On average there were 2,408 special benefit recipients at the end of each week in 1988-89.

### Child support

The Child Support Scheme was introduced in June 1988 to ensure that non-custodial parents who have the capacity to do so, contribute to the support of their children. The Child Support Agency located in the Australian Taxation Office was set up to collect maintenance liabilities under the Child Support Act. The Department of Social Security is responsible for forwarding these payments to the custodial parent.

### Additional payments for beneficiaries

Additions to basic payments are made for certain special needs which apply to a number of income support categories—age pension, sole parent's pension, Class B widow's pension, widowed person's allowance, unemployment benefit, job search allowance and sickness benefit. These

additions recognise higher costs incurred by those maintaining children, by those who pay high private rent or by clients who live in remote areas.

**Additional payment for children.** An additional pension is paid to Social Security beneficiaries for dependent children. This additional pension is not payable for children who are in receipt of an education scheme payment or pension, benefit or allowance in their own right.

**Mother's/Guardian's allowance.** An additional payment of \$12 a week is payable to single pensioners and beneficiaries who have at least one dependent child. It may be payable where couples are living apart indefinitely owing to ill-health.

**Rent assistance/incentive allowance.** Rent assistance is a tax-free allowance which may be paid to beneficiaries who pay rent, lodging, board and lodging, a site rent for a boat, caravan or other accommodation which the person occupies as their home, or for services provided in a retirement village.

All recipients of sheltered employment allowance and invalid pensioners undertaking training receive, in lieu of rent assistance, a non-taxable incentive allowance of \$15 a week free from any rent or income test.

**Remote area allowance.** A weekly allowance of \$7 for a single person and \$12 for a married couple is payable to beneficiaries living in specified remote areas. At 30 June 1989, 4,679 persons were in receipt of this allowance.

**Special temporary allowance.** For up to 12 weeks after the death of one of a married pensioner couple, the surviving pensioner is paid the equivalent of the two pensions that would have been paid if the spouse had not died.

**Funeral benefit.** A benefit of up to \$20 is payable to a person liable for the funeral costs of an eligible age, invalid, wife, carer's or service pensioner or recipient of sheltered employment or rehabilitation allowance. Up to \$40 is payable to eligible pensioners or beneficiaries who are liable for the funeral costs of a spouse, a child or another eligible pensioner.

There were 2,806 grants of funeral benefit during 1988-89, totalling \$82,000.

### **Fringe benefits**

The majority of beneficiaries are entitled to a range of non-cash fringe benefits upon presentation of a concession card.

The Department issues four types of health cards: pensioner health benefits card; health benefits card; health care card; and pharmaceutical benefits concession card. These cards are issued depending on the income and assets of the claimant and the type of social security payment being received. The cards may entitle the holder to a wide range of concessions including health, transport, household and recreation concessions.

The concessions are provided by Government and semi-Government authorities and private organisations.

### **Payment of benefits outside Australia**

From 1 February 1989, pensioners who leave Australia for six months or longer must obtain a pre-departure certificate in order to continue receiving the pension after six months absence from Australia.

Another change in pension portability arrangements was the introduction, from 1 July 1988, of a twelve month limit on payment of sole parent's pensions overseas.

## **INCOME SUPPORT THROUGH THE DEPARTMENT OF VETERANS' AFFAIRS**

The Department provides income support to compensate veterans and their dependants for the premature ageing and loss of earning power which could result from the intangible effects of qualifying (theatre of war) service and to allow veterans and their dependants to enjoy a living standard which is at least equal to that provided by other Government income support programs and, whenever practicable, consistent with veterans' special standing in the community.

### **Service pension**

The Department of Veterans' Affairs provides service pensions to male veterans aged 60 years and over and female veterans aged 55 and over. At June 1989, 36,246 service pensions were being paid, 21,080 to veterans and 15,166 to wives and

widows of veterans. During 1988-89, \$184 million was expended on service pensions.

TABLE 7.2 - SERVICE PENSIONS: 30 JUNE 1989

<i>War service</i>	<i>Number of pensions</i>
1914-18 war	229
1939-45 war	27,426
Korea and Malaya	626
British Commonwealth	6,497
Allied Forces	735
Special Overseas Service	367
Mariners	366
<b>Total</b>	<b>36,246</b>

### Disability pension

The Department of Veterans' Affairs provides a disability pension to veterans as compensation for incapacity accepted as war service related. At 30 June 1989, 30,761 disability pensions were being paid to 14,150 incapacitated veterans, 10,677 dependants of incapacitated veterans and 5,935 dependants of deceased veterans. During 1988-89, \$43 million was expended in disability pensions.

TABLE 7.3 - DISABILITY PENSIONS: 30 JUNE 1989

<i>War service</i>	<i>Number of pensions</i>
1914-18 war	905
1939-45 war	24,356
Korea/Malaya/F.E.S.R. (a)	800
Special Overseas Service	2,043
Peacetime Forces	2,642
Seamen's War Pension	15
<b>Total</b>	<b>30,761</b>

(a) Denotes Far East Strategic Reserve.

### Allowances

Several allowances are provided to supplement and service disability pensions. These allowances vary according to the severity of disablement and the special needs of the pensioner. They include attendant's allowance, loss of earnings allowance, recreation transport allowance and domestic allowance. An education allowance is paid for children of special rate pensioners and children of veterans who died as a result of service.

### War widow's pension

War widow's pensions are granted automatically to the widows of veterans receiving the special rate pension, or equivalent at the time of death. Other claims for the war widow's pension require determination that the veteran's death was war caused. During 1988-89, a total of \$41 million was paid in widow's pensions and allowances in Western Australia.

TABLE 7.4 - MAXIMUM WEEKLY RATES OF BENEFIT PAYABLE THROUGH THE DEPARTMENT OF VETERANS AFFAIRS: NOVEMBER 1989

	\$
Disability Pension—	
Special rate (TPI) (a)	248.98
Intermediate rate	171.45
General rate (100%)	93.85
Extreme Disablement Adjustment Allowance	140.78
War and Defence Widows' Pension	145.60
Service Pension—	
Single person	133.60
Married couple	222.70
Orphan's Pension—	
High rate (both parents deceased)	44.40
Low rate (veteran parent deceased)	22.20
Rent assistance (b)	20.00
Children	3.50
Attendant's Allowance—	
High rate	78.20
Low rate	39.10
Clothing Allowance—	
High rate	3.35
Low rate	1.55
Recreational Transport Allowance—	
High rate	20.80
Low rate	10.40
Vehicle Assistance Scheme (annual rate)	780.00
Veterans' Children Education Scheme—	
Tertiary students—	
Maximum	97.70
Minimum	53.55
Secondary students—	
Maximum	97.70
Minimum	10.00
Allowances paid to service pensioners—	
Guardian's Allowance	12.00
Additional pension for each child—	
Under 13 years	24.00
13-15 years	34.10
Student 16-24 years (if eligible)	17.00
Remote Area Allowance—	
Single person	7.00
Married couple	12.00
Children	3.50

(a) Totally and permanently incapacitated. (b) Single person and couple.

**DEPARTMENT OF COMMUNITY  
SERVICES AND HEALTH**

The Department of Community Services and Health administers programs which provide or subsidise services providing universal access to primary health care, illness prevention and promotion of better health, as well as services for the aged, children, people with disabilities and people who need accommodation. Reference to the activities of the Department primarily relating to Health are to be found in Chapter 8.

**Housing and related assistance programs**

A range of programs has been developed to assist households in the owner-occupied, public housing and private rental housing sectors. The Commonwealth Government provides funds for public housing, supported accommodation services, crisis accommodation, mortgage and rent relief, home purchase loans, and home purchase assistance to individuals and families. The bulk of the Commonwealth financial assistance for housing is provided through the First Home Owners Scheme and the Commonwealth—State Housing Agreement.

**First Home Owners Scheme.** This scheme provides financial assistance to low and moderate income earners. Assistance may be paid either as a series of monthly payments over five years, or as an initial lump sum payment with smaller monthly payments over five years. The scheme provides eligible first home buyers with a tax free benefit of up to \$5,000.

During 1988-89, 3,813 claims were approved and expenditure on new and continuing subsidies totalled \$21 million. In 1989-90 the Department will provide \$17 million for this scheme which will help an estimated 3,300 households buy their first homes and provide continuing monthly subsidies to a further 34,000 home buyers.

**Commonwealth—State Housing Agreement Assistance.** Public rental housing and home purchase assistance is provided for people in need. Untied grants are provided to the State Government which has flexibility in managing housing programs within the guidelines set out in the Agreement. Assistance is available irrespective of age, sex, marital status, race, religion, disability or lifestyle; however, priority is on the basis of need.

**TABLE 7.5 – COMMONWEALTH– STATE  
HOUSING AGREEMENT  
(\$'000)**

	<i>Expenditure 1988-89</i>	<i>Appropriation 1989-90</i>
Untied	48,502	66,266
Rental assistance to pensioners	3,268	4,153
Rental assistance to Aborigines	12,121	15,862
Mortgage and rent relief	2,471	2,898
Crisis Accommodation Program	1,824	3,717
Local Government and Community Housing Program	1,494	2,288
<b>Total</b>	<b>69,680</b>	<b>95,184</b>

**Supported Accommodation Assistance Program.** This program provides for a cost-shared arrangement between the Commonwealth and State Governments to assist organisations in providing a range of supported accommodation and related services to people who are homeless as a result of crisis. The program is directed at persons needing assistance to move towards independent living, wherever possible and appropriate, and tries to improve their status, dignity and self-esteem.

**TABLE 7.6 – SUPPORTED ACCOMMODATION  
ASSISTANCE PROGRAM  
(\$'000)**

	<i>Expenditure 1988-89</i>		<i>Appropriation 1989-90</i>	
	<i>Common- wealth</i>	<i>State</i>	<i>Common- wealth</i>	<i>State</i>
Recurrent base funds	5,375	3,560	6,031	4,178
Growth funds	413	457	436	436
Allowance for indexation	243	161	266	184
<b>Total</b>	<b>6,031</b>	<b>4,178</b>	<b>6,733</b>	<b>4,798</b>

**Programs for families with children**

The Commonwealth provides funds for services to families with children through the Children's Services Program. Grants are made directly to State Government or local government authorities and non-profit community organisations to provide

child care services. The State Government also contributes towards the capital and recurrent costs of the program.

The program aims to ensure that parents and children have access to quality, affordable child care services which meet their needs.

TABLE 7.7 – CHILD CARE SERVICES

	Services provided	Expenditure	
		1989-90	1990-91 (estimate)
	No.	\$'000	\$'000
Aboriginal and isolated care	24	783.6	738.5
Disabled special services	7	314.7	314.7
Family day care	13	3,420.6	3,413.4
Family support	6	357.9	321.8
Long day care	85	9,980.0	9,995.2
Migrant special services	2	262.9	262.9
Occasional care	28	1,553.7	1,549.7
Outside school care	71	1,129.4	749.8
Program support	16	512.1	405.1
Supplementary workers	30	619.7	597.9
<b>Total</b>	<b>282</b>	<b>18,934.5</b>	<b>18,349.0</b>

### Programs for people with disabilities

As well as funding services and programs for people with disabilities, the Commonwealth provides direct rehabilitation services, hearing aids and other audiological services. Other community support services for people with disabilities are funded under the Home and Community Care Program.

**Disability Services Program.** Under this program, non-profit community based organisations, State Government and local government authorities can be funded to provide a range of services for people

TABLE 7.8 – SERVICES FUNDED UNDER DISABILITY PROGRAMS: 30 JUNE 1989

Sub-program (a)	Number
Rehabilitation	11
Hearing services (b)	3
Accommodation	58
Employment	45
Community participation	26

(a) Rehabilitation and hearing services are provided directly by the Commonwealth Government; all other services are provided by the voluntary sector with Commonwealth Government financial assistance.  
(b) Permanently staffed hearing centres only.

with disabilities, providing these services meet their ongoing support needs.

TABLE 7.9 – DISABILITY SERVICES PROGRAM (\$'000)

	Expenditure	
	1988-89	1989-90 (estimate)
Ongoing program (salaries and rental)	15,117.9	18,177.1
Equipment/maintenance	397.6	182.0
One-off assistance	-	1,153.1
Handicapped Childrens Benefit	125.7	130.0
Training Fee/Incentive Bonus	19.5	23.0
Attendant care	328.5	389.0
New services recurrent	111.4	624.7
New services capital and establishment	484.4	413.0
Transition	560.9	854.0
<b>Total</b>	<b>17,145.9</b>	<b>21,945.8</b>

**Rehabilitation services.** The Department provides rehabilitation services directly through the Commonwealth Rehabilitation Service. The services are available to working-age people who have a disability from birth, or as a result of illness or accident. The program aims to help people obtain or retain employment, live as independently as possible and adjust to their disabilities. Clients have access to occupational therapy, counselling and social work services which are provided by Departmental staff and through private and community organisations such as technical and further education colleges and local health services.

The Department also provides a range of financial assistance to people participating in rehabilitation programs. Rehabilitation services are free to people receiving a Social Security pension or benefit.

The Department also pays for community or other services used during a rehabilitation program. For those not receiving a pension or benefit and in particular those with a compensation or damages claim, costs will be recovered by the Department through a direct charge on the insurance company or employer.

Regional rehabilitation units have been established throughout the metropolitan area, in the south-west at Albany and Bunbury, and in Geraldton, to the north of Perth.

During 1988-89 the rehabilitation services outlayed \$2,733,218 in salaries and \$1,522,951 in other expenditure; \$871,980 was received making the net cost of the services \$3,384,189.

**Home and Community Care Program.** The Home and Community Care Program is a cost-shared program between the Commonwealth and State Governments which aims to provide an integrated range of home and community care services for frail aged, and younger persons with disabilities and their carers, thereby avoiding premature or inappropriate institutionalisation. A wide range of services related to the various aspects of home and community care is funded under the program.

An important principle of the program is the consultation with service providers and users as to the gaps in existing services and priorities for developing new types of services. Other key principles include ensuring that users' rights are observed, and that services are provided in an equitable and accessible manner.

Expenditure during 1988-89 on this program by the Commonwealth and State Governments amounted to \$30 million. Of this, the Commonwealth contributed \$17 million and the Western Australian Government \$13 million.

**National Acoustic Laboratory.** The Department provides audiological services, including free hearing aids to eligible people through the National Acoustic Laboratory. Services provided include hearing assessment, selecting and fitting hearing aids, maintaining aids, aftercare and free batteries for aids. Services are provided through hearing centres in the metropolitan area and major country centres are visited on a regular basis.

**Attendant Care Scheme.** This scheme enables younger people with disabilities who would otherwise live in nursing homes to receive up to 28 hours a week of assistance with personal care in their own homes. The Department provides funds to specially selected organisations to employ and train attendants. The scheme has a limited number of places.

#### Residential programs for aged people

Under the Residential Care Program, the Commonwealth funds a range of organisations to provide care in nursing homes and hostels for frail

aged people. The main aims of the program are to ensure that the aged receive services best suited to their needs, facilities are developed where they are needed, care is of high quality, and facilities are designed and services provided to allow the maximum level of independence. Nursing homes and hostels are only two of the care options available to aged people. Home and Community Care services are also funded for the frail aged or disabled who wish to live at home.

#### Capital grants for nursing homes and hostels.

Capital funding is provided to approved organisations to build or buy existing nursing homes and hostels for frail aged people. In some cases funds are also available to help upgrade existing accommodation. An important consideration in funding is that services are located in areas where they are needed most and that they provide frail aged people with as home-like and comfortable a life as possible.

#### Recurrent funding for nursing homes and hostels.

The Commonwealth also provides financial support to help nursing homes meet the costs of providing care. The operational costs of nursing homes are split into two components. One component covers nursing and personal care services and staff, the other, known as the infrastructure component, covers all other costs such as food, laundry and domestic staff.

Organisations managing hostels may receive hostel care, personal care, and respite care subsidies. The hostel care subsidy helps organisations employ staff. The personal care and respite care subsidies are paid to help meet the cost of providing short term hostel accommodation and care.

TABLE 7.10 - APPROVED NURSING HOMES AND HOSTELS FOR THE AGED

	Period	Nursing homes	Hostels
Number	31 December 1989	112	117
Approved beds—			
Permanent	31 December 1989	6,068	{ 4,065
Respite	31 December 1989		
Expenditure (\$m)—			
Recurrent	1988-89	95.7	11.1
Estimated	1989-90	100.0	15.0

**Assessment Program.** High priority is given to ensuring that aged people receive the types and levels of services most suited to their needs and funding is provided to develop assessment services that will assist aged people to choose suitable available services.

**Domiciliary nursing care benefit.** The Department provides a payment of \$42 per fortnight to assist people caring for the chronically ill at home. This benefit is neither means tested nor regarded as income for taxation purposes. To receive the benefit a person must be caring for and living with someone who is eligible for admission to an approved nursing home, receiving adequate nursing care on a 24 hour basis, chronically ill, and at least 16 years old.

**Special Services Program.** Dementia grants help organisations provide special hostel care in separate facilities for people suffering from this condition. Grants are provided for special services and activities, minor capital items and staff development programs.

Funds may also be provided for additional services which prolong the relative independence of aged people in residential care. It also helps develop the provision of services for special groups such as people from non-English speaking backgrounds, Aborigines and people with disabilities who have aged.

#### DEPARTMENT FOR COMMUNITY SERVICES, WESTERN AUSTRALIA

The purpose of the Department for Community Services is to contribute to the Western Australian community by promoting and providing welfare services that assist families, individuals, groups and communities achieve their own well-being.

Services are based on the principles of furthering independence, autonomy, social justice and access to opportunity.

In pursuing its purpose of enhancing the well being of people throughout the community, the Department's services are directed towards a number of broad issues. These include the maltreatment and exploitation of children, children cared for outside their natural family, the needs of socially disadvantaged youth, juvenile offending and its consequences, people seeking development of life skills, families or individuals in social crisis situations, the capacity of communities to provide their own support, people without resources to meet essential needs, and natural disasters.

The Department's philosophy is that services should be responsive to the needs, aspirations and rights of families, individuals and groups conducive to maintaining the family unit 'as appropriate', sensitive to gender and cultural differences, and just, humane and empowering.

It believes that services should be of a high quality, equitable and accessible and the Department's operations should be accountable in all respects.

The Acts under which the Department operates are the *Community Services Act 1972*, the *Child Welfare Act 1947*, the *Welfare and Assistance Act 1961* and the *Adoption of Children Act 1986*.

TABLE 7.11 – DEPARTMENT FOR COMMUNITY SERVICES: EXPENDITURE 1988-89

<i>Nature of expenditure</i>	<i>\$'000</i>
Salaries, wages and allowances	48,645
Administrative support	4,323
Professional and technical support	1,703
Family, children and aged services	6,814
Youth services	3,896
Community and public affairs	929
Financial and material assistance	4,948
Regional services	4,914
Non-government agency support	22,420
<i>Total expenditure</i>	<i>98,593</i>
<i>Total revenue</i>	<i>9,087</i>
<b>Net expenditure</b>	<b>89,506</b>

#### State financial assistance

The State Government provides a range of concessions to people on low incomes to assist with the purchase of essential goods and services such as energy, water, transport and education. The estimated total value of State concessions in 1988-89 was \$140 million.

Emergency financial assistance may be provided through the offices of the Department for Community Services to people who are experiencing financial crises. The Department also funds a number of financial counselling services at non-government welfare agencies. These provide budgeting advice, advocacy and debt renegotiation to people on low incomes.



### Child welfare

The Department for Community Services is responsible for the care of children who are wards of the State or are the subject of certain orders of the Children's Courts. A child is defined as 'any boy or girl under the age of eighteen years'.

Both Departmental and private sector facilities provide emergency, short and long term accommodation to children who are in need of care or who may be awaiting a decision of a Children's Court. The Department has authority to decide which centre or facility or what form of treatment is appropriate to the needs of a child committed by a Children's Court to the care of the Department.

The Department has a statutory responsibility for issuing licences to all people who have care of children under the age of six years who are not near relatives, and who are providing care on a day-to-day basis.

The Department is also responsible for arranging adoptions.

**Maintenance of children.** The Department for Community Services makes payments to foster parents and establishments having children in their care.

TABLE 7.12 - STATE GOVERNMENT  
MAINTENANCE OF CHILDREN PAYMENTS  
MAXIMUM WEEKLY RATES  
OCTOBER 1989  
\$

<i>Subsidy or allowance</i>	<i>Fostered</i>	<i>Group Home</i>	<i>Emergency foster care scheme</i>
<i>Subsidy—</i>			
<i>Wards of the State—</i>			
Primary school age	52.25	56.75	63.50
High school age	59.75	63.55	63.50
<i>Non-wards of the State—</i>			
<i>Departmentally arranged placement—</i>			
Primary school age	52.25	56.75	63.50
High school age	59.75	63.55	63.50
<i>Privately arranged placement—</i>			
Near relative	13.80	..	..
Non-relative	45.00	..	..
Pre-adoptive foster care	52.25	..	..

TABLE 7.12 - STATE GOVERNMENT  
MAINTENANCE OF CHILDREN PAYMENTS  
MAXIMUM WEEKLY RATES  
OCTOBER 1989 - *continued*  
\$

<i>Subsidy or allowance</i>	<i>Fostered</i>	<i>Group Home</i>	<i>Emergency foster care scheme</i>
<i>Additional allowances to wards only—</i>			
<i>Pocket money—</i>			
Primary school age		2.00	
High school — years 8-10		5.00	
— years 11-12		6.50	
Working (awaiting benefits)		10.00	
<i>Clothing allowance (a)</i>			
<i>Initial grant—</i>			
Primary school		200-275	
High school		260-350	
<i>Wear and tear (b)</i>			
Primary school		134	
High school		177	

One dollar per week for each child maintained is paid to the establishments by the State Lotteries Commission. Where an establishment refuses assistance from the Commission on religious or moral grounds the State Government may grant an equivalent allowance to the establishment for each ward maintained. All establishments and foster parents having the care of children receive family allowances from the Commonwealth Government. At 30 June 1989, there were 386 State wards in foster care (264 non-Aboriginal and 122 Aboriginal) and the Department was subsidising a further 452 non-ward children (204 non-Aboriginal and 248 Aboriginal) in foster care.

**Supervision of children.** A child committed to the care of the Department for Community Services becomes a ward of the Department. Many wards remain living at home with their families, but may be placed in a Departmental centre or facility, boarded out with a relative or other approved person, or placed in suitable employment. Where a child is placed under the control of the Department, the child's parents retain guardianship but the child may be treated as a ward. Regional Directors of the Department have authority to place wards of working age in employment or apprenticeship.

**Family and children's services.** Any person who provides day-to-day care of children under the age of six years must be approved and licensed by the Department for Community Services. Licensed services are required to meet standards outlined in the *Community Services (Child Care) Regulations 1988*, in relation to staffing, buildings and physical environment, health and safety, programs and administration.

Family and children's services include privately owned and government funded long day care, occasional care, family day care centres, together with Government funded neighbourhood centres, family centres and community houses. Child care centres provide group care on a full-time, part-time or occasional basis. Government funded family day care is a supervised and coordinated system of child care which is conducted by licensed caregivers in their own homes. Community and neighbourhood houses provide day care, occasional care, family support and community outreach programs to their communities. The Department for Community Services provides a support service to family and children's services ensuring the maintenance of satisfactory standards. It provides information to parents using services, persons in the industry, providers and management committees. It also assists community groups to identify child care needs and facilitates in the establishment of new services.

The information in Table 7.13 is from a census of all child care services registered with the Department for Community Services.

TABLE 7.13 - NUMBER OF LICENSED PLACES  
IN CHILDREN'S SERVICES  
JUNE 1989

Type of service	Number
Long day care	5,299
Occasional care	853
Family day care	3,141
Total	9,293

**Establishments.** The State Government provides substitute care facilities primarily through the Department for Community Services in the form of group homes and hostels, with the latter being mainly provided for education purposes.

The Department provides funding to subsidise establishments for children which are operated by the private sector. Most of these are conducted by religious organisations. The private sector

primarily provides residential based care with some emphasis on the provision of foster care. At 30 June 1989, 199 beds were being provided by seven different agencies.

The Department provides four centres in Western Australia for children who are the subject of remand, assessment and sentencing orders. Children in this category may also be accommodated through community support hostels. At 30 June 1989, there were six hostels operating.

**Adoption of children.** Children placed for adoption in Western Australia come under the guardianship of the Director-General of the Department for Community Services. A person wishing to adopt a child (other than a close relative) should apply directly to the Department. Applicants who meet certain criteria must be assessed by the Department for suitability, and an order for the legalisation of an adoption must be obtained from a Judge of the Family Court of Western Australia. Persons wishing to adopt a related child should consult a solicitor.

During 1988-89, nineteen locally born children were placed with adopting parents, compared with forty-six in 1987-88 and fifty-three in 1986-87. Placements are currently being made with applicants who applied in 1984-85. In 1988-89 three locally born older children and five children with special needs were also placed. Twenty children from overseas were placed for adoption in Western Australia during 1988-89, compared with thirty-four in 1987-88.

**Employment of children.** The *Child Welfare Act 1947* provides the conditions under which children may engage in street trading. These provisions are currently under review and are to be expanded to include employment of children in entertainment and advertising.

#### AUTHORITY FOR INTELLECTUALLY HANDICAPPED PERSONS

The Board of the Authority consists of a Chairperson and five Board members who are appointed by and responsible to the Minister for Health. At June 1989, there were 1,640 staff employed by the Authority.

The Authority has overall responsibility for establishing policy and advising Government on issues impacting on the lives of people who have an intellectual handicap. It is also responsible for maintaining standards and coordinating the

provision of services for people within Western Australia with an intellectual handicap. This role includes both the licensing and funding of service providers. The Mission Statement adopted by the Authority is: to advance the rights, responsibilities, dignity, development and community participation of people with an intellectual handicap.

In June 1989, just over 8,500 Western Australians were registered with the Authority, with 4,600 of these regarded as active. A person who learns and develops at a significantly slower rate than others the same age, has more than ordinary difficulty in coping with everyday life, and has shown these problems during childhood, is eligible for registration with the Authority.

People with an intellectual handicap are actively encouraged to use the same services available to the general public; however, the Authority funds necessary additional services through both the government and non-government sectors.

Irrabeena is the name of the direct-service providing arm of the Authority. A wide range of services are available to people of all ages. The direct services include twenty-two hostels and twenty-seven group homes accommodating 608 and 138 persons respectively.

The Authority actively encourages the participation of consumers and their families in the decision making process of the Authority through consultation.

Services are available on a regional basis and cover all areas of life including personal development programs and support for people who are living in the community, accommodation on both a short and extended stay basis as required, education and personal development opportunities in liaison with educational organisations, a wide range of recreational opportunities, and sheltered and supported employment opportunities. Specialist health services such as medical, dental, podiatry, audiology and dietetics are also available.

In addition to the provision of these services there are community education programs to increase community awareness and acceptance of people who have an intellectual handicap, so that they can fully participate in the everyday life of their community.

## THE WESTERN AUSTRALIAN COUNCIL OF SOCIAL SERVICE

The Western Australian Council of Social Service (WACOSS) is an independent organisation representing a wide range of interests in the field of social welfare, health and community services. The Council currently has 91 individual members and 191 organisational members, including voluntary groups, self-help and community groups, professional associations and Commonwealth, State and local government bodies.

WACOSS is part of a network which comprises Councils of Social Service in all States and Territories and a national body (ACOSS) based in Sydney.

WACOSS has four principal roles:

- to contribute, through participation in various forums, to the development of social policy in Western Australia;

- to offer informed comment on, and to promote understanding of, social welfare and social development issues in the community;

- to facilitate coordination and cooperation amongst social welfare agencies in Western Australia; and

- to provide a range of services to member agencies.

In 1989 WACOSS resourced a significant number of non-government working parties and forums in the areas of Home and Community Care Services, psychiatric issues, Emergency Relief and Poverty, the Child Support Scheme, Child Poverty and the Department for Community Services Legislative Review. These working groups have developed policy discussion papers, responded to State and Commonwealth policy and program initiatives, and planned sector workshops and training sessions upon request from the membership.

The Council also resourced an information workshop for agencies on the Financial Administration and Audit Act and directions in Public Sector management.

The Council, in partnership with the Department for Community Services, conducted statewide workshops on the nature and content of funding contracts. These workshops provided an opportunity for sector input into the review and evaluation of services as components of accountability for government funding.

With increased pressure to reduce expenditure on social programs, the Council has emphasised to the public and business sectors the need for continued social welfare expenditure. Papers on topics such as *The Economic and Social Cost of Child Poverty* and *Who Benefits from Social Welfare Expenditure* have been presented to Rotary Clubs and the Country Women's Association. The Western Australian Child Poverty Campaign is part of a national strategy to raise community awareness of the causes and consequences of child poverty.

At the initiative of WACOSS, a taskforce composed of welfare, business and community groups examined the larger issue of poverty in Western Australia. The taskforce reported to a State Government Cabinet Committee various findings and made recommendations on strategies for the long-term reduction of the causes of poverty in Western Australia.

The following articles are part of a series focusing on welfare organisations operating in Western Australia.

#### THE WESLEY CENTRAL MISSION

The Wesley Central Mission was formally established in 1915, having operated as an activity of the Church since 1829.

The Mission "... is for the man or woman with no religion; it is for anyone who wants help. We feed them, we clothe them, provide recreation for them, and generally by practical help and example on social religious lines, lead them to think that there is something worth having in a good, clean life."

The Mission caters to the needs of Perth's most disadvantaged members of the community. With its inner city location at the centre of the public transport system, it is accessible to clients throughout the metropolitan area.

A large component of the client group comprises single city dwellers. Many live on the streets; some are addicted to alcohol or other substances, others suffer from mental disorders or tragic

personal circumstances. To help these people the Mission's Tranby Day Centre provides food and shelter, and develops opportunities for clients to gradually work their way back into an independent lifestyle.

Another major problem is poverty. Financial counselling, a consumer legal service, an Emergency Relief Centre and Family Welfare are provided to the poor, as well as 'material aid'. Programs have been developed to help overcome the problems of low self dignity and loss of confidence resulting from poverty; support accommodation for homeless people, alcohol rehabilitation, financial and consumer legal credit counselling, a medical centre, home skills, visitation of aged shut-ins, marriage education, drug education and a day centre. These services are offered without cost to the consumer, and are run by trained staff. Financial support comes from the Government, Church and the community.

#### FINANCIAL ADVICE AND WELFARE SERVICE

The Financial Advice and Welfare Service is situated in Fremantle. The Service is funded jointly by The Department for Community Services and the City of Fremantle.

The target population of the Service is those most susceptible to poverty and its effects. People from Fremantle, its environs and adjacent rural areas, from Mosman Park to Mandurah and inland to Jandakot, use the Service. There is also some contact from other metropolitan and rural areas.

People come to the Service for advice on a range of problems. These vary from assistance in completing Department of Social Security forms to the need for individual advocacy in a tribunal hearing when the client appeals a Department of Social Security decision.

In 1988-89, contacts were made with 1,262 families with dependant children, 1,460 females, 356 Aborigines, and 225 migrants. There were 489 new clients. Clients approached the Service for assistance in matters mainly related to emergency relief, finance, social security, housing and legal issues. The majority of clients were on Commonwealth income support (e.g. Social Security, Department of Veterans' Affairs, and Austudy).

The Service employs four people who provide advocacy, information dissemination, community education and work towards institutional change.

## Chapter 8

### HEALTH

The Commonwealth and State Government health authorities, together with local government authorities, cooperate in maintaining health services and in the prevention and control of infectious diseases in Western Australia. Commonwealth activity in the health area is primarily directed towards ensuring that all Australians have access to necessary health services; it also includes the setting and administering of standards for the safety and efficacy of therapeutic goods and services, support for health research and promotion of better health. During 1988-89, \$10,790 million were expended in Australia on health by the Commonwealth, which was 13.1 per cent of total Commonwealth outlays for that year. The State Government provides a range of health care services including dental and hospital care. Local government authorities have the power to make and enforce by-laws relating to health matters such as sanitation and keeping of animals.

#### COMMONWEALTH GOVERNMENT HEALTH BENEFITS AND ASSISTANCE

Commonwealth financial assistance for health services is provided for both individuals and institutions.

For individuals, benefits are paid for services rendered and goods supplied, in the main, by private professionals and organisations, for example, doctors, pharmacists and nursing home proprietors. As well, individuals can receive assistance through tax expenditures in the form of a rebate for the excess of unreimbursed medical expenses over \$1,000 in the year of income, sales tax exemptions on a wide range of health related goods, and tax deductibility for gifts to eligible organisations.

For institutions, support is provided to State's hospital systems through specific purpose hospital grants. Health services are also provided directly through the Repatriation hospital system as well as through organisations such as the National Acoustic Laboratories.

#### Medical Services and Benefits

**Medical Benefits.** The universal health insurance program known as Medicare was introduced by

the Commonwealth Government on 1 February 1984.

TABLE 8.1 - MEDICARE : 1988-89

	<i>Unit</i>	
Persons enrolled (a)	'000	1,603
Services processed—		
General practitioner attendances	"	6,300
Specialist attendances	"	888
Pathology	"	2,563
Other	"	1,749
<b>Total</b>	"	<b>11,500</b>
Services processed (average number per enrolled person)		
Males		5.5
Females		8.9
Persons		7.2
Benefits processed	\$'000	26,708

(a) At 30 June 1989.

Medicare provides Australians and other eligible people with reimbursement for medical and optometrical services, free shared ward

accommodation and treatment, and free outpatient treatment at public hospitals. Those electing to have 'doctor of choice' or private ward accommodation in a public hospital must bear the additional cost or take out appropriate hospital insurance cover. The Commonwealth provides substantial financial assistance to the States to support Medicare services.

**The Health Insurance Commission** pays medical benefits for medical and optometrical services and administers the daily operations of the Medicare program. It also combats medical fraud and overservicing and provides services for processing of Department of Veterans' Affairs Treatment Accounts. The responsibility for payments to pharmacists through the Pharmpay system was transferred from the Department of Community Services and Health to the Health Insurance Commission on 17 July 1989.

**Veterans and Dependants.** The Commonwealth meets the costs for eligible veterans and their dependants of specialist local medical officer, paramedical, and dental services, the supply and maintenance of surgical aids, and travelling and other expenses incurred in obtaining medical treatment.

### Hospital Services

**State Public Hospitals.** Apart from Commonwealth outlays for free hospital care under Medicare the Commonwealth also contributes to the upgrading of the infrastructure of State public hospitals through the Hospital Enhancement Program. The Commonwealth granted \$2.04 million to Western Australia under this program in 1988-89.

TABLE 8.2 - HOSPITALS AND BEDS  
30 JUNE 1989

	<i>Number</i>	<i>Beds</i>
Public hospitals	87	6,149
Private hospitals	23	1,942
<b>Total</b>	<b>110</b>	<b>8,091</b>
Beds per 1,000 population	..	5.1

**Veterans and Dependants Hospitals.** Repatriation hospitals and clinics are maintained in each State for the treatment of eligible veterans and their dependants. Community patients are admitted to Repatriation hospitals free of charge if

spare beds are available and the facilities are suitable for the treatment required. Conversely, veterans and their dependants may, where appropriate, be admitted to private or State public hospitals, generally at Commonwealth expense. Currently, 52 per cent of bed-days for veterans are provided outside Repatriation hospitals.

The Commonwealth has decided that Repatriation hospitals should be integrated with the State public hospitals system by 1995. Negotiations with the States to ensure the continued availability of high quality hospital care to veterans are currently underway.

**Nurse education.** The Commonwealth provides financial assistance to the States for transferring nurse education from hospital based facilities to the higher education sector.

**Health insurance.** New health insurance arrangements were announced by the Commonwealth in the 1989-90 Budget designed to reinforce the principle under which everyone is treated equally for health insurance purposes, regardless of age or risk of illness. These arrangements include provisions to ensure that benefit liabilities are equitably distributed between health insurance funds.

TABLE 8.3 HEALTH INSURANCE FUNDS  
MEMBERSHIP AND PERSONS COVERED  
31 MARCH 1989

	No.	
Registered organisations (a)	No.	5
Basic hospital table (b)		
Membership	'000	293
Persons covered	"	678
Supplementary hospital table (c)		
Membership	"	269
Persons covered	"	621
Ancillary table (d)		
Membership	"	330
Persons covered	"	768

(a) State of registration of organisation. Number of funds offering health insurance. (b) Provides for cover for hospital accommodation charges for inpatients of public, private and day hospital facilities. (c) Provides additional hospital accommodation benefits to those provided by the basic

### Pharmaceutical Benefits Scheme (PBS)

Through the payment of pharmaceutical benefits, the Commonwealth aims to ensure access by the Australian community to necessary cost-effective, prescribed medications at the lowest cost to Government and consumers, consistent with reliable supply. Under current arrangements, pharmaceutical benefits are supplied to the general public at a maximum of \$12 per prescription item.

Low income families, and the Departments of Social Security and Veterans' Affairs pensioners (and dependants), can apply for a card which entitles them to prescription benefits at a concessional rate of \$2.50 per prescription item, or, for some cardholders, at no cost.

There is also a safety net arrangement which operates on a calendar year basis for general and concessional users of pharmaceuticals, individuals or families, who use more than 25 PBS prescriptions in a calendar year. Such users are entitled to obtain further PBS prescriptions at no cost during the remainder of the calendar year.

In 1988, 24,400 safety net and prescription benefit entitlement cards were issued which covered 59,900 persons.

Items available under the PBS and the conditions under which they may be prescribed are determined by the Minister for Housing and Aged Care on the recommendation of the Pharmaceutical Benefits Advisory Committee. Prices paid to manufacturers are recommended by the Pharmaceutical Benefits Pricing Authority. Pharmacists' remuneration is determined by the Pharmaceutical Benefits Remuneration Tribunal.

TABLE 8.4 - BENEFIT PRESCRIPTIONS : 1988-89

	Unit	General	Concessional	Pensioner (a)	Total (b)
Number	'000	1,199	679	5,561	7,439
Payments	\$'000	10,817	5,270	56,846	72,934
Patients contributions on general benefit prescriptions	\$'000	12,705	1,704	..	14,409
<b>Total benefit prescription cost</b>	<b>\$'000</b>	<b>23,522</b>	<b>6,974</b>	<b>56,846</b>	<b>87,343</b>
Average total cost per prescription	\$	19.56	10.30	10.26	11.76

(a) Includes payments for holders of safety net cards. (b) Payments to approved persons.

### Nursing Home Subsidies and Domiciliary Care Services

Nursing home subsidies are provided to ensure that those people who are assessed as needing nursing home care have access to residential support and care which is appropriate to their needs.

Domiciliary nursing home care benefits provide financial support to carers to assist frail aged and young disabled people, who would otherwise require nursing home admission, to remain in the community.

**Nursing Home Subsidies for the Aged.** Standard daily resident fees and standard Commonwealth benefits for nursing homes commenced on 1 July 1987 and will be phased in over the period to 1 July 1991. These funding arrangements provide a national standard funding component for infrastructure costs, national uniform nursing and personal care staffing arrangements, and additional standard benefits payable for respite care patients as an incentive for the provision of respite care.

**Nursing care for veterans and dependants.** The Commonwealth meets the costs of nursing home accommodation required for veterans with service-related disabilities and certain categories of veterans and war widows with disabilities not related to service, subject to the payment of a standard contribution by the patient.

**Nursing home subsidies for people with disabilities.** The Commonwealth meets the approved operating deficits of eligible non-profit nursing homes for persons with disabilities. In addition, nursing home benefits are paid to a small number of nursing homes for people with disabilities.

**Domiciliary nursing care benefits.** The Commonwealth pays a benefit of \$42 per fortnight to eligible persons who provide care for approved persons at home as an alternative to nursing home care. Such persons must be aged 16 years or over and would otherwise justify admission to an approved nursing home. A total of \$3.1 million was paid in 1988-89.

**Home nursing service.** The Commonwealth funds under the cost-shared Home and Community Care (HACC) Agreements with the State, certain home nursing services to assist frail or at risk aged and young disabled people to continue to live in their own homes. For more details on the HACC Program, refer to Chapter 7.

TABLE 8.5 - HOME AND COMMUNITY CARE PROGRAM : 1988-89 (\$'000)

Payments received for	
Capital expenditure	950
Recurrent expenditure	20,736

### Other Health Services.

The Commonwealth provides financial assistance to support health research, to promote better health in conjunction with the prevention of disease, and to provide health services supplementary to the mainstream health care system.

**Health research.** Commonwealth support for health research activities covers medical and public health research. It includes financial assistance through the Medical Research Endowment Fund (MREF) and the Public Health Research and Development Committee (PHRDC), and to the Australian Institute of Health.

Payment of available moneys from the MREF, received from both the Commonwealth and other sources such as gifts and bequests, is determined by the Minister for Community Services and Health on the advice of the National Health and Medical Research Council. The latter acts, where necessary, in accordance with any conditions imposed by private benefactors. Assistance is provided from the MREF and the PHRDC in the form of project, program, institute and research unit grants and training awards. Assistance may also be provided to Commonwealth and State Government departments.

**Health promotion and disease prevention.** The Commonwealth provides financial assistance for a wide range of health promotion and disease prevention activities that emphasise prevention in contrast to the dominant curative approach.

The National Health Promotion Program supports community based initiatives to promote better health and to prevent illness. In addition it fosters the establishment of preventive health strategies throughout Australia including the development of

those recommended by the Better Health Commission.

The National Better Health Program funds projects with the States to encourage reductions in the incidence of hypertension, accident injury, poor nutrition, skin cancer and preventable health problems in the elderly. In 1988-89 a total grant of \$37,000 was paid to Western Australia.

Under the National Community Health Program the Commonwealth funds national projects which provide health professional training initiatives and foster community participation, self-help and multi-disciplinary approaches to health care (e.g. through support to voluntary associations and other non-government organisations operating at the national level). The largest project under this Program is the Family Medicine Program which funds a vocational training program organised by the Royal Australian College of General Practitioners for medical graduates wishing to enter general practice.

Financial assistance is also provided to non-Government Family Planning Associations for clinical services (part of which is paid in lieu of benefit for medical services provided in clinics) and for education and training.

The Public Health Program provides assistance to tertiary education institutions for courses and programs in public health.

The Commonwealth provides grants to the States for women's health, to undertake cost shared selected trials of cervical cancer screening and to assess the feasibility of mammography screening for breast cancer.

**AIDS control.** Although primary care and treatment of AIDS patients is a State responsibility, the Commonwealth provides hospital funding grants to the States based on the actual number of AIDS cases treated. Grants are provided for education and prevention, treatment and support services, the National Media Campaign and research activities.

**National Drug Programs.** The National Campaign Against Drug Abuse activities include drug abuse treatment, rehabilitation and prevention programs, the 'Drug Offensive' public information campaign and the development of a national drug abuse data system together with research and evaluation. Funding on a dollar for dollar basis is provided to the States. In 1988-89, \$1.6 million was allocated to Western Australia (\$0.6 million



for education and \$1 million for treatment/rehabilitation.).

**Health Support Services.** In addition to its commercial activities, the Commonwealth Serum Laboratories Commission (CSL) carries out functions determined by the Minister to be in the national interest, including research projects, blood fractionation and maintenance of reserve stocks. The Commonwealth reimburses CSL for the cost of carrying out these functions.

The annual operating costs of the Red Cross Society's Blood Transfusion Service (BTS) to the States are shared by the States (60 per cent), the Society (the lower of 5 per cent of operating costs and 10 per cent of the previous year's income from donations) and the Commonwealth (the balance). Approved capital costs are shared between the Commonwealth and the States on a dollar for dollar basis. Blood collected by the BTS is processed by the CSL and blood products are supplied, free of charge (excluding freight), to hospitals and approved pathologists for use in medical treatment and analysis. The Commonwealth reimburses CSL for the cost of processing the blood.

The Commonwealth subsidises the Royal Flying Doctor Service to the extent of about 45 per cent of annual operating costs (matched on a dollar for dollar basis with the States) and also provides a substantial contribution to capital costs.

**Health services for Aborigines** The Government is committed to raising Aboriginal health standards to the level of other Australians. Strategies emphasise improvement of environmental conditions, domiciliary hygiene and preventive education programs coupled with the promotion of Aboriginal participation and decision making in health care delivery.

**Aids and appliances.** The Commonwealth provides through the National Acoustic Laboratories, at no cost to users, a range of hearing services to eligible pensioners and children under the age of twenty-one. Reference to the details of services provided are to be found in Chapter 7.

Commonwealth and patient contributions subsidise the cost of syringes and other materials required by diabetics.

**Other.** This category includes outlays on environmental, social and other public health activities including human quarantine and health

advisory committees, and outlays under the *Therapeutic Goods Act 1966*. Also included is provision for 'act of grace' payments, frequently to meet additional costs incurred in sending patients with life threatening diseases overseas for treatment unavailable in Australia. The Commonwealth contributes to establishment and operational costs of a national centre for liver transplantation on a cost-shared basis with NSW, reciprocal health care agreements with other countries, and payments towards the operational costs of the Australian Medical Council.

### THE HEALTH DEPARTMENT OF WESTERN AUSTRALIA

The Health Department of Western Australia coordinates and manages health care functions and services throughout the State. The Department administers a wide range of legislation incorporating matters of individual and community health protection, treatment and regulation.

The Department is currently in the process of decentralising health services with the aim of establishing regional responsibility for the management of services and the control of funds. There are now seven country regions and four metropolitan regions, each with a director who is responsible for all financial, capital, human and technical resources for health care services and facilities in the region.

Head Office in Perth maintains responsibility for planning and policy development, resources and public health. The statutory relationship between Board hospitals and the Minister for Health will continue, but regional directors will be delegated the power to negotiate the allocation of Board hospital resources.

The services provided through Head Office and the regions are organised under a series of programs which reflect the move towards the integration and regionalisation of health services in Western Australia.

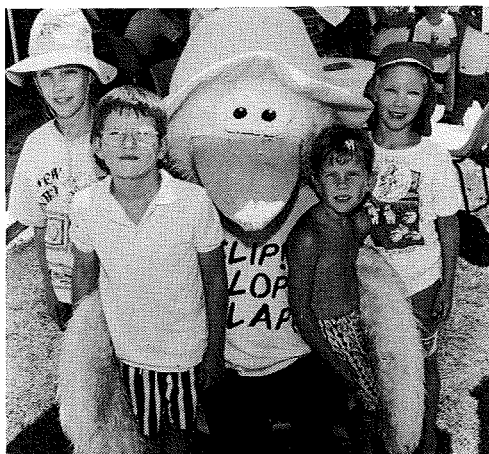
#### Health Promotion Program

The Department's Health Promotion Program informs the public about the causes and prevention of major preventable illnesses and injuries, and encourages the adoption of attitudes and behaviours that are conducive to health.

Through both Head Office and regional health promotion officers, the Health Promotion Branch seeks to promulgate from a community base, the

priorities of infectious disease control (e.g. immunisation, AIDS, sexually transmitted diseases), nutrition education, alcohol, drug and smoking control, and Aboriginal health.

To promote such campaigns as 'Eat Less Fat', 'AIDS', 'Quit', 'Drinksafe', and 'Slip, slop, slap' health education officers give talks to, liaise with, and organise seminars for various community organisations such as Rotary; Country Women's Association; Lions; Police and Citizens; Aboriginal, religious, migrant and women's groups; the media; hospital staff; technical colleges and schools. In addition, they organise shopping centre displays, hospital open days, sponsor youth sports teams and encourage worksites such as Shire Councils to adopt policies on health issues. Health education officers also serve as a general resource point for information requests from the community and other health professionals.



Syd Seagull promoting the Health Department of Western Australia's 'Slip, slop, slap' sun safety message to a group of young children.

*Photograph* : Health Department of Western Australia

### **Health Surveillance and Protection Program**

This program monitors the health of the community and the prevalence of environmental factors relevant to health, to identify any changes that may signify a danger to health, and seeks to ensure the safety of food and water and other components of the environment.

Of note in 1988-89 was the Ross River Virus (RRV) epidemic. A large aerial larviciding program was undertaken which proved a success in reducing the numbers of RRV vector mosquitoes. In addition, a public information

program was run, aimed at informing the community about ways of avoiding the virus and aiding research.

The Health Surveillance and Protection Program is responsible for advising on and monitoring waste management, food surveillance, meat hygiene, pesticides/pest control, pharmaceuticals, and radiation health.

The Environmental Health Worker Program is aimed at a community based approach to environmental health problems that exist in remote Aboriginal communities by training workers in service and facility maintenance.

### **Community Health Program**

The Community Health Program serves as a community based health delivery service in the form of health promotion, primary health care, immunization, and nursing care which are carried out by nursing staff, community health and allied health staff.

Community health services are targeted at broad groups within the community which have special needs, particularly children, youth, women, the elderly and Aboriginal people.

Some of the health issues targeted by community health services include:

- Nutrition (paediatric and adult obesity, heart disease, general nutrition);

- Lifestyle Management (stress, assertion, relaxation, diet, exercise);

- Paediatrics (speech, language, coordination, developmental delay, fine and gross motor);

- Women's Health (antenatal exercise and education, new mum's fitness (postnatal), and

- Accident Prevention (occupational health and safety, child abuse).

These education programs are designed to address the problems of substance abuse (e.g. alcohol, tobacco abuse, with clients referred by Community Nursing Staff to a Health Education Officer), nutrition (i.e. obesity, failure to thrive), communicable diseases (e.g. measles, sexually transmitted diseases, AIDS), lifestyle related disorders (e.g. hypertension, diabetes), women's health (e.g. antenatal, menopause, pap smears) and accident prevention (e.g. safety, child abuse).

Of note in 1988-89 was the establishment of the Women's Cancer Prevention Unit in August 1988 to develop programs for the effective early diagnosis and management of both breast and cervical cancer.

### Hostels and Nursing Homes Program

The majority of hostels and nursing homes in Western Australia are privately run. Five of the nursing homes listed as public receive funds from both government and private sectors. At June 1989, there were 116 private hostels in Western Australia with a total bed capacity of 3,981 persons.

TABLE 8.6 - NURSING HOMES AND BEDS FOR THE AGED : JUNE 1989

	Number	Beds
Non-government (a)	94	3,740
Government (b)	19	1,457
<b>Total</b>	<b>113</b>	<b>6,197</b>

(a) Private enterprise and religious/charitable homes. (b) Conducted by State Government.

### Communicable diseases

The *Quarantine Act 1908* provides for the quarantine of humans, animals and plants. The Commonwealth Department of Health administers the Act in matters relating to humans whilst aspects relating to animals and plants are the responsibility of the Commonwealth Department of Primary Industries and Energy. The *Health Act 1911* provides for the compulsory notification of infectious diseases and for the application of preventive measures.

TABLE 8.7 - PRINCIPAL INFECTIOUS DISEASES NOTIFIED (a) : 1988-89

Disease	Notifications
Acquired immune deficiency syndrome (AIDS)	29
Acquired immune deficiency syndrome (AIDS) - related complex	82
Amoebiasis	12
Ancylostomiasis	38
Bacillary dysentery (shigellosis)	102
Campylobacter infection	369
Giardiasis	332
Hepatitis A (infectious)	151
Hepatitis B (serum)	467
Legionnaires' disease	9
Malaria	63

TABLE 8.7 - PRINCIPAL INFECTIOUS DISEASES NOTIFIED (a) : 1988-89 - continued

Disease	Notifications
Measles	10
Meningococcal infection (includes epidemic cerebrospinal meningitis)	17
Pertussis (whooping cough)	87
Puerperal fever	20
Ross River Virus infection	657
Salmonella infection	420
Scarlet fever	8
Trachoma	431
Tuberculosis (all forms)	133
Venereal disease—	
Gonorrhoea	820
Granuloma inguinale	37
Syphilis	149
Venereal warts	41

(a) Excludes diseases where the incidence was less than eight cases.



'Immunise Now'—the Health Department of Western Australia's campaign to promote the importance of childhood immunisation.

Photograph : Health Department of Western Australia

### Dental Health Services

A General Dental Health Service operates through a number of Departmental dental clinics in strategic towns, with the itinerant Dental Service bringing dental care to communities which are remote from such clinics. Total combined attendances during 1988-89 were 9,907. A subsidised dental scheme also enables people in areas with no government dental clinic to receive care from a local private practitioner through an income tested subsidy.

The Department's School Dental Service offers dental treatment and oral preventative services to children in Years 1 to 9 throughout the State, and Years 10 to 12 where resources are available. In 1988-89, 191,641 children were treated as part of this service and 231,088 examinations were made.

A Dental Health Education Unit provides advisory and support services for all people involved in dental care, as well as answering requests from high school teachers and the general public.

### Psychiatric Services

To maximise the effectiveness of the Western Australian health system, moves were undertaken in 1988-89 to integrate psychiatric services with other health services and to give them a more regional focus. This involved consultation with community groups, health professionals and other interested parties.

Presently the Health Department of Western Australia administers hospitals for the treatment of mental illness, community mental health centres, child and adolescent clinics, day care facilities, training centres, hostels, sheltered workshops and domiciliary services for psychiatric patients.

The Mental Health Act provides for the admission of patients to hospitals approved for the purpose, either on referral by a medical practitioner or by order of a Justice of the Peace supported by the referral of a medical practitioner. Special provisions exist for the detention for observation or treatment of persons admitted by order of a court or from a prison. The Act also provides for voluntary admissions. A person not less than eighteen years of age may be granted admission on their own request. Younger persons may be admitted on the application of a parent or guardian.

TABLE 8.8 - PSYCHIATRIC SERVICES: 1988-89

	<i>Beds (a)(b)</i>	<i>Separations (c)</i>
Approved psychiatric hospitals	517	2,427
Child and adolescent residential units	43	274
Other adult residential psychiatric units (d)	68	19
Psychogeriatric residential units	234	909

(a) At 30 June. (b) Approved beds. (c) Includes deaths. (d) Whitby Falls Hostel and Heathcote Halfway House.

### Hospitals Program

The hospital system in Western Australia is responsible for the treatment of injury and disease, obstetric care, services for the restoration of function of those who are disabled by illness or injury, and long-term care where no alternative exists.

TABLE 8.9 - STATE GOVERNMENT ACUTE HOSPITALS (a) : 1988-89

	<i>Unit</i>	
Staff (b)—		
Medical	Number	1,132
Nursing	"	7,497
Medical support	"	1,869
Other	"	7,311
<b>Total staff</b>	"	<b>17,809</b>
Salaries and wages	\$'000	507,285
Other goods and services (c)	"	281,976
<b>Total</b>	"	<b>789,262</b>

(a) Includes particulars of the Perth Dental Hospital. (b) At 30 June. Full-time equivalents. (c) Payments to visiting medical officers, alterations, equipment, vehicle and repairs, food services, medical and surgical supplies, energy and water, domestic services and all other administrative expenses.

TABLE 8.10 - ACUTE HOSPITALS NUMBER, BEDS AND IN-PATIENT STATISTICS 1988-89

	<i>Number</i>
Public hospitals (a)—	
Number	5
Number of beds	2,493
Other public—	
Number	83
Number of beds	3,633
Repatriation general, Hollywood (b)—	
Number	1
Number of beds	371
Private—	
Number	19
Number of beds	1,892
<b>Total—</b>	
<b>Hospitals</b>	<b>108</b>
<b>Number of beds</b>	<b>8,389</b>
In-patients (c)—	
Treated in—	
Public hospitals	242,089
Private hospitals	82,549
In-patients days—	
Public hospitals	1,324,891
Private hospitals	360,422

(a) At 30 June. (b) Commonwealth. (c) Figures are preliminary. Excludes figures for Repatriation General Hospital, Hollywood.

## OTHER HEALTH SERVICES

### Royal Flying Doctor Service of Australia

The Royal Flying Doctor Service of Australia is a non-profit organisation financed by grants from the Commonwealth and State Governments and by private donations. The principal function of the Service is to provide aerial medical services for all persons in Western Australia irrespective of their location and economic situation.

The radio network of the Royal Flying Doctor Service is regularly used in the work of Schools of the Air conducted by the Ministry of Education, and also for the transmission and receipt of telegrams and radio telephone calls. In addition, it may be used, as the need arises, in connection with flood relief, in searching for lost parties and during cyclones or other emergencies.

**TABLE 8.11 – ROYAL FLYING DOCTOR SERVICE OF AUSTRALIA – OPERATIONS OF THE WESTERN AUSTRALIAN SECTION: 1988-89**

	<i>Unit</i>	
Expenditure (operational)	\$'000	7,570
Medical flights	Number	7,089
Nautical miles flown	"	1,318,637
Patients transported	"	3,966
Patients attended	"	13,133
Radio and telephone consultations	"	2,805

### St. John Ambulance Australia W.A. Ambulance Service Inc.

The W.A. Ambulance Service Inc. is responsible for the road ambulance service and for teaching first aid throughout Western Australia. The Service also cooperates closely with the Royal Flying Doctor Service in transporting patients by air throughout the State.

The W.A. Ambulance Service is a non-profit organisation. The main sources of finance are charges on users of the service, members' contributions to the Ambulance Benefit Fund, donations by individuals and grants from the State Government and the Lotteries Commission.

The Medic Alert Foundation administered by St. John in Western Australia provides bracelets or necklets to persons who have a medical condition which may affect their treatment in the event of accident or collapse. Under such circumstances these persons may be unable to communicate

effectively but the information on the bracelet would enable emergency medical personnel to assess the patient's needs. If necessary, further details can be obtained from Ambulance Service computer records.

During 1988-89 approximately 2,200 bracelets and necklets were issued bringing the total issued in Western Australia to some 39,818.

**TABLE 8.12 – ST. JOHN AMBULANCE AUSTRALIA  
W.A. AMBULANCE SERVICE INC. : 1988-89**

	<i>Number</i>
Ambulance service—	
Patients transported	84,500
Kilometres travelled	2,730,463
First aid classes—	
Certificates issued	22,700

### Western Australian Alcohol & Drug Authority

The Western Australian Alcohol & Drug Authority is an independent statutory authority established in November 1974 as a result of the recommendations of the Honorary Royal Commission into Alcohol and Drugs.

The Authority's mission is to contribute to the well-being of the people of Western Australia by the minimisation of problems associated with mind-altering substances.

The Authority's three main treatment facilities are the Carrellis Centre, William Street Clinic and Central Drug Unit.

The Carellis Centre, which includes a detoxification unit, provides residential and non-residential treatment for people with problems relating to alcohol and prescription drugs. A Community Nursing Service provides detoxification, assessment and counselling in clients' homes.

Non-residential assistance to individuals and families with problems arising from the use of opiates and drugs other than alcohol is available at William Street Clinic. The clinic operates a methadone service as well as providing AIDS education, assessment, counselling and referral services.

The Central Drug Unit provides residential detoxification for persons dependent on illicit

drugs. The unit also operates the Court Diversion Service, which takes referrals from the Courts and aims to engage drug dependent offenders in suitable treatment as an alternative to imprisonment.

The Authority has regional offices in Albany, Bunbury, Derby, Geraldton, Kalgoorlie, South Hedland and Karratha. Services include counselling, assessment, referral, professional skills education, prevention, and direct support to non-government organisations active in the field of alcohol and drug treatment.

An Education and Research directorate provides drug-related education and training to people working or studying in the health and welfare field, and also formulates strategic advice on legislation, policy and services involving alcohol and other drug-related issues.

Information, confidential counselling and referral on alcohol, other drug problems and AIDS is available to the public by telephoning the Alcohol and Drug Information Service. A library containing a special collection of print and audiovisual material covering all aspects of addiction is also open for public use.

The Authority provides funding and professional support to non-government organisations engaged in providing services to people with alcohol and other drug problems. Grants made to non-government organisations totalled nearly \$3 million during 1988-89.

Currently the Authority's focus is on providing community based services and directing greater resources to special needs groups identified as being at-risk. These include Aboriginal people, youth, non-English speaking people, and women.

### **The Perth Aboriginal Medical Service**

The Perth Aboriginal Medical Service (PAMS) provides a health and medical service to the Aboriginal community of Perth. Funding is received from the Department of Aboriginal Affairs, the Aboriginal Hostels Ltd, the Department of Community Services and Health, the Health Department of Western Australia and the National Australian AIDS Council.

At 15 September 1989, PAMS had 14,662 clients on file, an increase of nearly four per cent over the previous year. The Service employs a staff of forty-five people, some of whom are employed

under the Department of Employment, Education and Training programs.

The Medical Clinic of the Service in East Perth employs a multi-disciplinary team covering general medical, psychiatry, podiatry and dental services. Four doctors work full-time at the Clinic. Fourth-year medical students are based with the Service for five-week terms as part of their training to gain first hand experience of Aboriginal health.

Service doctors give regular talks to health worker trainees and mental health nursing trainees at Graylands, the Aboriginal Health Unit at Curtin University of Technology and at the Marr Mooditj College.

PAMS community nurses make regular visits to clients in the community to see and understand the client within the context of their work and family situations; and to assess, educate and counsel as necessary. A prison visitor scheme is also in operation.

The Aboriginal Interpreter Service of PAMS maintains close liaison with major hospitals, doctors, social workers and government agencies. With more traditional Aboriginal people being sent to Perth for medical treatment, patients feel more comfortable when the Interpreter Service is present especially when discussing legal and medical problems in their own dialect.

The Interpreter Service also works in close contact with the Welfare section of PAMS. Donations of toiletries, personal items and warm clothing from welfare and religious groups are distributed to patients in hospitals, especially those from the Central Desert and northern regions, and to clients from the north of the State and Kalgoorlie.

The Welfare section of the Service liaises with other Aboriginal agencies and Government Departments on behalf of clients for food parcels, extension of time for bills payment and donations of clothing and household items.

The Transport section of the Service delivers patients to and from hospital appointments, picks up medical supplies, delivers specimens to hospitals and other general transport duties.

The Service operates the Boomerang Hostel set up to relieve the homelessness of the Nyungar people of Perth. The Hostel is located in East Perth and has eight beds.

The Marr Mooditj College, which provides education in Aboriginal health care, is also part of the Service. During 1988-89, fifteen students graduated with the Aboriginal Health Workers Certificate. The College also offers refresher courses for qualified health workers and enrolled nurses wishing to work with Aborigines. A post-graduate medication course was offered in 1988-89 and a certificate course in venepuncture was being planned.

Both staff and students of Marr Mooditj were involved in delivering talks to the community and institutes of higher education. During 1988-89, talks were delivered to the University of Western

Australia, Curtin University of Technology, the Western Australian College of Advanced Education, church groups, women's groups and prisons.

A new initiative of the Service is the Mum-Ba-Gee Program which aims to create employment for Aborigines with the Silver Chain Nursing Association and the Home of Peace. Programs within educational institutions and Marr Mooditj College will be examined in order to enhance students' capabilities in preparation for permanent employment with the two organisations.

## Chapter 9

### LAW, ORDER AND PUBLIC SAFETY

The law in force in Western Australia is contained in The Statutes of Western Australia, comprising legislation passed by the Western Australian Parliament and certain Imperial Acts which have been adopted, and in the Commonwealth Acts in so far as they apply to Western Australia. Under the Constitution of the Commonwealth of Australia, 'when a law of a State is inconsistent with a law of the Commonwealth, the latter shall prevail, and the former shall, to the extent of the inconsistency, be invalid.'

#### CROWN LAW DEPARTMENT

The Crown Law Department is administered, subject to the control of the Attorney General, by the Under Secretary for Law. The Department is responsible for the Supreme Court Central Office, the District Court Registry, the Family Court Registry, Children's Court of Western Australia Registry, Court Offices throughout the State, the Crown Solicitor's Office, and the Parliamentary Counsel's Office. The Department, in addition to administering the Acts which come under the portfolio of the Attorney General, conducts Crown legal business and, when required, acts for and advises State Government departments and instrumentalities. Subject to the control of the Minister for Justice, the Under Secretary for Law is also responsible for two sub-departments, the Public Trust Office and the Registrar General's Office. The Law Reform Commission is an independent body responsible directly to the Attorney General.

#### LAW COURTS

In Chapter 21, reference is made to the Federal Court of Australia, the Industrial Relations Commission, the Western Australian Industrial Appeal Court, and The Western Australian Industrial Commission.

#### High Court of Australia

The High Court of Australia is the Federal Supreme Court. The Constitution requires that there shall be a Chief Justice and not less than two other Justices of the High Court. At 31 December 1989 there were six other Justices. Sittings are held in the capital city of each State as occasion requires. The High Court exercises both original and appellate jurisdiction, acting as a court of appeal for Australia.

#### Supreme Court of Western Australia

The Supreme Court of Western Australia, consisted of a Chief Justice, ten other Judges and three Masters at 31 December 1989. The jurisdiction of the Court in both civil and criminal matters is exercised by a single Judge, sitting alone or with a jury, unless it is provided that an action must be brought before a Full Court. Criminal cases are heard before a jury. Appeals are heard against judgements of the Supreme Court and the District Court as well as against decisions of the magistrates in the Courts of Petty Sessions. Appeal from a judgement of the Supreme Court of Western Australia in some cases lies to the High Court of Australia.



### The District Court of Western Australia

At 31 December 1989 the District Court of Western Australia consisted of a Chief Judge and fourteen other Judges. The jurisdiction of the Court is exercised by a Judge sitting alone or with a jury. Criminal cases must be heard before a Judge and jury.

The Court has the same jurisdiction as the Supreme Court in actions claiming damages for death or bodily injury. Otherwise, its civil jurisdiction exists broadly up to a maximum of \$80,000. Criminal jurisdiction exists in respect for indictable offences except those for which the penalty may be life imprisonment or strict security life imprisonment, such cases being under the jurisdiction of the Supreme Court.

Appeals from a District Court Judge lie, in the civil jurisdiction, to the Full Court of the Supreme Court and, in the criminal jurisdiction, to the Court of Criminal Appeal.

### Family Court of Western Australia

The Family Court of Western Australia consisted of a Chairman of Judges and four other Judges, at 31 December 1989. The jurisdiction of the Court is exercisable by one Judge.

The Court hears petitions for divorce and has jurisdiction in the welfare and custody of children and in disputes as to maintenance and property of marriage.

Appeals relating to federal jurisdiction matters lie to the Full Court of the Family Court of Australia and appeals in respect of non-federal jurisdiction matters lie to the Full Court of the Supreme Court of Western Australia.

TABLE 9.1 - FAMILY COURT  
OF WESTERN AUSTRALIA

	1986	1987	1988
Dissolution of marriage—			
Number of—			
Applications filed	3,751	3,962	4,074
Decrees made	4,001	4,044	3,964

### Courts of Petty Sessions

Courts of Petty Sessions are held at centres of population throughout the State. Two or more

Justices of the Peace sitting together in petty sessions may deal with cases which could be decided by a magistrate sitting alone.

### Children's Courts

Children's Courts in Western Australia are now established under the *Children's Court of Western Australia Act, 1988* which came into force on December 1, 1989. The new Court is headed by a President who may deal with any offence committed by a child. Magistrates and members of the Children's Court have different jurisdiction under the Act.

### Local Courts

Local Courts are held throughout the State to determine minor civil issues. Jurisdiction is limited in most cases to claims not exceeding \$10,000. A Small Disputes Division of the Local Court provides a quick and less expensive means of recovering debts of less than \$3,000 and caters for disputes between landlord and tenant under the provisions of the *Residential Tenancies Act 1987*.

### Coroner's Courts

Coroner's Courts may be held to inquire into the circumstances of sudden, unnatural and suspected deaths or the cause and origin of fires. A coroner may charge a person with a major offence and commit that person for trial at a higher court.

### Liquor licensing

The *Liquor Licensing Act 1988* regulates the sale, supply and consumption of liquor, the use of premises on which liquor is sold, and the services and facilities provided in conjunction with or ancillary to the sale of liquor. The Act, which repeals the *Liquor Act 1970*, constitutes the Licensing Authority which comprises the Liquor Licensing Court headed by a Judge, and the Director of Liquor Licensing.

Under the new Act classes of licences and permits have been divided into two categories. Category A comprises hotel (including tavern and restricted hotel), cabaret, liquor store, special facility licences and the casino liquor licences. Category B comprises restaurant, club (including club restricted), wholesale, producer and occasional licences.

If an objection is received against an application for the grant or removal of a Category A licence, the matter is referred to the Liquor Licensing

Court for determination. If no objection is lodged, it is determined by the Director of Liquor Licensing, Office of Racing and Gaming. The Director has a quasi-judicial role as well as being responsible for the administration of the Act.

All other applications, including the grant or removal of a Category B licence or the transfer of any licence, are determined by the Director whether or not objections are received.

As well as determining contested applications for the grant or removal of Category A licences, the Liquor Licensing Court hears applications to review decisions of the Director, and complaints for disciplinary action to be taken against licensees.

There were 2,274 licences current at 30 June 1989 compared with 2,229 for the previous year. During 1988-89 20,672 applications were received compared with 23,915 in 1987-88. The total revenue received for 1988-89 was \$57,557,543. This consisted of \$56,131,208 for licence fees and penalties, \$878,613 for general fees as prescribed under the Liquor Licensing Regulations 1989, and \$547,722 for premiums paid under the repealed Act.

### Small Claims Tribunals

Small Claims Tribunals deal with claims involving amounts less than \$3,000. A Tribunal is constituted by a referee sitting alone and may be constituted at any place in the State.

## CONVICTIONS IN COURTS

### Number of convictions

It is important to bear in mind when considering the particulars shown in Table 9.2 that the figures relate to the *number of convictions* recorded and not to the *number of persons* convicted. Thus, when a person is convicted on more than one count each conviction so recorded has been included in the statistics.

Under the provisions of parking facilities legislation and municipal by-laws, fines may be imposed without court action for minor traffic offences. In the year ended June 1988 the total number of infringement notices issued for these minor traffic offences was 525,581.

TABLE 9.2 - COURT STATISTICS - NUMBER OF CONVICTIONS: 1986-87  
References: Cat. Nos. 4501.5, 4502.5 4503.5

Code (a)	Description of Offence	Supreme and District Courts	Courts of Petty Sessions	Children's Courts	Total
100	Offences against the person	470	3,386	1,210	5,066
200	Robbery and extortion	135	2	31	168
300	Breaking and entering, fraud, and other offences involving theft	2,897	17,941	14,931	35,769
400	Property damage and environmental offences	50	2,550	1,584	4,184
500	Offences against good order	116	39,129	6,528	45,773
600	Drug offences	232	6,950	1,193	8,375
700	Motor vehicle, traffic and related offences	12	79,955	7,185	87,152
800	Other offences	-	7,491	104	7,595
900	Child welfare matters	-	-	202	202
..	<b>Total</b>	<b>3,912</b>	<b>157,404</b>	<b>32,968</b>	<b>194,284</b>

(a) Related to Draft Australian National Classification of Offences, June 1980.

## THE JURY SYSTEM

The operation of the jury system is governed by the *Juries Act 1957*. Indictable offences are tried before a Judge and twelve jurors sitting in the criminal jurisdiction of either the Supreme Court or District Court, depending on the gravity of the offence. Juries for civil cases comprise six persons.

### Eligibility for jury service

Subject to the Juries Act, a person who is enrolled on any of the rolls of electors entitled to vote at an election of members of the Legislative Assembly of the Parliament of the State is liable to serve as a juror at trials in the jury district in which he or she is shown to live by any of those rolls of electors.

Each year a Juror's Book is prepared by the Chief Electoral Officer for each jury district within the State for persons who appear to be qualified for, and not otherwise ineligible for service as jurors. Certain persons are excluded from jury service and persons may be excused on the grounds of illness, undue hardship, circumstances of sufficient weight, importance or urgency; or recent jury service.

### **LAW REFORM COMMISSION OF WESTERN AUSTRALIA**

The Law Reform Commission of Western Australia, established by the *Law Reform Commission Act 1972*, examines proposals for review of aspects of the law referred to it by the Attorney General. It may also submit to the Attorney General proposals for review. The Commission usually issues a discussion paper dealing with the issues involved in a particular proposal under consideration and invites comments from interested persons. A report is then made to the Attorney General.

### **PARLIAMENTARY COMMISSIONER FOR ADMINISTRATIVE INVESTIGATIONS**

The Parliamentary Commissioner for Administrative Investigations (commonly known as the Ombudsman) is empowered under the *Parliamentary Commission Act 1971* to investigate complaints by a person or a body of persons (whether incorporated or not) affected by the administrative actions of government departments, specified statutory authorities, and local authorities.

The Act does not apply to Courts of Law in the State, a Judge of the Supreme Court, the Family Court or the District Court, a Commissioner of any Court, a Stipendiary Magistrate, a Coroner, the Auditor General, the Parliamentary Privileges Act, or any decision of the Cabinet or a Minister.

During the year ended 30 June 1988, of the 1,511 complaints processed, 29 were sustained. In 169 cases, complaints were discontinued because they were rectified or settled during investigation. In 795 of the complaints processed some assistance was given to the complainant by way of resolution or clarification.

### **THE LEGAL PROFESSION**

The Barristers' Board has the power to regulate and control the examination of articulated clerks, and the qualification and examination of all candidates for admission as practitioners. Practitioners are also required to obtain a Practising Certificate, renewable annually, from the Board. At 30 June 1988, 1,787 Practising Certificates had been issued for the 1987-88 year.

### **LEGAL AID COMMISSION OF WESTERN AUSTRALIA**

The Legal Aid Commission provides legal assistance to eligible persons throughout Western Australia. The assistance may be made available at no expense to, or wholly or partly at the expense of, the Commission.

During the year ended 30 June 1988 some 48,900 persons sought assistance from the Commission. The duty counsel service, in conjunction with private legal practitioners, assisted some 20,898 persons whilst Legal Advice Bureau staff (duty solicitors) assisted 13,034 persons. Ongoing legal assistance was granted in 9,720 cases from 14,964 applications. Staff lawyers employed by the Commission handled 2,701 of these cases, whilst \$8.6 million were paid to private legal practitioners for cases undertaken by them.

### **WESTERN AUSTRALIA POLICE SERVICE**

The Western Australia Police Service refers to the combined resources of the Western Australia Police Force (comprising sworn personnel) and the Western Australia Police Department (comprising Public Service staff).

There are five portfolios under the direction of the Commissioner of Police, three operational — crime, traffic and operations, and two non-operational — personnel and services. Also under the direction of the Commissioner of Police is the Secretary (Public Service Head) who is responsible for all Public Service Act and wages employees of the Department. The Commissioner is appointed by the Governor and is responsible to the Minister for Police.

**TABLE 9.3 - WESTERN AUSTRALIA POLICE SERVICE - CRIMES REPORTED AND CLEARED: OFFENDERS 1987-88**

Offence	Number of crimes		Offenders apprehended		
	Reported	Cleared	Male	Female	Total
Homicide	39	36	37	1	38
Sexual offences (excluding aggravated sexual assault and sexual assault)	1,437	884	483	3	486
Aggravated sexual assault	201	143	107	-	107
Sexual assault	99	73	47	-	47
Breaking and entering	34,386	5,765	5,771	410	6,181
Robbery	379	126	125	14	139
Serious assault	1,490	1,231	927	101	1,028
Assault police	597	595	447	93	540
Common assault	4,229	3,176	2,111	267	2,378
Stealing	52,852	11,992	7,180	3,373	10,553
Motor vehicle	13,247	2,385	2,396	266	2,662
Fraud	10,343	6,703	1,290	813	2,103
Damage	19,110	3,937	3,156	408	3,564
Arson	102	38	43	5	48
Unlawfully on curtilage/premises	3,042	988	1,066	105	1,171
Drugs	7,524	7,524	4,550	826	5,376
Bomb hoax	272	63	40	10	50
Other indictable offences	565	403	322	48	370
<b>Total</b>	<b>149,914</b>	<b>46,062</b>	<b>30,098</b>	<b>6,743</b>	<b>36,841</b>

The maintenance of public peace and good order, the protection of life and property and the prevention of crime through the apprehension and prosecution of criminals remain the foremost objectives of the Service.

There were 3,243 officers in the Police Force at 30 June 1988 compared with 3,287 the previous year.

### PRISONS

The Director of the Department of Corrective Services is responsible, subject to the control of the Minister, for the administration of prisons in Western Australia. Police gaols administered jointly by the Department of Corrective Services and the Police Service hold prisoners awaiting trial and some short-term prisoners. In addition, provision is made for holding some prisoners with very short sentences at police lock-ups throughout the State.

Work and educational opportunities vary from prison to prison. All prisons employ some prisoners in maintenance, cleaning and cooking tasks, whilst at the larger and better equipped institutions, workshops provide additional employment and trades training including apprenticeships. Prison farms provide employment and some training in various aspects of agriculture. Full-time or part-time educational facilities are available at most prisons.

**TABLE 9.4 - NUMBER OF PRISONERS DAILY AVERAGES, 1987-88**

Institution	Males	Females	Total
Prisons	1,541.8	88.3	1,630.2
Police gaol—			
East Perth	15.7	-	15.7
Police lock-ups	104.2	29.2	133.4
Public hospitals	6.4	0.3	6.7
<b>Total</b>	<b>1,668.1</b>	<b>117.7</b>	<b>1,785.9</b>

**TABLE 9.5 - PRISON RECEIVALS: DISTINCT PERSONS (a) BY AGE 1987-88**

Age (years)	Males	Females	Persons
Under 16	-	-	-
16-17	74	1	75
18-19	585	53	638
20-24	1,189	156	1,345
25-29	769	116	885
30-34	513	87	600
35-39	325	46	371
40-44	187	38	225
45-49	115	12	127
50 and over	122	18	140
Unknown	7	3	10
<b>Total</b>	<b>3,886</b>	<b>530</b>	<b>4,416</b>

(a) Distinct persons refers to the individuals admitted during the period. A person received more than once during the period is counted only for the first time.

## PROBATION AND PAROLE SERVICE

Probation is an alternative to imprisonment, being the conditional suspension of punishment. Parole is the conditional release of selected prisoners after the offender has served part of the sentence in a penal institution. One of the main functions of the Probation and Parole Service is to provide pre-sentence reports to assist the Court in coming to a decision as to sentence which is, as far as possible, in the best interests of the community and the offender.

The Parole Board is empowered to release on parole a prisoner who has served a minimum term fixed by a court, or a prisoner being detained at the Governor's pleasure. Parole officers establish contact with prospective parolees during their imprisonment, prepare a case history of each prisoner for the information of the Parole Board, and supervise paroled persons during the parole period.

TABLE 9.6 - PROBATION AND PAROLE SERVICE  
YEAR ENDED 30 JUNE 1988

PROBATION	
Number of probation orders—	
Current at beginning of period	2,392
Issued during period	2,110
Terminated—	
By compliance	1,509
Breach action taken	436
Current—	
For all or part of period	4,723
At end of period	2,530
Number of persons under supervision at end of period (a)	2,424
PAROLE	
Number of parole orders (b)—	
Current at beginning of period	904
Issued during the period (c)	639
Terminated as a result of—	
Successful completion	501
Cancellation	199
Current at end of period	839
Number of persons under supervision during period	1,451

(a) Includes persons subject to interstate orders and Commonwealth Crimes Act bonds. (b) Excludes those released to parole for deportation, extradition or repatriation only. (c) Includes orders for release under supervision, by the Governor in Executive Council.

## PUBLIC SAFETY

### Industrial Foundation for Accident Prevention

The Industrial Foundation for Accident Prevention is a non-profit organisation and most of its funds are generated by the provision of its services, with

the balance made up of member subscriptions and State Government grants. Employers and Government are represented on the Foundation's Management Committee and Advisory Council.

The Foundation provides occupational safety and health services to industry, commerce and Government departments in Western Australia and other States with the aim of preventing occupational injuries and illness.

### The Western Australian Fire Brigades Board

The Board is responsible for taking, superintending, and enforcing all necessary steps for the prevention and extinguishing of fires and the protection of life and property from fire, and the control of all fire brigade premises and all fire brigades.

Of the 12,063 incidents attended by metropolitan and country fire stations in 1987-88, there were 3,971 false alarms, 5,374 fires causing negligible damage and 763 calls for special services including rescue, assistance with hazardous conditions and salvage operations.

The Metropolitan Fire District has seventeen fire stations, fifteen are staffed by permanent brigade personnel only, one by permanent staff supported by volunteers and one wholly by volunteers. Permanent brigade personnel serve with volunteer brigade personnel in five large country centres, and volunteer brigades provide town fire protection at seventy-seven other centres. At 30 June 1988, the Board had 906 employees and there were 2,071 volunteer brigade officers and firefighters.

### Bush Fires Board

The Bush Fires Board is constituted under the *Bush Fires Act 1954*. The principal functions of the Board are to administer the Act; to report to the Minister on methods of preventing or extinguishing bush fires; to recommend the prohibited and restricted burning times to be declared for the whole or any part of the State for any yearly period; to carry out research in connection with fire prevention and control; to conduct publicity campaigns for the purpose of improving fire prevention measures; to provide training facilities for volunteers; and to carry out such fire prevention measures as it considers necessary. The Board operates through its staff liaison officers based in country centres. These officers promote fire protection by the exercise of coordination, liaison and advisory functions.

Local authorities throughout the State handle local administration of the Bush Fires Act.

#### REFERENCES

Legal Aid Commission of Western Australia  
*Annual Report 1988*

Office of Racing and Gaming *Annual Report 1988-89*

Report of the Parliamentary Commissioner for Administrative Investigations *1988*

Western Australia Police Service *Annual Report 1988*

Western Australian Department of Corrective Services *Annual Report 1988*

Western Australian Fire Brigades Board *Annual Report 1988*

## Chapter 10

### EDUCATION

In Western Australia, education at pre-primary, primary and secondary levels is provided at government schools administered and staffed by the Ministry of Education and at non-government schools, most of which are conducted by the principal religious bodies. Technical and further education is offered by the Department of Technical and Further Education, a sub-department of the Ministry of Education, and by three independent regional colleges. The latter also provide higher education facilities. Additionally, higher education is available through a multi-campus college of advanced education and three universities.

#### PRE-PRIMARY EDUCATION

Before commencing primary school, a child may receive pre-primary education at either a government or non-government school. A child

may also attend a government staffed community pre-school or an independent pre-school. Attendance is optional at all centres. Children commence pre-primary education during the year in which they attain five years of age, although they may enrol during their fourth year where vacancies exist.

TABLE 10.1 - PRE-PRIMARY EDUCATION: JULY

	1987	1988	1989
NUMBER OF CENTRES			
Government—			
Pre-primary	483	506	511
Community pre-school	136	r134	133
Non-government—			
Pre-primary	87	92	103
Independent pre-school	22	24	22
<b>Total</b>	<b>728</b>	<b>r756</b>	<b>769</b>
NUMBER OF TEACHING STAFF(a)			
Government	555	594	602
NUMBER OF CHILDREN			
Government—			
Pre-primary	21,474	23,721	25,215
Community pre-school	6,985	6,859	6,835
Non-government—			
Pre-primary	2,434	r2,810	3,078
Independent pre-school	1,136	r1,312	1,251
<b>Total</b>	<b>32,029</b>	<b>34,702</b>	<b>36,379</b>

(a) Numbers shown are for full-time equivalents rounded to the nearest whole number.

Every person conducting a pre-school centre is required to hold a permit issued by the Minister for Education and all authorised pre-school centres are subject to inspection by an officer of the Ministry.

#### PRIMARY AND SECONDARY EDUCATION

Children may commence school at the beginning of the year in which they attain the age of six years. Except in special circumstances, attendance is then compulsory to the end of the year in which the child attains the age of fifteen years. Instruction in primary school is provided over a seven-year period. A child who makes normal progress completes the course at the age of twelve years and may then enter secondary school.

Secondary education is provided over a period of five years — from Year 8 to Year 12. Generally, students may leave at the end of Year 10 or continue through to Year 12 to attain a Certificate of Secondary Education.

**TABLE 10.2 - GOVERNMENT AND NON-GOVERNMENT SCHOOLS, FULL-TIME STUDENTS CLASSIFIED ACCORDING TO AGE (a) JULY 1989**

Age last birthday (years)	Government schools (b)	Non-government schools (c)	Total
Under 6	9,453	2,273	11,726
6	20,239	5,024	25,263
7	20,096	4,991	25,087
8	19,528	4,895	24,423
9	19,180	4,875	24,055
10	19,131	4,986	24,117
11	19,255	5,206	24,461
12	18,012	6,020	24,032
13	17,257	6,881	24,138
14	16,948	6,849	23,797
15	14,666	6,358	21,024
16	10,816	5,319	16,135
17	5,943	2,966	8,909
18 and over	1,920	860	2,780
<b>Total</b>	<b>212,444</b>	<b>67,503</b>	<b>279,947</b>

(a) Excludes pre-primary and technical school students. (b) Includes students attending education support schools, centres and units. (c) Includes students attending special schools.

Western Australia also has two Senior Colleges run by the Ministry which provide 'second chance' secondary education for those people who left the school system before achieving their goals.

Specialist assistance is provided to handicapped children through Education Support schools, centres and units run by the Ministry of Education and special schools conducted by the non-government sector.

The Ministry of Education provides a range of facilities for children with a hearing impairment including separate schools, units within primary and secondary schools, and a visiting teacher service to assist students and teachers.

Distance education in Western Australia operates as an adjunct to the general school system. The Distance Education Centre of the Ministry of Education provides basic schooling to a wide variety of groups in the community who are unable to attend normal schools. These groups include children living in remote areas, isolated Aboriginal communities, students (adults and children) who for various medical and social reasons are unable to attend normal schools, students at smaller schools who cannot have maximum choice of subjects because of the small size of the teaching staff, prisoners in gaols, students travelling interstate and overseas with

their parents, and adults seeking a second chance at a basic education.

A feature of the service offered by the Distance Education Centre is the field support given to students by visiting tutors and teaching staff as well as its links with the five Schools of the Air.

**TABLE 10.3 - GOVERNMENT SCHOOLS: JULY**

	1987	1988	1989
NUMBER OF SCHOOLS			
Primary schools	532	534	539
Education support schools/centres	50	57	61
Secondary schools—			
District high schools	58	59	59
High schools	7	5	6
Senior high schools	81	83	83
Senior colleges	2	2	2
Distance Education Centre	1	1	1
<b>Total</b>	<b>731</b>	<b>741</b>	<b>751</b>
NUMBER OF TEACHING STAFF (a)			
Engaged in teaching duties—			
Primary	6,478	6,657	7,092
Secondary	5,788	5,869	5,939
Education support (b)	315	r354	370
<b>Total</b>	<b>12,581</b>	<b>r12,880</b>	<b>13,401</b>
NUMBER OF FULL-TIME STUDENTS			
Level of education—			
Primary (c)	131,510	134,181	137,669
Secondary—			
Years 8, 9 and 10 (c)	53,069	51,365	51,227
Years 11 and 12	21,093	22,003	20,965
Senior colleges	1,148	1,387	1,405
Other (d)	1,207	1,132	1,178
<b>Total</b>	<b>208,027</b>	<b>210,068</b>	<b>212,444</b>
Males	107,297	108,277	109,530
Females	100,730	101,791	102,914

(a) Numbers shown are for full-time equivalents rounded to the nearest whole number. (b) Excludes teachers working in education support units attached to primary and secondary schools. (c) Includes ungraded and education support students (students with intellectual disability) who attend primary or secondary schools. (d) Students attending education support schools and centres who cannot be assigned a level. Prior to 1987 all education support school and centre students were included in this category.

Schools of the Air are conducted through the radio network of the Royal Flying Doctor Service from bases at Carnarvon, Derby, Kalgoorlie, Meekatharra and Port Hedland to supplement tuition provided by the Distance Education Centre.

### Primary and secondary curricula

The curricula of both the primary and secondary schools are organised into seven study areas: English, Languages and Communication; Mathematics; Science and Technology; Social



Studies; Practical and Creative Arts; Personal and Vocational Education; and Physical Education.

**TABLE 10.4 – NON-GOVERNMENT SCHOOLS: JULY**  
(Source: National Schools Statistics Collection)

	1987	1988	1989
NUMBER OF SCHOOLS			
Primary	137	143	139
Secondary	37	39	38
Primary/secondary combined	58	56	60
Special	5	5	4
<b>Total</b>	<b>237</b>	<b>243</b>	<b>241</b>
NUMBER OF TEACHING STAFF (a)			
Primary	1,595	1,692	1,757
Secondary	2,185	2,352	2,444
Special	27	25	25
<b>Total</b>	<b>3,807</b>	<b>4,069</b>	<b>4,226</b>
NUMBER OF FULL-TIME STUDENTS			
Level of education—			
Primary (b)	32,941	34,012	35,478
Secondary—			
Years 8, 9 and 10 (b)	19,892	20,346	20,888
Years 11 and 12	9,756	10,896	11,056
Special	73	76	81
<b>Total</b>	<b>62,662</b>	<b>65,330</b>	<b>67,503</b>
Males	31,240	32,552	33,686
Females	31,422	32,778	33,817

(a) Numbers shown are for full-time equivalents rounded to the nearest whole number. (b) Includes students in ungraded classes.

The curriculum in Years 1 to 3 of primary school focuses on the development of language abilities and functional literacy and numeracy. Middle and upper primary students study an integrated curriculum which covers the seven broad categories.

Lower secondary school students, Years 8 to 10, progress through the Unit Curriculum which is designed to ensure a general and balanced education whilst providing scope for a choice of units from those offered. Each unit is intended to take about forty hours. Generally, students are expected to study four units of English and Mathematics in each year and to complete at least one unit from each of the seven curriculum components.

Students in Years 11 and 12 study year-long courses which lead to their accreditation and admittance to higher education.

The Secondary Education Authority (SEA) approves the courses of study and issues certificates recording student achievement in

secondary education in Western Australia (more details are given later in this chapter).

Education in government schools is secular in character but periods may be set aside during which representatives of various religious denominations may attend to give special religious instruction. In addition, elements of religion may be included, in one or more of the seven study areas, by individual teachers.

Although Aboriginal children normally work in the mainstream education program, practically orientated courses are offered when needed. The functions of the Ministry of Education provide for the formulation of policy, the identification of curriculum strategies, the production of suitable learning materials and the provision of supplementary funding and advisory assistance to teachers of Aboriginal children in Government schools. The Aboriginal Community Liaison Unit assist Government schools and districts with the implementation of education for Aboriginal children in local situations.

Agricultural education in the form of full-time residential courses is available at a number of centres. Day instruction is also provided at a number of secondary schools. Some private schools offer courses in agriculture.

### The Secondary Education Authority

SEA is responsible to the Minister for Education for the accreditation and registration of courses of study in secondary education.

### Student achievement

At the end of three years of studying the unit curriculum, students are issued with a Certificate of Lower Secondary Studies. This certificate lists the units satisfactorily completed in the last two years of compulsory schooling—Years 9 and 10.

The Certificate of Secondary Education is awarded to students who have completed at least one of Years 11 and 12. Students in these years study year-long courses selected from 150 accredited courses and a range of registered courses approved by SEA. Assessment is school-based and grades in accredited courses are moderated by SEA to ensure comparability across all schools in the State. Grades in registered courses are not moderated.

In the twenty-eight Year 12 accredited courses which can contribute to a student's Tertiary

Entrance Score (called TES subjects) an external examination is conducted. A numerical score for TES subjects is reported on the Certificate of Secondary Education, as well as a grade. This numerical score is a 50:50 combination of the moderated school assessment and the standardised examination mark. The combined mark is scaled using the Australian Scholastic Aptitude Test (ASAT).

Entrance to higher education institutions is based on TES, which is a weighted average of scores in a student's best three, four or five TES subjects. Ten per cent of the student's ASAT score is also included. The maximum TES is 510. The student must also have satisfied the requirements for Secondary Graduation, satisfactory performance and English Language competence.

## POST SECONDARY EDUCATION

### The Western Australian Higher Education Council

On 1 January 1990, the Western Australian Higher Education Council (WAHEC) commenced operations, replacing the Western Australian Post-Secondary Education Commission. WAHEC, supported by the Western Australian Office of Higher Education, advises the Government, post-secondary and higher education institutions and the Commonwealth Department of Employment, Education and Training on the planning, coordination, development and financing of post-secondary and higher education in Western Australia.

### Technical and Further Education

The Department of Technical and Further Education (TAFE) coordinates the provision of technical and further education in Western Australia, although three independent colleges also offer TAFE programs (details of their operations are shown later in this chapter).

Vocational education and training programs are provided for managers, supervisors, technicians, skilled tradespersons, semi-skilled personnel and other kindred support staff required by industry and commerce.

These programs also provide an alternative to those of the upper secondary schooling system. Included are vocationally related courses, bridging and link courses for young people aged fifteen to nineteen years of age. Increasingly, TAFE programs are becoming available as part of the

upper secondary school curriculum. Further services provided include specialist and mid-career training and retraining, and a range of cultural, recreational and leisure programs for the State's adult population.

The Department of Technical and Further Education has developed a variety of mechanisms to make its programs more accessible to students. It operates a network of sixteen colleges, thirteen in the metropolitan area and three in the country, which offer a wide range of courses in the days and evenings. Many colleges are, however, equipped for specialist areas of study. Eight metropolitan evening technical schools operate from local community and high school premises. Although some offer daytime classes, most cater for part-time evening students.

TABLE 10.5 - TECHNICAL AND FURTHER EDUCATION

	1987	1988	1989
NUMBER OF INSTITUTIONS			
Colleges	16	16	16
Evening technical schools	8	8	8
Technical centres	89	99	100
NUMBER OF TEACHING STAFF (a)			
Colleges	1,727	1,767	1,806
Evening technical schools	63	61	69
Technical centres	90	89	85
NUMBER OF STUDENT ENROLMENTS (b)			
Colleges	75,616	83,647	85,636
Evening technical schools	23,372	23,323	26,307
Technical centres	19,944	20,934	20,613

(a) Full-time equivalent. (b) Each student is counted only once, even though they may have enrolled in more than one course, or on more than one occasion. From 1987, students enrolled in adult education (hobby) courses were similarly counted only once, even though they may have enrolled in more than one adult education course.

Technical centres, including full-time TAFE centres in several major country towns, are distributed throughout the rural areas of the State. These facilities provide for the needs of local communities whenever there is sufficient demand for classes. For those students who have difficulty in attending institutional based programs, the TAFE External Studies College provides a comprehensive range of courses.

The TAFE Rural Coordinator Scheme operates in several country centres, and serves the needs of the local populations for vocational programs by harnessing the resources and expertise in the regions.

Short intensive skills training and retraining courses are also provided to meet specific vocational needs, such as small business management. In 1989, TAFE expanded its user-pays capacity for meeting industry needs through the creation of the TAFE Customised Training Agency. Business managers and labour market training consultants were appointed to metropolitan colleges.

The TAFE Counselling Service provides education, vocational and general guidance to students and prospective students of TAFE. A limited range of consultancy services are also available to industry and commerce, in areas such as staff selection, training and evaluation.

The Department of TAFE, in conjunction with a number of Commonwealth Government agencies, provides a range of courses to meet the particular needs of women, Aborigines, migrants, disabled persons and adults with literacy problems. The major objective of these programs is to enhance the students' prospects of gaining employment or pursuing further education and training.

### **The Colleges**

Multi-level post-secondary education colleges have been established by the Minister for Education, on the advice of the former Western Australian Post-Secondary Education Commission. Such colleges may, with the Minister's approval, provide advanced education, technical and further education, and education at other levels in specified circumstances.

Hedland College and Karratha College are situated in the Pilbara region in the north-west of the State and Kalgoorlie College is situated in the Eastern Goldfields region in the south-east of the State.

The Hedland, Karratha and Kalgoorlie Colleges provide courses mainly in the technical and further education sector. Currently the Colleges, together with regional colleges of TAFE, provide higher education courses under contract to Perth-based institutions. These colleges provide a focus for educational and cultural activities within their respective communities. In addition to academic subjects, the colleges also provide personal interest courses.

## **HIGHER EDUCATION**

### **The Tertiary Institutions Service Centre (Incorporated)**

The Tertiary Institutions Service Centre (Incorporated) processes applications for admission to the higher education institutions and carries out such other functions as agreed by the institutions.

Applicants seeking admission to a first year undergraduate course (or later years in the case of Curtin University of Technology, Murdoch University and the University of Western Australia) or to a Diploma in Education course apply through a joint system operated by the Centre. Applicants list four preferences from all the higher education courses available and offers are then made by the institutions for each course on the basis of a ranked order.

### **The Higher Education Contribution Scheme**

From 1989, the Commonwealth Government introduced the Higher Education Contribution Scheme for students enrolled at higher education institutions.

In 1990 students are liable for an annual course charge of \$1,882 for each year of equivalent full-time study that they undertake. They are able to pay this charge through tax instalment deductions or as a payment in advance with a 15 per cent discount. No payment is required until personal annual income reaches \$23,583 at which time payment will commence at the rate of 1 per cent of taxable income. For annual incomes of \$26,799 to \$37,518 the rate is 2 per cent and for those of \$37,519 and over, it is 3 per cent.

### **Western Australian College of Advanced Education.**

Five metropolitan campuses (Churchlands, Claremont, Joondalup, Mount Lawley and Nedlands), the Western Australian Academy of Performing Arts and the Bunbury Institute of Advanced Education combine to form the Western Australian College of Advanced Education. In April 1989 the total enrolment was 14,108 comprising 7,762 full-time, 4,584 part-time and 1,762 external students.

The College offers more than 170 different undergraduate and postgraduate courses over six teaching schools: Arts and Applied Sciences; Business; Community and Language Studies; Education; Nursing; and Performing Arts.

The academic programs range through diploma, degree, masters, doctoral and other postgraduate awards.

The College fosters links with the community by providing research and consultancy services, implementing training programs for industry and by offering a wide variety of community courses.

**Western Australian Academy of Performing Arts.** The Academy of Performing Arts enjoys a wide and semi-autonomous brief in the Western Australian College, though administratively it is a school of the College, and has access to its resources and facilities.

The Academy provides for the preparation of aspiring professionals who seek full-time employment in the performing arts, in-service training of practising professionals in the performing arts in Western Australia and servicing of the performing arts needs of the West Australian community at large.

The Academy is organised into two major divisions, the Western Australian Conservatorium of Music providing courses in classical music and jazz, and the School of Dramatic Arts providing courses in arts management, dance, musical theatre, media performance, production and design, and theatre.

In 1989 the Academy had approximately 500 students enrolled in courses ranging from Certificate level to Baccalaureate level. All courses emphasise talent and performance. Admission depends upon audition and performance is the essential element of instruction and of final assessment. The staff are outstanding performers and teachers drawn from throughout the world.

Students have substantial contact with professional companies such as the Western Australian Symphony Orchestra, Radio 6NR, the Western Australian Theatre Company, the West Australian Ballet Company and the Western Australian Opera Company. Performance opportunities with these companies enable students to work with professionals in large scale productions as part of their training programs.

Students in production and design and arts management serve an internship with an appropriate professional company.

In addition to providing formal courses for its students, the Academy serves the West Australian community at large in a variety of ways. Music centres are established at Hedland College, Kalgoorlie College, Esperance and Armadale. In the areas of dance, music and theatre, the Academy offers community courses, in-service and professional refresher programs, both on campus and at selected centres in Western Australia.



Members of the Western Australian Academy of Performing Arts in *The Accrington Falls* by Peter Whelan, November 1989

Photograph : Peter Northcott.

### **The Universities**

**The University of Western Australia.** The University of Western Australia was established in 1911 and teaching began in 1913. The University is located close to the city of Perth, adjacent to the Swan River.

The University has five residential colleges and a hall of residence for students, an art gallery, a museum of geology and a museum of anthropology. There are also five theatres, a music

auditorium and Winthrop Hall which is used for arts attractions, mainly orchestral and choral works. These venues are used by arts practitioners from within and outside the University and are used particularly during the annual Festival of Perth.

TABLE 10.6 - THE UNIVERSITY OF WESTERN AUSTRALIA: AT 30 APRIL(a)

	1987	1988	1989
NUMBER OF STAFF(b)			
Teaching—			
Full-time and fractional full-time—			
Professors	71	74	69
Associate professors, readers	89	91	92
Senior lecturers	197	205	200
Lecturers	137	139	162
Other (c)	106	107	92
Total	600	616	615
Casual—			
Lecturing	12	20	20
Tutoring/demonstrating	68	69	69
Total	80	89	89
Research—			
Full-time and fractional full-time	229	(d)118	123
Other—			
Full-time and fractional full-time	r1,341	(d)1,434	1,457
Casual	r83	57	57
<b>Total staff</b>	<b>r2,333</b>	<b>2,314</b>	<b>2,341</b>
NUMBER OF STUDENTS			
Internal—			
Full-time	7,096	7,645	8,193
Part-time	2,479	2,386	2,187
External	50	32	43
<b>Total</b>	<b>9,625</b>	<b>10,063</b>	<b>10,423</b>
Males	5,178	5,359	5,490
Females	4,447	4,704	4,933

(a) The new Higher Education Staff Statistics collection, introduced by the Department of Employment, Education and Training (DEET) in 1988, no longer considers Student Guild and Staff Club staff as University member staff. Figures for 1987 have been revised to reflect this new definition. (b) Full-time equivalent. (c) Assistant lecturers, teaching fellows, tutors and demonstrators. (d) Due to changes in (DEET) definitions, research assistants other than those funded by the National Health and Medical Research Council are included in the category *Other - Full-time*. In past years, research assistants were included in the category *Research - Full-time*.

As well as admitting students with a sufficiently high TES who satisfy individual faculty pre-requisites, entry may also be offered to an applicant who has satisfied the admission requirements of another university in Australia or of an overseas university in which there is a reasonable correspondence in admission requirements. Persons twenty years of age or older

may be admitted without the necessary pre-requisites if they are able to demonstrate that there is a reasonable prospect of their being able to assimilate and benefit from their course.

The University offers bachelor, honours, masters and doctoral degrees. Bachelor degrees vary between three and six years duration, some requiring successful completion of the first year course of another faculty for admission and others the completion of a first degree course. Honours degrees generally entail an additional year of study. Masters and doctoral degrees are conferred in a number of disciplines and a postgraduate Diploma in Education is also available.

University Extension is responsible for community education activities, of which the annual Summer School, with its long tradition, is an important component.

The University makes awards of research studentships for postgraduate study to eligible students. Graduates may also apply for Hackett Studentships for overseas study. Some large private industrial concerns also make awards for study at postgraduate level.

TABLE 10.7 - THE UNIVERSITY OF WESTERN AUSTRALIA

	1987	1988
STUDENTS WHO COMPLETED COURSES (a)		
Field of study—		
Agriculture, animal husbandry	58	58
Architecture, building	18	26
Arts, humanities and social science	496	619
Business administration, economics	369	403
Education	179	183
Engineering, surveying	129	148
Health	123	158
Law, legal studies	179	213
Science	472	503
<b>Total</b>	<b>2,023</b>	<b>2,311</b>
AWARDS CONFERRED		
Bachelors	1,197	1,253
Honours	316	353
Postgraduate Diplomas	111	126
Masters	142	156
Doctors (b)	56	72

(a) Year ended 31 December. (b) Includes higher doctorates.

Some \$22.2 million was expended on research activity in the University in 1988. This came from a number of sources including the Australian

Government through the Commonwealth Department of Employment, Education and Training, which provided general support to departments; from a number of outside granting agencies which support individual projects; and from bequests and benefactions from members of the public.

**TABLE 10.8 – THE UNIVERSITY OF WESTERN AUSTRALIA – FINANCE (a)**  
(\$'000)

	1986	1987	1988
<b>INCOME</b>			
Commonwealth Government grants—			
Specific capital purposes (b)	520	1,902	2,611
Other	79,031	83,490	87,340
State Government grants	1,825	1,751	1,247
Donations and endowments	13,104	18,449	18,586
Other	7,866	10,183	15,734
<b>Total</b>	<b>102,346</b>	<b>115,775</b>	<b>125,518</b>
<b>EXPENDITURE</b>			
Teaching and research	69,333	74,458	80,856
Administration and general overheads	10,433	11,245	12,526
Libraries	6,680	6,310	6,862
Buildings, premises, grounds	8,675	10,109	13,259
Sundry auxiliary expenditure	3,911	4,703	4,980
<b>Total</b>	<b>99,032</b>	<b>106,825</b>	<b>118,483</b>

(a) Year ended 31 December. (b) Income received specifically for new buildings, major alterations and additions to buildings, installation of services, purchase of land and buildings and major equipment.

*Radio Station 6UVS FM.* Station 6UVS is owned and operated by University Radio Ltd, a consortium of the University of Western Australia and Murdoch University. The station derives its funding from the two universities, corporate sponsorship and a variety of fund raising activities. The main studios are located in Nedlands with additional studios on the campus of Murdoch University. The station has a full-time staff of thirteen and over 300 volunteer staff including students from both Universities. The station commenced broadcasting in 1977 and was Perth's first stereo FM radio station. Coverage of the arts has been an important part of the station's contribution to the community.

**Murdoch University.** Murdoch University was established in 1973. The University, situated some 13km from Perth, comprises over 230 hectares including the University farm.

The gardens are a feature of the University and some 60,000 native trees, plants and wildflowers have been planted which attract many native birds.

Incorporated into the gardens is an amphitheatre which is used by arts practitioners from within and outside the University. The stage area is lawn and the seating comprises re-cycled wooden railway sleepers set into grassed hillsides. There is also a Chinese garden, the materials for which were donated by Chinese communities in Asia. Craftspeople from Taiwan visited Perth to assemble the garden.

**TABLE 10.9 – MURDOCH UNIVERSITY: AT 30 APRIL**

	1987	1988	1989
<b>NUMBER OF STAFF</b>			
Teaching—			
Full-time—			
Professors	21	22	22
Associate professors, readers	25	35	36
Senior lecturers	71	62	70
Lecturers, teaching registrars	59	65	74
Other (a)	44	44	46
<b>Total</b>	<b>220</b>	<b>228</b>	<b>248</b>
Part-time (b)—			
Lecturing	1	1	1
Tutoring/demonstrating	16	26	27
<b>Total</b>	<b>17</b>	<b>27</b>	<b>28</b>
Research—			
Full-time	14	16	17
Other—			
Full-time	478	505	551
Part-time (b)	7	21	14
<b>Total staff</b>	<b>736</b>	<b>797</b>	<b>858</b>
<b>NUMBER OF STUDENTS</b>			
Internal—			
Full-time	2,346	2,772	3,312
Part-time	906	1,009	1,398
External	1,372	1,415	1,557
<b>Total</b>	<b>4,624</b>	<b>5,196</b>	<b>6,267</b>
Males	2,258	2,550	2,972
Females	2,366	2,646	3,295

(a) Assistant lecturers, teaching fellows, tutors and demonstrators. (b) Figures for part-time staff have been converted to a full-time equivalent on the basis of 250 hours per annum for lecturers, 700 hours per annum for tutors and demonstrators and 35 hours per week for all other staff.

On campus, accommodation is provided for 400 students. Student House provides self-service accommodation with each student having a single study/bedroom. Groups of students share common kitchen, dining and lounge areas.

School leavers wishing to gain admission to Murdoch University are expected to meet normal admission requirements based on the TES or equivalent. Mature age applicants are invited to demonstrate their capacity for tertiary study in one of a number of ways which permit consideration of a range of educational, professional and

employment backgrounds and allows each application to be considered on its merit.

The University admitted full fee-paying overseas students for the first time in 1987, with an intake of ninety-eight students. In 1989 there were 478 full fee-paying overseas students enrolled in several areas of study including commerce, computer science and communication studies. In addition, there were a number of exchange students from the USA studying under the Study Abroad Scheme.

The University offers bachelor, graduate and postgraduate diplomas, honours, masters and doctoral degrees. Bachelor degrees are between three and five years duration; honours degrees, when available, require a further year of study. Special provision has been made for external students, and a substantial and innovative program of external studies has been developed.

Community education programs for all ages are provided by cooperation with University Extension.

Undergraduate and postgraduate scholarships are offered and private organisations also provide awards for postgraduate studies.

TABLE 10.10 - MURDOCH UNIVERSITY

	1987	1988	1989
STUDENTS WHO COMPLETED COURSES (a)			
Field of study—			
Biological and environmental sciences	85	97	99
Divinity	6	15	21
Economics and commerce (b)	35	83	160
Education	126	117	124
General studies	7	7	-
Humanities	93	106	99
Mathematical and physical sciences	68	63	75
Social sciences	r109	120	149
Veterinary studies	99	103	99
<b>Total</b>	<b>628</b>	<b>711</b>	<b>826</b>
AWARDS CONFERRED			
Bachelor	315	409	485
Honours	88	102	95
Diploma (c)	52	64	73
Masters	22	32	29
Doctoral	30	21	29

(a) Year ended 31 December. (b) Previously included in Social sciences. (c) Includes graduate and post-graduate diplomas.

Various government authorities and private organisations provided \$5.9 million for basic and applied research during 1988. The University's development company, Murmin, is involved in an \$11 million research and development joint agreement with an American corporation to develop a zinc bromine battery.

Substantial funding for energy research has been received from State, Federal and industry sources.

TABLE 10.11 - MURDOCH UNIVERSITY - FINANCE (a) (\$'000)

	1986	1987	1988
INCOME			
Commonwealth Government grants—			
Specific capital purposes (b)	5,923	3,170	3,865
Other	27,684	31,703	33,159
State Government grants	551	627	1,398
Donations and endowments	68	297	811
Other	2,566	3,311	5,419
<b>Total</b>	<b>36,792</b>	<b>39,108</b>	<b>44,652</b>
EXPENDITURE			
Teaching and research	19,004	22,307	26,404
Administration and general overheads	4,633	5,121	6,079
Libraries	2,240	2,429	2,692
Buildings, premises, grounds	8,108	8,250	6,101
Sundry auxiliary expenditure	2,998	3,553	3,856
<b>Total</b>	<b>36,983</b>	<b>41,660</b>	<b>45,132</b>

(a) Year ended 31 December. (b) Income received specifically for new buildings, major alterations and additions to buildings, installation of services, purchase of land and buildings and major equipment.

**Curtin University of Technology.** The main campus of the University is set on 112 hectares of landscaped parkland in the Perth suburb of Bentley, 10 kilometres from the city centre. The Schools of Occupational Therapy, Physiotherapy and Podiatry are located in the Royal Perth (Rehabilitation) Hospital grounds at Shenton Park. Specialist campuses are located at the Muresk Institute of Agriculture in the Avon Valley near Northam and two campuses of the Western Australian School of Mines are at the gold mining centre of Kalgoorlie and at the coal mining town of Collie.

Curtin is concerned with technology and the range of ideas, operations and materials by which people apply knowledge to real situations. The University fosters close links with the community through its teaching programs and research and development activities.

TABLE 10.12 - CURTIN UNIVERSITY OF TECHNOLOGY: AT 30 APRIL

	1987	1988	1989
NUMBER OF STAFF			
Teaching—			
Full-time—			
Professors		19	26
Associate professors		59	59
Senior lecturers		169	169
Lecturers		298	326
Other		122	110
Total		667	690
Part-time—	(a)		
Tutoring		136	135
Research—			
Full-time		-	-
Other—			
Full-time		838	864
Part-time		44	62
<b>Total staff</b>		<b>1,685</b>	<b>1,751</b>
NUMBER OF STUDENTS			
Internal—			
Full-time	7,076	8,027	8,774
Part-time	4,676	5,278	5,164
External	917	903	1,006
<b>Total</b>	<b>12,669</b>	<b>14,208</b>	<b>14,944</b>
Males	6,733	7,156	7,271
Females	5,936	7,673	5,936

(a) Details are not available on a comparable basis.

TABLE 10.13 - CURTIN UNIVERSITY OF TECHNOLOGY

	1987	1988	1989
STUDENTS WHO COMPLETED COURSES(a)			
Field of study—			
Agriculture	48	45	49
Architecture	112	110	133
Arts	483	515	559
Business studies	569	619	784
Education	310	348	346
Engineering	226	205	244
Health	625	801	893
Science, pure and applied	192	202	225
<b>Total</b>	<b>2,565</b>	<b>2,845</b>	<b>3,233</b>
AWARDS CONFERRED			
Bachelor	1,598	1,728	1,826
Honours	67	66	62
Diploma(b)	854	765	792
Masters	79	81	115

(a) Year ended 31 December. (b) Includes graduate, post-graduate and associate diplomas.

Minimum entrance requirements for undergraduate courses are based on TES. Holders of other qualifications which are assessed as equivalent and who possess evidence of adequate literacy may be considered for selection. Mature age provisions allow for alternative assessment methods for applicants at least twenty years of age.

The University offers 180 courses at undergraduate and postgraduate levels leading to Associate Diploma, Diploma, Bachelor degree, graduate and postgraduate Diploma, Masters degree or Doctoral qualifications. The courses vary in duration according to the level and may be undertaken as full-time or part-time studies. It is also possible to study some courses on an external (correspondence) basis.

*Western Australian School of Mines.* The Western Australian School of Mines comprises the Departments of Mineral Exploration and Mining Geology; Minerals Engineering and Extractive Metallurgy; and Mining Engineering and Mine Surveying. Associate diploma, bachelor degree, postgraduate diploma and masters degree courses are offered.

The increasing emphasis on applied research and consultancy within the School led to the establishment of the Brodie-Hall Mining Research and Consultancy Centre in Kalgoorlie in 1986, which is currently funding the appointment of a Research Fellow in the field of mining geophysics.

The Collie Federated School of Mines is also a campus of the Curtin University of Technology where the first year of the degree programs is being run as well as an Associate Diploma in Coal Mining Technology. The development of teaching and research facilities at Collie has consolidated the role of the School and expanded its base as a South-West Regional/Bentley Campus research centre.

*Muresk Institute of Agriculture.* Muresk Institute of Agriculture is situated near Northam. Muresk offers a range of courses which allows its graduates to fill almost any role in the rural industry.

The campus of some 1,800 hectares contains a cereal and sheep farm and a thoroughbred horse stud. Research facilities include laboratories, glass and tunnel houses and the Clyde Smith Rural Management Centre which houses the Rural Management Unit and its wide range of microcomputer hardware and software. Through this unit and with the establishment of the Farm



Management Foundation of Australia (Inc.) on the campus, Muresk has expanded its applied research profile in the agricultural business field. This research concentrates on the development and application of new technologies in both broadacre and intensive farming systems and on assisting farmers to incorporate these developments into decision support systems.

Numerous short courses are held at Muresk, including in-service training schools for personnel of the Department of Agriculture and for field and service staff of agricultural firms.

**TABLE 10.14 - CURTIN UNIVERSITY OF TECHNOLOGY: FINANCE (a)**  
(\$'000)

	1986	1987	1988
<b>INCOME</b>			
Commonwealth Government grants—			
Specific capital purposes (b)	587	1,942	3,195
Other	62,902	64,256	73,063
State Government grants	3,853	8,144	4,122
Donations and endowments	842	1,236	2,872
Other	16,362	23,578	39,309
<b>Total</b>	<b>84,546</b>	<b>99,156</b>	<b>122,561</b>
<b>EXPENDITURE</b>			
Salaries and wages	50,290	50,717	56,975
Library	938	1,056	1,280
Buildings, grounds and equipment	5,395	11,556	15,705
Sundry auxiliary expenditure	24,758	32,897	42,851
<b>Total</b>	<b>81,381</b>	<b>96,226</b>	<b>116,811</b>

(a) Year ended 31 December. (b) Income received specifically for new buildings, major alterations and additions to buildings, installation of services, purchase of land and buildings and major equipment.

### COMMONWEALTH GOVERNMENT ASSISTANCE FOR EDUCATION

The State Government has the major responsibility for education, including the administration and substantial funding of primary, secondary and technical and further education in Western Australia. The Commonwealth Government provides supplementary finance to the State and is responsible for the total funding of universities and colleges of advanced education. The Commonwealth also has special responsibility for Aboriginal people and for migrants, as well as the power to provide assistance for students.

The National Board of Employment, Education and Training was established in 1988, one function being the provision of advice and information on education to the Commonwealth Government.

**TABLE 10.15 - COMMONWEALTH GOVERNMENT ASSISTANCE FOR EDUCATION: WESTERN AUSTRALIA**  
(\$'000)

Nature of assistance	1987-88	1988-89
Assistance of a revenue nature—		
Higher education	208,471	207,525
Technical and further education (a)	12,078	11,642
Government schools	53,609	60,451
Non-Government schools	72,342	80,574
Joint school programs	3,317	3,464
National Policy on Languages	534	780
Participation and equity program	2,284	-
<b>Total</b>	<b>352,635</b>	<b>364,436</b>
Assistance of a capital nature—		
Higher education	23,349	13,704
Technical and further education	15,032	14,617
Government schools	15,990	17,860
Non-Government schools	4,894	5,419
Video facilities	63	-
<b>Total</b>	<b>59,328</b>	<b>51,600</b>
<b>Total</b>	<b>411,963</b>	<b>416,036</b>

### Financial assistance for students

**Assistance for Isolated Children Scheme.** This scheme assists families whose homes are too remote for normal daily access to government schools. It provides allowances for eligible students living away from home to attend school, for students studying by correspondence or when a second home is maintained for student occupation. The scheme also covers children regarded as isolated owing to medical disability.

**AUSTUDY.** In 1987 AUSTUDY replaced the Tertiary Education Assistance Scheme, Adult Secondary Education Allowance Scheme, and the Secondary Allowances Scheme as the main scheme for community-wide student assistance.

**TABLE 10.16 - AUSTUDY: WEEKLY RATES OF BENEFIT: JANUARY 1990**

	\$
Student living at home—	
Secondary and tertiary—	
16-17 years of age	57.60
18 years of age and over	69.20
Student not living at home or independent (a)—	
16-17 years of age	95.10
18 years of age and over	105.15

(a) Not available for secondary students under the age of 19.

Subject to eligibility criteria, AUSTUDY provides support for full-time students 16 years of age and older studying secondary, technical and further education, undergraduate and some postgraduate courses at universities and colleges of advanced education. Higher degree students, who are eligible for postgraduate awards do not qualify for AUSTUDY.

**Postgraduate Award Scheme.** This scheme provides awards to selected higher degree students undertaking masters and doctor of philosophy programs at Australian universities and colleges of advanced education. They are made on academic merit, are taxable and, although not income-tested, are not available if a certain level of income is received from other awards.

#### EXPENDITURE ON EDUCATION BY STATE AND LOCAL AUTHORITIES

##### Financial Assistance for Schools and Students

The State Government provides financial aid to non-government schools by means of a direct annual grant for each student enrolled. The grant incorporates a needs component and separate rates are applicable to pre-primary, primary and secondary students.

Assistance is also given to non-government schools by way of low interest loans and interest subsidies on moneys borrowed to help meet expenditure on new residential accommodation, classrooms and associated facilities and school site acquisition. The scheme also applies to the provision of teacher accommodation north of the Twenty-Sixth Parallel.

The State Government provides an allowance of \$50 for each primary pupil and \$100 for each secondary student to assist in meeting education costs.

A boarding-away-from-home allowance, to supplement the isolated children's allowance paid by the Commonwealth Government is also provided. An allowance of \$500 per annum is paid

to an isolated child who is obliged to live away from home to attend school.

The State Government Additional Assistance and Clothing Assistance Schemes are also available to indigent parents who have children in Years 8 to 12 aged under 16. These schemes aim to assist families on low incomes to meet the costs of books, materials and clothing.

TABLE 10.17 - STATE AND LOCAL GOVERNMENT AUTHORITIES (a) - OUTLAY ON EDUCATION (b) (\$m)

	1985-86	1986-87
Pre-school education and education not definable by level—		
Current	43.7	46.5
Capital	0.1	-
Primary and secondary education—		
Current	623.6	665.6
Capital	66.1	64.5
Tertiary education—		
Technical and further education—		
Current	107.2	118.1
Capital	35.5	26.5
University education		
Current	90.3	99.8
Capital	10.4	46.4
Other higher education		
Current	80.0	88.0
Capital	12.5	19.9
Education n.e.c. (c)—		
Current	18.8	17.5
Capital	1.3	-0.8
Transportation of students—		
Current	27.0	29.2
<b>Total</b>	<b>1,116.5</b>	<b>1,221.2</b>
Current	990.6	1,064.7
Capital	125.9	156.5

(a) State authorities comprise State Government departments and instrumentalities. Local authorities refer to municipal governments set up under local government legislation. (b) Includes expenditure from Commonwealth Government grants for education. (c) Includes special education and education not definable by level.

#### REFERENCES

##### ABS Publications

*Schools, Australia* (4221.0)

## Chapter 11

# CULTURE, SCIENCE AND RECREATION

## Culture

The Perth Cultural Centre, located in Northbridge close to central Perth, provides a focus for the arts and culture. Its heart is a large paved plaza with an amphitheatre for outdoor performances. Around the perimeter are housed the Library and Information Service of Western Australia in the Alexander Library, the Western Australian Museum, the Art Gallery of Western Australia and the Perth Institute of Contemporary Art.

Around the Perth Cultural Centre are a number of arts resource organisations, including the National Exhibitions Touring Structure, responsible for taking small exhibitions to Western Australian country centres; Artemis Women's Art Forum; the Australian Association of Dance Education; Evos Music, exponents of contemporary music; and the Australian and Regions Artists' Exchange, a body established to enable dialogue and exchange between artists from Australia and the Pacific region. Artists' studios are also located in and near the Centre. The Forrest Chase development links the Cultural Centre with the city.

The last few years have seen the development of regional arts facilities and there is a steady flow of country touring activity by professional companies.

### DEPARTMENT FOR THE ARTS

The Western Australian Department for the Arts was established to advance the cultural development of Western Australia. The arts portfolio includes the Western Australian Film Council and the statutory authorities of the Western Australian Museum, the Art Gallery of Western Australia, the Library and Information Service of Western Australia (LISWA) and the Perth Theatre Trust. The Department for the Arts also includes the State Censorship Office.

Central to the role of the Department is support for the range of arts organisations and creative cultural practices that enrich the lives of Western Australians.

Major funded performing arts organisations include the Western Australian Theatre Company,

Hole in the Wall Theatre, Deckchair and Swy Theatres, Spare Parts Theatre, the Western Australian Opera Company, Youth Orchestra and Ethnic Music Centre, the West Australian Ballet and 2 Dance Plus.

The Department also administers financial support to individuals and agencies as recommended by peer group assessment panels in each artform. Financial assistance is considered for projects of a developmental nature. Fremantle Arts Centre and its Press receive support as does the Perth Institute of Contemporary Art. Artists are assisted and nurtured through a Creative Development Fund, arts traineeships and study exchanges.

Specific artforms are serviced by the Arts Development Officers in each field: literature; visual arts; music; dance; theatre; film; Aboriginal arts; community arts and multicultural arts. The

potential of country areas is also of special concern, and three strands of research, the W.A. Touring Arts Review, the Country Arts Development Committee Report and the Community Arts in Rural Areas of W.A. Review have resulted in the development of a Regional Arts Plan.

Other areas currently receiving attention include cultural tourism, international cultural development, public art, corporate sponsorship for the Arts, housing the Arts and women and the Arts.

TABLE 11.1 - DEPARTMENT FOR THE ARTS  
GRANTS TO ARTS AGENCIES (a)  
1988-89  
(\$'000)

	Base grants	Special projects	Equipment grants	Total
Aboriginal arts	-	-	-	-
Community arts	49.5	-	-	49.5
Dance	1,031.4	10.0	-	1,041.4
Film and television	219.0	-	47.5	266.5
Literature	143.5	10.0	-	153.5
Multi-art forms	990.8	88.0	-	1,078.8
Music	1,769.3	32.1	8.7	1,810.2
Theatre	1,245.0	128.9	16.4	1,390.3
Visual arts and crafts	753.3	66.4	33.3	852.9
<b>Total</b>	<b>6,201.8</b>	<b>335.4</b>	<b>105.9</b>	<b>6,643.1</b>

(a) In 1988-89, additional financial assistance of \$2.3 million was provided for peer panels, the Creative Development Fund, the Touring panel, conferences and seminars, Discretionary Grants and minor capital works.

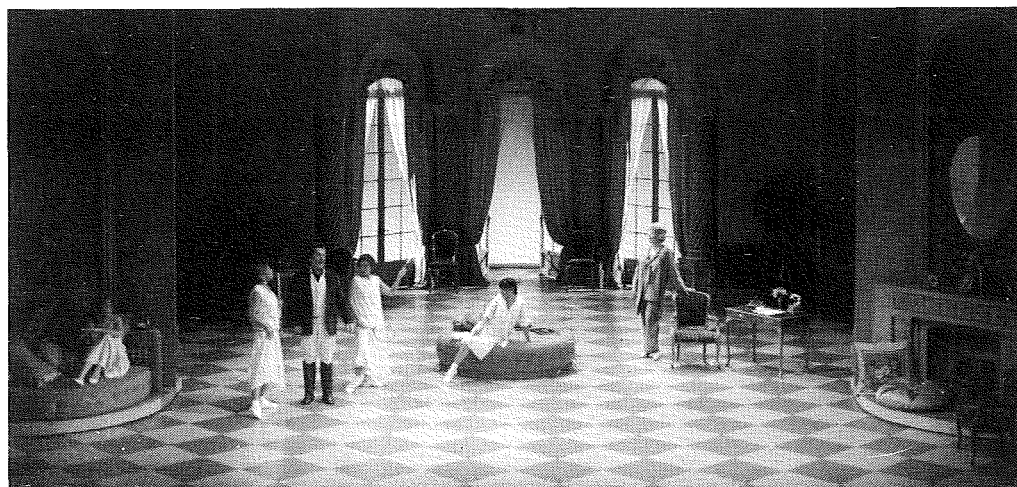
## THE WESTERN AUSTRALIAN OPERA COMPANY

The Western Australian Opera Company is an incorporated body with approximately 600 members. The principal aims of the Company are to advance opera and musical theatre awareness in Western Australia, the performance of theatrical productions such as opera, operetta and musical comedy, and the training of singers and musicians towards the performing of musical theatre.

The Company was formed in 1967, largely through the efforts of Giuseppe Bertinazzo (who had recently arrived in Perth from being principal tenor with La Scala, Milan) and James Penberthy, noted Australian composer. The Australian opera singer, Dame Joan Sutherland, agreed to be the Company's first patron.

Several previous attempts to found an opera company in Western Australia had failed. There had been no funding to cover the difference between box office receipts and the costs of production. It was not until 1967, following a UNESCO conference recommendation, that State and Federal agencies combined to provide greater support for the arts by way of subsidy.

To date, the Company has performed fifty-eight major staged works, numerous concerts, country tours and school performances in the metropolitan area and in country centres around the State. Its touring program has included full operas (*Carmen*,



Scene from *Countess Maritza*, staged by The Western Australian Opera Company in 1989.

Photograph: Geoffrey Harris.

*La Boheme*, *Madam Butterfly*, *Beggar's Opera*, *Marriage of Figaro* and *Don Pasquale* (for example), scenes from opera and operetta performed in costumes, and straight concert performances.

During 1989, the Company performed two major staged works, *La Boheme* and *Countess Maritza*. Four principal singers from the eastern states appeared in *La Boheme*, and two in *Countess Maritza*. All other roles were cast with local singers, as was the chorus of approximately forty elements and eight dancers for *Countess Maritza*. Including the orchestra and support staff for these productions, over 150 people were employed for each season.

During the year, the Company also employed four resident singers, a pianist and a stage manager. They performed in primary schools throughout the State, held community concerts in locations such as senior citizens homes, and undertook three major country tours. In total, they gave 182 performances to an attendance of 33,946 patrons.

Including the Company's two main seasons, 199 performances were presented to a total audience of 48,247 patrons.

### THE LIBRARY BOARD OF WESTERN AUSTRALIA

The Library Board of Western Australia is constituted to advise the Minister and local authorities on matters of general policy relating to libraries and to administer the funds made available by Parliament for LISWA.

TABLE 11.2 - THE LIBRARY BOARD OF WESTERN AUSTRALIA : 1988-89

	Unit	
Expenditure	\$	23,374,939
Staff (a) (b)	Number	270
Associated public libraries	"	221
Books—		
Total circulation stock (a)	"	2,023,613
Received and dispatched in the exchange program with local libraries	"	828,320
Inter-library requests received	"	119,345
Visitors to reference libraries	"	779,658

(a) At 30 June. (b) Number of full-time staff plus full-time equivalent units of part-time staff.

The Library and Information Service comprises five Directorates: Collection Management; Corporate Services; Public Libraries and Lending Services; Reference and Information Services and the State Archives. These directorates are coordinated by the State Librarian to provide an integrated and comprehensive library and information service throughout the State.

#### Collection Management

The Collection Management Directorate provides services for supporting and maintaining all collections within the organisation. The Branches are Acquisitions, Cataloguing, Information Technology and Preservation Services.

#### Corporate Services

The Corporate Services Directorate consists of four administration branches. These are Finance, Human Resources, Publications and Display, and Building Services. The main objective of the Directorate is to provide centralised administrative and support services to the organisation.

#### Reference and Information Services

The Directorate comprises seven branches which offer reference and information services within the Alexander Library Building. These are the Humanities and Social Sciences Branch; Infolink Government and Community Information; JS Battye Library of Western Australian History; Maps Collection; Music Branch; Science, Technology and Commerce Branch; and the State Film and Video Library. The objective of the Directorate is to provide, develop and assist in the exploitation of resources of information and cultural value for the people of the State. The JS Battye Library of West Australian History has a mandate to seek out, acquire and make available local materials for research covering printed records, film archives and oral history. Infolink has responsibility for providing community and State Government information services to the public. The State Film and Video Library provides a free film and video lending service to groups and organisations throughout Western Australia. The Music Library provides a cassette and musical scores lending service to the general public.

#### Public Libraries and Lending Services

Public libraries in Western Australia are a cooperative venture between the Library Board of Western Australia and the 139 local government authorities throughout the State. The Public

Libraries and Lending Services Directorate is responsible for the provision to public libraries of fully processed bookstock and other resource materials and professional consultancy services. It also provides a centralised inter-library loans system available to public libraries and all government, private or academic library services within the State.

### The State Archives

Under legislation passed in 1974 the Board has responsibility for the control and custody of all State archives. These include the records of the State Government, all local authorities and all other bodies established under statute. When records cease to be in current use they become the responsibility of the Board and their destruction is prohibited without the approval of the Board.

### THE WESTERN AUSTRALIAN MUSEUM

The Western Australian Museum has its headquarters and principal display galleries in Perth, in the heart of the Cultural Centre. It has branches in Fremantle (Fremantle Museum, Western Australian Maritime Museum, Samson House and Sails of the Century); Albany Residency Museum); Geraldton (Geraldton Museum); and Kalgoorlie (Museum of the Goldfields). The Museum has special responsibilities for Aboriginal material including sites, for historic shipwrecks and for meteorites. The Director also has delegated powers for wrecks and material under Commonwealth control.

The Museum is a vital resource centre, its collections and displays reflecting the research and fieldwork constantly being undertaken by its curatorial staff. Emphasis in both display and research is on natural sciences and human studies, past and present, and on the State's rich culture and colourful maritime history.

The Trustees of the Museum are empowered to assist in establishing and maintaining local museums. The Museum is able to assist such museums with expertise, advice on the maintenance of collections, conservation and restoration, design and display, and by providing objects for display in recognised museums. At present eighteen local museums are recognised under the Museum Act. The Museum plays an important role in the sphere of education from primary schools to tertiary institutions and the community in general. This is achieved through a variety of activities and endeavours including school visits, organised holiday activities (in the

Museum and its branches) and lectures by scientific staff in tertiary institutions and public venues.

The Museum is often called upon to act in an advisory capacity to government departments. Senior staff serve on Government committees dedicated to the protection of heritage, the environment and wildlife. The Museum is assisted in certain fields by Honorary Associates, some of whom serve on advisory committees appointed by the Trustees, and by education volunteers.



West German volunteer Bernard Finkenzeller, who is working with the Western Australian Maritime Museum's conservation laboratory, at work on one of the bronze cannon retrieved from the wreck of the Dutch vessel *Batavia*.

Photograph: Western Australian Museum

TABLE 11.3 - THE WESTERN AUSTRALIAN MUSEUM: 1988-89

	<i>Unit</i>	
Expenditure(a)	\$	8,816,107
Staff (b)	Number	224
Days spent on field work	"	3,293
Public attendance—		
Western Australian Museum Perth	"	218,105
Fremantle Museum	"	51,206
Western Australian Maritime Museum	"	100,022
Samson House	"	2,541
Sails of the Century	"	35,313
Albany Residency Museum	"	97,551
Geraldton Museum	"	29,201
Museum of the Goldfields, Kalgoorlie	"	22,012
<b>Total public attendance</b>	<b>"</b>	<b>555,951</b>

(a) Excludes capital works. (b) At 30 June 1989.

## THE ART GALLERY OF WESTERN AUSTRALIA

The Art Gallery of Western Australia incorporates seven major galleries, an auditorium, conservation laboratories, a prints and drawings study room, a restaurant and a bookshop. The Gallery Administration Centre, incorporates a library, a theatre and the Art Gallery Society rooms.

TABLE 11.4 - THE ART GALLERY OF WESTERN AUSTRALIA: 1987-88

	Unit	
Expenditure	\$	4,096,473
Staff (a)	Number	80
Exhibits for display (a)	"	9,332
Exhibitions for year	"	40
Visitor attendances	"	332,631

(a) At 30 June.

As well as exhibiting works from the permanent collection, activities of the Gallery involve the presentation of important exhibitions from overseas, lectures and exhibitions by visiting artists, and an artist-in-residence program. One of the highlights of 1987-88 was *Old Masters New Visions* from the Phillips Collection in Washington D.C., U.S.A. The *Brian McKay* exhibition reflected the Gallery's policy to feature the achievements of local artists in both the collection and exhibition programs.

The Gallery's collection includes both Australian and international art, and is divided into four curatorial departments: Aboriginal and Asian; Craft; Painting and Sculpture; and Prints and Drawings.

Current acquisition policy concentrates on contemporary and Aboriginal art. A highly selective international component, representing artistic pinnacles and the evolution of style since 1960, is included. It incorporates significant pieces from other regional cultures, especially Latin America and South-East Asia. The Australian component reviews in depth outstanding artists illustrating the evolution of certain key artists and providing a systematic view of artistic developments over the past three decades. The most intensive focus is on the art of Western Australia.

The Art Gallery has over fifty volunteer guides who maintain a regular program of guided tours to

the public. Their aim is to enrich personal experience and public awareness of the collection and exhibition program.

The Art Gallery Society supports the Gallery through functions organised both within the Gallery and at other venues. Donations from their fund raising efforts make possible the acquisition of many important art works which otherwise may not have been obtained.

### Geraldton Regional Art Gallery

The Geraldton Regional Art Gallery was opened in August 1984 in the former Town Hall building. In 1987-88, eight exhibitions were produced in Geraldton, thirteen were from the Art Gallery of Western Australia, six were toured through the National Touring Structure, and another six were obtained from other sources. There were two main exhibitions: *Western Australian Art and Artists 1900-1950* (supplied by the Western Australian Art Gallery), and *Fred Williams A Restrospective* (a travelling exhibition from the Australian National Gallery).

During 1987-88, 24,151, persons visited the Gallery.

### Bunbury Regional Art Gallery

In February 1987, the Bunbury Regional Art Gallery opened as part of the launching of the Bunbury Arts Complex. The Gallery is housed in the former historic Convent of Mercy.

The Gallery consists of an upper gallery which was formerly the chapel and the lower gallery, previously the sisters' sleeping quarters. The lower gallery leads through an open foyer area to the City of Bunbury Art Gallery (distinct from the Bunbury Regional Art Gallery).

Thirty-three exhibitions were set up in the Gallery in 1987-88, of which eighteen were produced locally. The remainder were provided by the Art Gallery of Western Australia, the National Exhibition Touring Support Program (WA) and other touring agencies. One of the highlights of the year was the first *South-West Survey of Contemporary Art and Craft Festival*, which was held in September/October 1987. This exhibition was sponsored by the South-West Development Authority.

During 1987-88 21,483 persons visited the Gallery.

## THE ABORIGINAL ARTS BOARD

The Aboriginal Arts Board supports activities involving the preservation and continuation of traditional cultural practices and their associated art forms as well as the generation of new artistic expression among Aboriginal people in urban and country areas.

The Aboriginal Arts Board awarded 88 grants totalling \$1,447,869 for arts programs in Western Australia during 1988-89. This compares with 39 grants amounting to \$539,875 awarded for Western Australian Aboriginal arts projects in 1987-88.

## Science

### PERTH OBSERVATORY

The Perth Observatory, previously a research institution with limited public access, has now changed focus to more readily cater for the public. Emphasis is also being placed on the needs of schools.

The Education Program includes night tours, the demand for which has resulted in the tours being booked out at least six months in advance. Participants see astronomical objects at first hand through Observatory telescopes.

A 3 p.m. Sunday tour is also popular. Other daytime tours for school groups are usually booked for the week of the full moon, when Observatory staff are not engaged in observing programs.

In addition to 'on site' tours, the acquisition of two portable 20 cm telescopes has enabled Observatory staff to conduct field nights at remote locations. Typical interested groups include primary and high schools, as well as service organisations and participants in the Kalamunda Shire Council 'awareness' programs.

An annual Astronomical Handbook is produced, and a new Museum display gives an insight into past and present astronomy.

On the scientific side of astronomy, collaboration has continued with overseas organisations in cooperative observing programs.

A joint initiative with the local universities has seen the formation of the Perth Astronomical Research Group. The primary objective of this group has been the establishment of a fully automated telescope equipped with a Charge Coupled Device camera.

The Observatory has four telescopes operational on site. These include the 61 cm Lowell-Perth reflector, the 33 cm Astrographic Refractor, the University of Western Australia 45 cm reflector, and a 35 cm Celestron reflector. The Celestron has been used mainly as a 'visitors' telescope, and several amateur astronomers have undertaken 'deep sky' photography programs.

The astronomical highlight of 1989 was the dramatic upsurge in sightings of Aurora Australis as the peak of the solar activity cycle in June 1990 is approached. Bright auroral displays, featuring pink, white and green colouration of the usually dark southern night sky has been seen from as far north as Exmouth. Aurorae are caused by streams of highly charged particles that are ejected from the sun during periods of violent solar storms.

### CHEMISTRY CENTRE, WESTERN AUSTRALIA

The Chemistry Centre (WA), formerly the Government Chemical Laboratories, is a division of the Department of Mines and provides a wide range of scientific, analytical and consultancy services to government, industry and the general public. The Centre assists in mineral processing, soil and fertilizer analysis, agricultural trials, water quality assessment, food nutritional quality evaluation, forensic science, environmental monitoring, chemical aspects of occupational and physical environments, and materials testing. It undertakes research and development in all these areas.

In 1988-89, 117,912 samples were submitted for examination.



TABLE 11.5 - CHEMISTRY CENTRE (WA) : 1988-89

	<i>Staff Numbers</i>
Laboratory—	
Agricultural chemistry	27
Environmental chemistry	20
Forensic science	13
Health chemistry	12
Kalgoorlie metallurgical	8
Materials science	7
Mineral processing	17
Mineral science	24
Racing chemistry	5
Administration	16
<b>Total</b>	<b>149</b>

### COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION

The Commonwealth Scientific and Industrial Research Organization (CSIRO), the largest scientific research organisation in Australia, is a statutory body employing some 7,000 staff in more than 100 laboratories and field stations throughout Australia. Several laboratories and field stations employing around three hundred staff operate in Western Australia.

The work of the CSIRO is carried out within six institutes: Information and Communications Technologies; Industrial Technologies; Minerals, Energy and Construction; Animal Production and Processing; Plant Production and Processing; and Natural Resources and Environment. Each institute consists of several divisions. Of these divisions, two, Water Resources and Exploration Geoscience, have their headquarters in Perth. Divisional groups from Forestry and Forest Products, Entomology, Animal Production, and Plant Industry and Soils, are represented in the Laboratory for Rural Research (Perth). Other divisions established in Western Australia include Fisheries and Oceanography in the Marine Laboratories (Marmion), Food Processing, Geomechanics, Mathematics and Statistics, Mineral Products, Wildlife and Ecology, and Building, Construction and Engineering.

CSIRO maintains strong links with tertiary institutions, industry and the community to ensure that its research effort is targeted to national needs. Advisory committees make a significant contribution to divisional operations. Further industry input is obtained by the appointment of individuals to Sector Advisory Committees.

### BOTANIC GARDEN

The Western Australian Botanic Garden is in Kings Park (see following section *Public Parks and Reserves*). It specialises in the display of the State's native flora, in particular, that of the South-West. Much of the indigenous flora only occurs naturally in this region. Many species are spectacularly beautiful and some are curiously adapted to the harsh environmental conditions. Seed and other materials have been collected from the wild and the propagation of these plants investigated to bring them into cultivation and maintain the living collections of nearly 2,000 species native in this State.

Also growing in Kings Park and the Botanic Garden are about 1,500 species from other parts of the world, especially those which share with Perth a Mediterranean climate—cool, moist winters alternating with hot, dry summers.

The main Botanic Garden occupies more than twenty hectares, of which nearly seventeen hectares are devoted to Western Australian flora, and about one hectare each to plants from California, South Africa and the Mediterranean basin.

More than fourteen hectares are planted with native trees in an arboretum. There are other smaller collections embellishing particular features such as a bed planted with native species suitable for Perth suburban gardens at the Hale Recreation Area, where there is also a sensory trail of trees having contrasting scents, textures, colours and growth habits. Aromatic herbs and shrubs have been planted in a raised bed in the Ivey Watson Playground.

The display glasshouses extend the range of plants exhibited with species unsuited to growing in the open ground. These include some species from the drier inland parts of the Pilbara and Kimberley regions of the State, salt bushes and other succulents. Plants requiring humid conditions, such as carnivorous plants and ferns, are kept in separate sections of the display glasshouse complex. A collection of cycads surrounds a pool with aquatics in the central courtyard. Nearby there is a garden planted with rare and endangered species.

There is active scientific research by the botanical and horticultural staff into the biology, propagation and cultivation of the native flora, especially species threatened with extinction. Surplus seed and tissue cultures are distributed to

botanical institutions throughout the world. Public interest in and motivation towards the conservation of the flora are fostered through advice on the growing of native plants, educational and interpretative programs. These and many other

aspects are put on show during the annual spring Wildflower Festival, which is a major tourist attraction, as are Kings Park and the Botanic Garden throughout the year.

## Recreation

### PUBLIC PARKS AND RESERVES

The Governor, acting on the advice of Executive Council, may order the reservation of Crown lands for a variety of specific purposes which serve the public interest.

Some Crown land is reserved for public recreation and amusement, national parks and other public parks; and for the conservation of flora and fauna. Such reserves are often placed under the control of statutory bodies, some of which are dealt with in this section.

#### Department of Conservation and Land Management

The Department of Conservation and Land Management is required to manage public lands, waters and wildlife for the benefit of present and future generations of Western Australians. National parks management encourages public enjoyment of the natural attributes of these lands, meeting the diverse needs of the community, but in a manner that does not compromise conservation objectives.

National parks and marine parks are vested with the National Parks and Nature Conservation Authority, a statutory body responsible to the Minister for Conservation and Land Management. A majority of the Authority's members represent community interests.

The State's 4.8 million hectares of national parks contain picturesque landscapes ideally suited to more passive nature-based activities such as sightseeing, photography, bushwalking, nature study, picnicking and camping in designated areas. This system of fifty-nine national parks is complemented by almost two million hectares of State forest, which offers opportunities for picnicking, camping, backpacking, canoeing, fishing, marroning, orienteering and other pursuits. Within certain specified areas, other activities including horse and trail bike riding are permitted, subject to certain management controls.

Nature reserves are for the purposes of wildlife and landscape conservation, scientific study and protection of features of archaeological, historic or scientific interest. Wildlife values may not be commercially exploited, and no recreation which damages natural ecosystems is allowed. At 30 June 1989, there were 10.4 million hectares of nature reserves.

Marine Parks are managed for marine conservation and recreation, with areas zoned for commercial fishing on a sustained yield basis. There are two marine parks in Western Australia, one at Marmion and the other at Ningaloo (off Exmouth) which was created for the Bicentenary. The area of marine parks at 30 June 1989 was some 233 thousand hectares.

Extensive limestone caves are features at several places in the south-west part of the State as well as in the Kimberley and the Nullabor Plain. Some between Cape Naturaliste and Cape Leeuwin, and at Yanchep, have been developed for public inspection, and areas of the surrounding land have been reserved within Leeuwin-Naturaliste National Park, adjacent areas at Yallingup, Margaret River and Augusta, and within Yanchep National Park.

The total Department of Conservation and Land Management terrestrial estate constitutes 6.9 per cent of the land area of Western Australia.

TABLE 11.6 - DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT  
TERRESTRIAL ESTATE : 30 JUNE 1989

	<i>Hectares</i>
Nature reserves	10,419,039
National parks	4,834,518
State forests	1,747,867
Marine parks	233,350
Conservation recreation reserves	188,880
Timber reserves	144,399
Freehold	32,333
<b>Total</b>	<b>17,600,386</b>

## Kings Park

The Kings Park Board administers an area of approximately 400 hectares close to the centre of Perth. There are several scenic vantage points on Mount Eliza overlooking the city and Swan River with views to the Darling Scarp. The original purpose when development began in 1895 was to provide for public recreation, health and enjoyment. This is still catered for by drives, dual use paths, grassed walks, formal gardens, picnic lawns with barbeque fireplaces under shade trees, and playgrounds of various types. Subsequently other roles have been added.

The State War Memorial, the Pioneer Women's Memorial, avenues of dedicated trees and many other features commemorating the service and sacrifice of Western Australians in peace and war have been placed here making Kings Park the State's principal shrine. There are also several historic sites in Kings Park, visited by early explorers or used by the pioneer settlers and the Aborigines before them.

The decision in 1959, implemented three years later, to create the Western Australian Botanic Garden in Kings Park has led to the display in gardens and glasshouses of about 2,000 species of the native flora, and the undertaking of research into its biology, conservation and propagation, especially of rare and endangered plants. About two-thirds of Kings Park is still native bushland, scarred in places by the extraction of timber, firewood and kindling by the early settlers, and subsequent weed invasion and too frequent



The Vietnam Memorial Pavilion was formerly the Karrakatta Cemetery Chapel Pavilion erected in 1899. The Australian Vietnam Forces Memorial Fund of Western Australia raised the necessary finance and sponsorship for its transfer to and reconstruction in the children's playground, Kings Park.

*Photograph:* Kings Park Board

bushfires. Nevertheless the resilience of the indigenous vegetation and active rehabilitation programs have combined to make Kings Park a remnant nature reserve unique in its proximity to a capital city.

The Kings Park Guides are volunteers who give their time to operate an information centre and to lead walks through Kings Park and the Botanic Garden to share its many interesting aspects with tourists and other visitors.

## Perth Zoological Gardens

In South Perth, close to the Swan River, 15 hectares are set aside for Perth Zoo. Set in landscaped gardens, and boasting Australia's most comprehensive display of rare palms, the Zoo is a popular tourist attraction having the highest visitation rate per capita of any zoo in Australia.

Perth Zoo cares for the State's largest and most complete collection of Australian animals, as well as an extensive collection of exotic species. During the year ending 30 June 1989, this amounted to over 1,500 animals; 535 specimens in 38 families of mammals; 816 specimens in 46 families of birds; 175 specimens in 11 families of reptiles and a further 58 specimens of amphibians, fish and molluscs.

The Zoo is administered by the Zoological Gardens Board and is recognised internationally as a successful haven for many endangered species. It has adopted the fundamental objective of 'contributing to the development of positive attitudes towards wildlife and the conservation of life on earth'. Recent and future developments have all been designed with this in mind, and conservation education in Western Australia.

The rehousing of animals in naturalistic enclosures, the building of an educational complex (the Bicentennial Education Centre) and the addition of two new attractions (the Conservation Discovery Centre and Microworld, which opens in 1990), all underline the Zoo's primary conservation role. These new attractions will use electronic devices and 'state of the art' technology to provide learning experiences quite different from those traditionally associated with zoos.

During 1990 a new East African exhibit will open. Described as the best and most advanced of its kind in the world, this exhibit will give visitors the experience of walking through an African savannah surrounded by free ranging animals.

Also opening in 1990 will be a large new Children's Zoo designed as a Western Australian farm. Complementing the existing Australian Wildlife Park with its koala and wombat exhibits, the Children's Zoo will provide opportunities for animal contact and education.

Other principal attractions are the nocturnal house, otter and bear enclosures, lemur and gibbon islands, the water bird lakes, shady picnic areas and the new numbat enclosure which is the only place in the world where numbats, the Western Australian faunal emblem, can be seen on display.

Perth Zoo opens to the public every day of the year. During the year ended 30 June 1989, some 518,532 visitors took advantage of this opportunity. The Zoo has a permanent staff of one hundred. A further hundred and twenty trained volunteers, called Docents, liaise with the public and provide guided tours on request.

#### **Rottneest Island**

The Rottneest Island Authority administers, as a tourist and holiday resort, a reserve of 1,930 hectares comprising almost the whole of Rottneest Island, which is situated about eighteen kilometres west of Fremantle.

During the year ended 30 June 1989, 295,753 persons visited the Island by the daily commercial air and sea transport services.

#### **LOCAL GOVERNMENT RESERVES**

Many local authorities hold land for recreational purposes, the areas having been either Crown land vested in the Council, acquired by purchase, or received under private bequest. Included in these local government reserves are areas required to be surrendered to the Crown by private owners to provide recreation areas where land is divided into private residential lots. The reserves are frequently developed as public parks or to provide facilities for sports or camping.

#### **MINISTRY OF SPORT AND RECREATION**

Throughout the State, the Ministry works closely with all levels of government and communities to influence the planning and provision of leisure needs. To assist this work, there are specialist branches relating to sport, facility development, outdoor recreation and active recreation programs involving all population groups. A comprehensive regional network ensures provision of services in many country locations.

The Ministry makes recommendations concerning Sports Lottery funds and other government grants to local government authorities and community groups for capital works; special development projects; for training courses for coaches, leaders, officials and administrators; salary subsidies to sporting associations; travel subsidies for selected persons travelling to national championships; hosting national and international championships and regional games; single and multi-sport camps; innovative projects; resource development and long-term sports development plans.

**TABLE 11.7 - NUMBER OF PARTICIPANTS IN  
RECREATION AND SPORTING PROGRAMS FOR  
OVER 50s : 1988-89**

<i>Program</i>	<i>Number</i>
Walking	6,000
Swimming	1,200
Archery	500
Cycling	400
Canoeing	100
Camping	350
Triathlons	220
Ballroom dancing	1,500
Dragon Boat racing	50
Carpet bowls	250
Gliding	250
Abseiling	150
Various sports/lifestyle groups	450
<b>Total</b>	<b>11,420</b>

The Ministry conducts training courses, education programs and seminars for people working in a voluntary capacity in sport and recreation. A number of services which relate specifically to sport are also conducted. Of particular significance is the Coaching Accreditation Scheme which trains up to 600 sports coaches in Western Australia each year.

The Ministry also works closely with a wide range of community based agencies and individuals serving the needs of the community. High priority is placed on equality of access to recreational opportunities. A number of activity programs, seminars, courses and information services have been initiated which aim at improving the recreational opportunities and choices of the elderly, those with disabilities and young people.

The Ministry manages a chain of twelve campsites, which are available for hire by schools, churches, community organisations and individuals.

**TABLE 11.8 – USERS OF CAMPSITES MANAGED BY  
MINISTRY : 1988-89**

<i>Users</i>	<i>Per cent</i>
Primary schools	8.3
Secondary schools	9.9
Sporting groups	8.1
Community groups	9.3
Church groups	3.5
Ministry of Sport and Recreation	1.7
Other Government authorities	3.5
Families and unspecified	55.7

**TABLE 11.9 – TYPES OF CAMPSITE  
ACCOMMODATION : 1988-89**

	<i>Persons</i>
Dormitories (self catered)	22,752
Dormitories (catered)	9,055
Cottages	11,402
Conference/accommodation centres	11,473
<b>Total</b>	<b>54,682</b>

## Chapter 12

### WATER

Of the inhabited continents, Australia has the lowest average rainfall and the highest proportion of rainfall that is lost back to the atmosphere through evaporation and transpiration. Western Australia's average annual rainfall is 310mm compared with the Australian average of 420mm, and the average annual run-off from this western third of the continent is only eleven per cent of the nation's total.

#### WATER RESOURCES

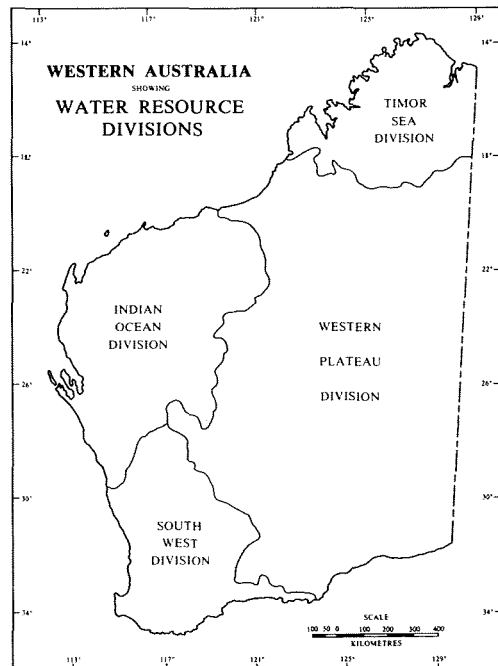
The amount of usable surface and groundwater resources available in each of the drainage divisions of Western Australia is shown in Table 12.1. These divisions, which are based on surface water hydrological boundaries, are shown in Diagram 12.1.

Eighty-six per cent of the State's fresh/marginal water resources (on a sustainable yield basis) are surface water and fourteen per cent are groundwater. The majority of the resources, seventy-three per cent of the State's total, are in the Timor Sea Division. The next most abundantly endowed division is the South-West, with twenty-two per cent of the State's potable resources. The remaining five per cent of divertible potable resources are in the Indian Ocean Division and the Western Plateau Division.

**TABLE 12.1 – DIVERTIBLE SURFACE AND GROUNDWATER RESOURCES**  
(million cubic metres per annum)

Drainage division	Surface	Ground-water	Total
South-West	1,860	876	2,735
Indian Ocean	285	262	546
Timor Sea	8,660	523	9,183
Western Plateau	1	155	156
<b>Total</b>	<b>10,806</b>	<b>1,815</b>	<b>12,620</b>

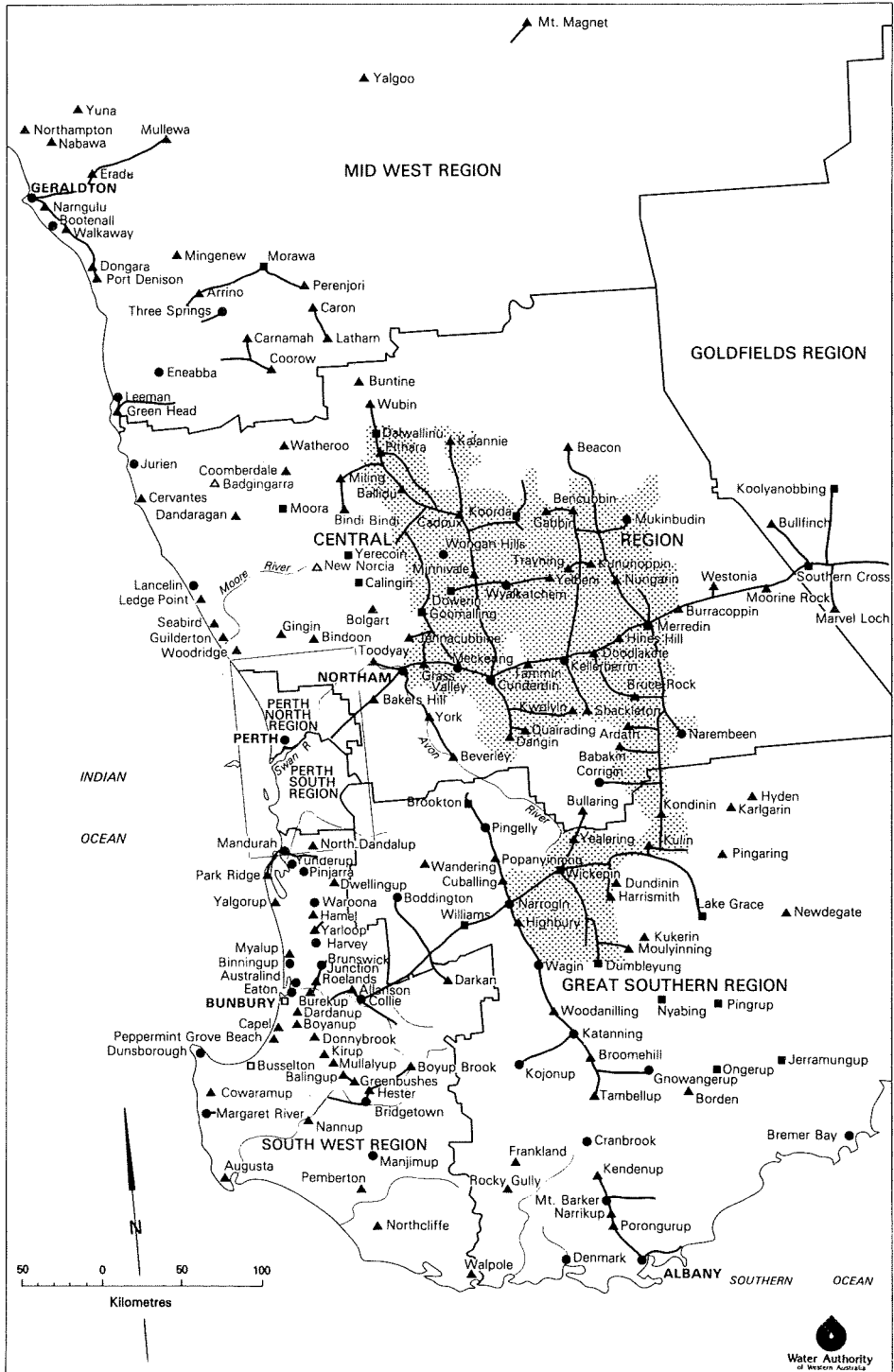
DIAGRAM 12.1



#### WATER AUTHORITY OF WESTERN AUSTRALIA

The Water Authority of Western Australia controls the majority of water-related services in Western Australia.

DIAGRAM 12.2  
MAJOR WATER SUPPLY REGIONS, WESTERN AUSTRALIA  
AT 30 JUNE 1989

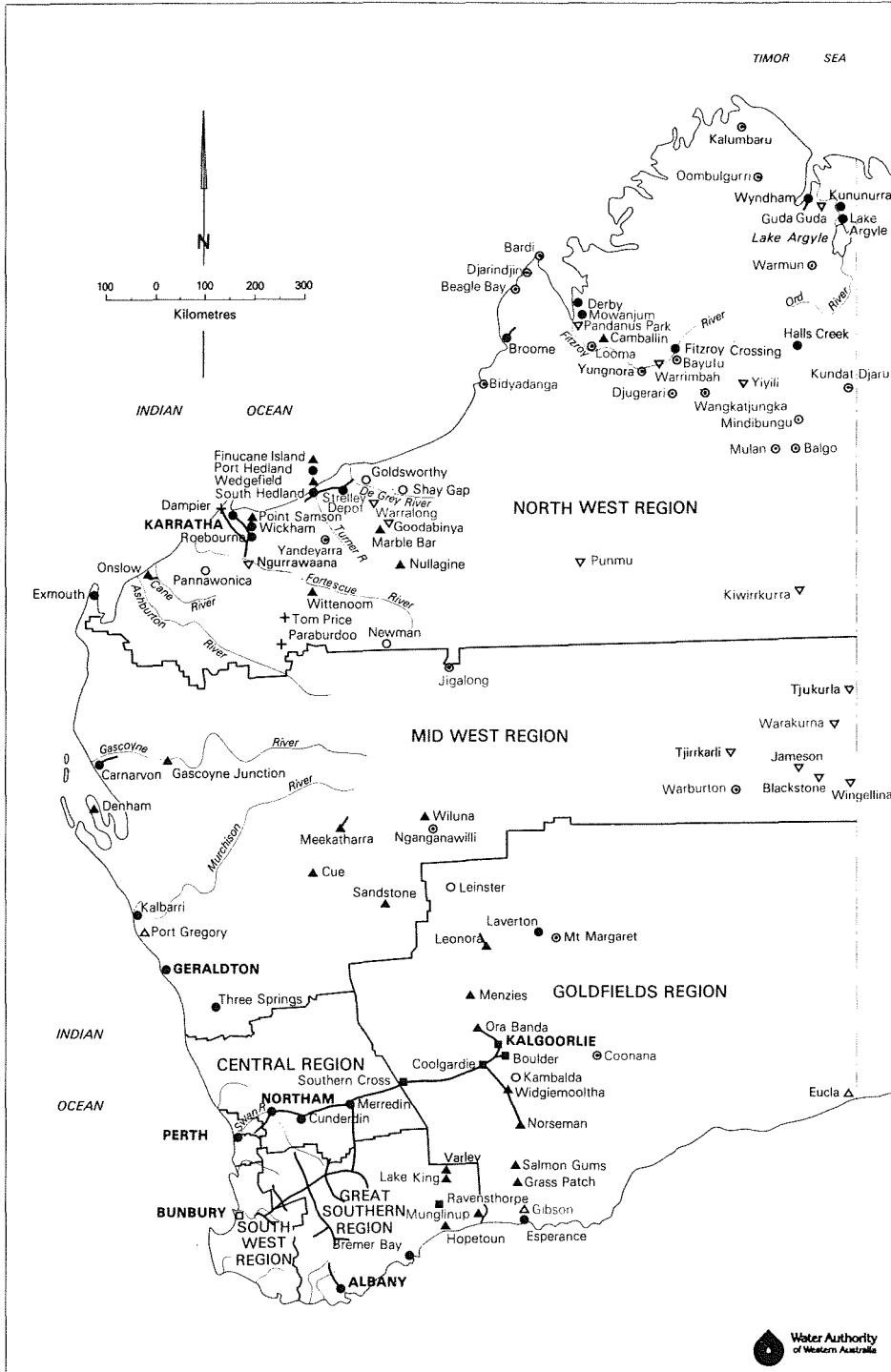


- |  |   |   |   |
|--|---|---|---|
| Water Authority of W.A. Water Supply                           | ▲ | Water Authority of W.A. and Other Authority Water Supply and Sewerage | + |
| Water Authority of W.A. Water Supply and Sewerage              | ● | Other Authority Water Supply  | △ |
| Water Authority of W.A. Water Supply, Other Authority Sewerage | ■ | Other Authority Water Supply and Sewerage                             | ○ |
| Water Authority of W.A. Sewerage, Other Authority Water Supply | □ | Regional Centre   | ○ |
| Farmlands Reticulation   | ▨ | Main Water Pipeline   | — |

BUNBURY



DIAGRAM 12.2  
MAJOR WATER SUPPLY REGIONS, WESTERN AUSTRALIA  
AT 30 JUNE 1990

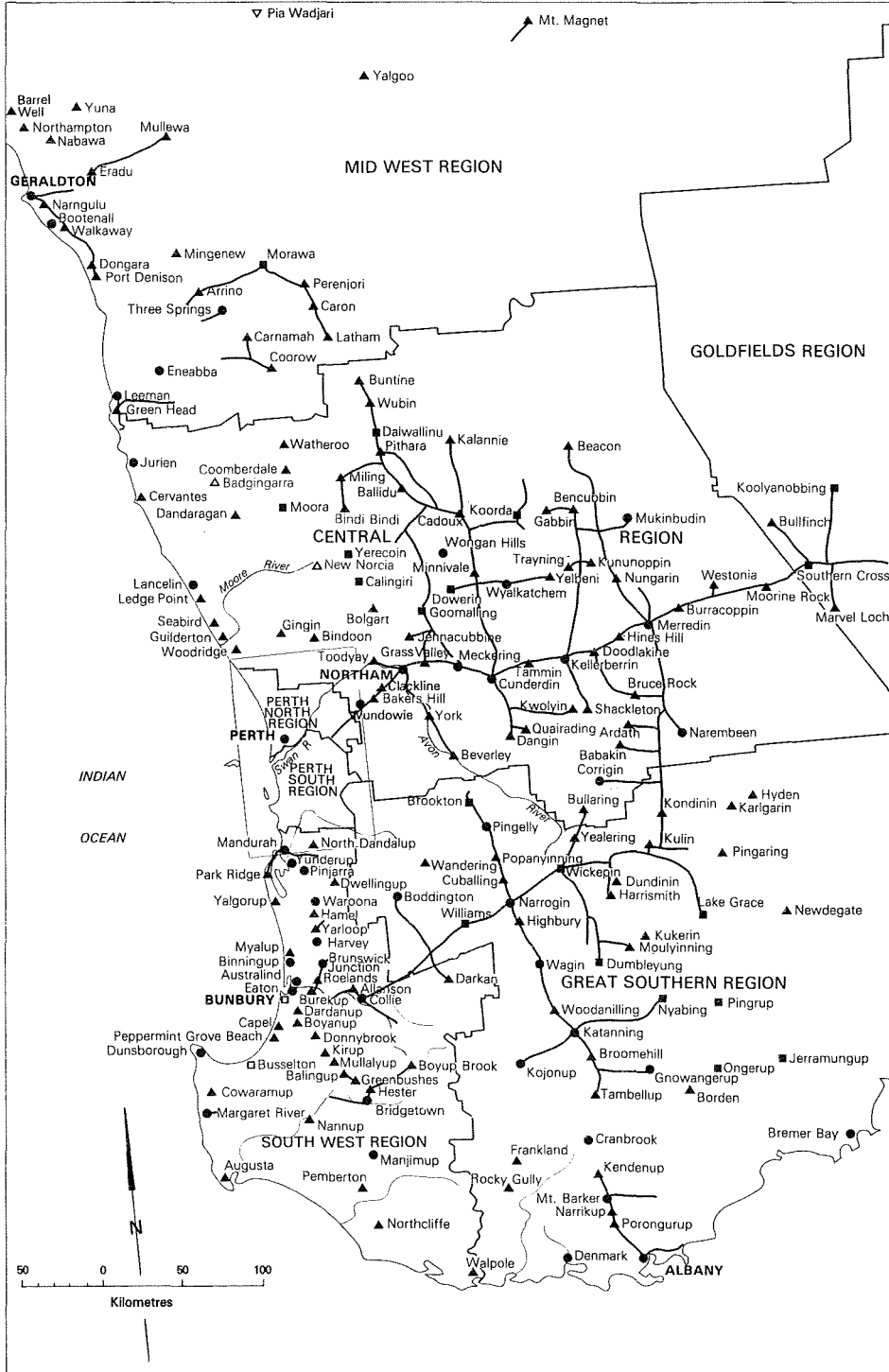


- |   |  |
|---|--|
| ▲ Water Authority of W.A. Water Supply                                  | ○ Other Authority Water Supply and Sewerage            |
| ● Water Authority of W.A. Water Supply and Sewerage                     | ▽ Major Aboriginal Community Water Supply              |
| ■ Water Authority of W.A. Water Supply, Other Authority Sewerage        | ⊙ Major Aboriginal Community Water Supply and Sewerage |
| □ Water Authority of W.A. Sewerage, Other Authority Water Supply        |  |
| + Water Authority of W.A. and Other Authority Water Supply and Sewerage |  |
| △ Other Authority Water Supply  |  |
- PERTH Regional Centre  
 — Main Water Pipeline  
 — Region Boundary





DIAGRAM 12.3  
MAJOR WATER SUPPLY REGIONS, SOUTH WEST OF WESTERN AUSTRALIA  
AT 30 JUNE 1989



- ▲ Water Authority of W.A. Water Supply
- Water Authority of W.A. Water Supply and Sewerage
- Water Authority of W.A. Water Supply, Other Authority Sewerage
- Water Authority of W.A. Sewerage, Other Authority Water Supply
- + Water Authority of W.A. and Other Authority Water Supply and Sewerage
- Other Authority Water Supply and Sewerage
- △ Other Authority Water Supply
- Farmlands Reticulation
- PERTH Regional Centre
- Main Water Pipeline

It is responsible for the following water-related services: water supply in the Perth metropolitan area and the majority of country towns; water resources assessment and management throughout the State; Government irrigation schemes; sewerage schemes in the Perth metropolitan area and several country towns; major drains in the Perth metropolitan area and drainage in several country areas.

### WATER SUPPLY

Western Australia has a great variation in the size and complexity of water supply schemes, which range from town schemes serving fewer than 100 people to the Perth metropolitan scheme servicing a population of more than one million.

TABLE 12.2 - DAMS AND RESERVOIRS - STORAGE CAPACITY (a)  
(\*000 kilolitres)

Dam or reservoir	Storage capacity
Big Brook Dam	700
Canning Reservoir	90,500
Churchman Brook Reservoir	2,200
Drakes Brook Dam	2,290
Fitzroy Dam	4,650
Glen Mervyn Dam	1,490
Harding Dam	63,800
Harvey Weir	9,126
Kununurra Diversion Dam (b)	97,400
Logue Brook Dam	24,300
Mundaring Weir	77,000
North Dandalup Pipehead Dam	(c)
Ord River Dam (Lake Argyle)	5,797,000
Samson Brook Dam	9,170
Serpentine Pipehead Reservoir	2,640
Serpentine Reservoir	194,500
17-Mile Dam (d)	5,489
South Dandalup Reservoir	208,000
Stirling Dam	56,123
Victoria Reservoir	860
Waroona Dam	14,954
Wellington Dam	184,900
Wungong Reservoir	60,000

(a) At 30 June 1987. (b) Ord River Diversion Dam. (c) Diversion weir only.  
(d) On Uralla Creek, an anabranch of the Fitzroy River.

Considerable use is made of groundwater by individual farmers, pastoralists, market gardeners and others and it is estimated that over 92,000 bores are in use in the State. The quality of water is variable and much of it is too saline for irrigation or even for stock. Both artesian and non-artesian sources are used to supply or augment the supplies of numerous towns, including such major centres as Perth, Albany, Bunbury, Busselton, Carnarvon, Dampier,

Esperance, Exmouth, Geraldton, Karratha and Port Hedland. In a number of ports and mining towns in the north-west mining companies are responsible for the provision of their own water supplies.

Industries also use groundwater in substantial quantities, particularly in the processing of titanium, iron and alumina. Recent mineral discoveries in several areas have given rise to very large demands for water, the search for which has had to be intensified. Marked advances in the knowledge of aquifers and quality of water in the main sedimentary basin have been made as a result of extensive geological surveys and exploratory drilling by the Geological Survey (a branch of the Department of Mines), several oil companies, and the Water Authority.

### Perth Metropolitan Water Supplies

The sources of the metropolitan water supply are South Dandalup Reservoir, Serpentine Reservoir and Pipehead Reservoir, Canning Reservoir, Wungong Reservoir, Churchman Brook Reservoir, Victoria Reservoir, North Dandalup Pipehead Dam, groundwater from the shallow unconfined aquifers of the Swan Coastal Plain and artesian water from the deep confined aquifers. The supply from these sources is supplemented as necessary from a pipeline link with Mundaring Weir.

TABLE 12.3 - METROPOLITAN WATER SUPPLY QUANTITIES OF WATER DRAWN  
(\*000 kilolitres)

Source	1986-87	1987-88	1988-89
Canning Reservoir	24,670	22,148	38,313
Churchman Brook Reservoir	1,841	2,952	5,166
Mundaring Weir	885	920	7,253
North Dandalup Pipehead Dam	8,735	8,969	15,567
Serpentine and Serpentine Pipehead Reservoirs	45,686	52,518	20,432
South Dandalup Reservoir	20,466	18,334	12,623
Victoria Reservoir	2,904	3,362	4,193
Wungong Reservoir	17,680	21,344	17,727
<b>Total hills sources output</b>	<b>122,867</b>	<b>125,169</b>	<b>121,274</b>
<b>Total groundwater output</b>	<b>69,568</b>	<b>73,274</b>	<b>79,743</b>
Gross output	192,435	198,443	201,017
Less output to Mandurah	3,632	4,015	4,602
<b>Output to Metropolitan Area</b>	<b>188,803</b>	<b>194,428</b>	<b>196,415</b>

Water from storages in the Darling Range is conveyed to the metropolitan area by the Canning Tunnel, the Wungong Tunnel, and large trunk

mains. It is then distributed by feeder, distribution and reticulation mains, either directly from the trunk main or from large storage service reservoirs at Mount Yokine, Mount Eliza, Bold Park, Mount Hawthorn, Richmond, Melville, Buckland Hill, Hamilton Hill, Thompson Lake, Greenmount, Mirrabooka, Wanneroo, Whitfords and Tamworth Hill and from summit tanks and water towers situated at high points throughout the area supplied. The Canning and Wungong Tunnels are designed to help meet the peak summer demand for water by producing high capacity links to Canning Dam and Wungong Reservoir respectively. In addition, groundwater is distributed, after treatment, into the supply system. The groundwater is treated at water treatment plants situated at Gwelup, Mirrabooka, Wanneroo and Jandakot.

TABLE 12.4 - METROPOLITAN WATER SUPPLY

	1986-87	1987-88	1988-89
Number of services	353,604	368,389	368,435
Length of water mains (kilometres)	8,955	9,396	9,735
Water supplied ('000 kilolitres)	187,472	191,645	194,266

### Country Water Supplies

The Water Authority is responsible for all town water supply schemes in the country towns of Western Australia, with the exception of the Bunbury, Busselton and Harvey schemes which are run by local Water Boards. There are also a small number of town water supply schemes operated by mining companies. Individual water supplies serve railways, timber mill towns, isolated mines, pastoral properties, stock routes and agricultural areas, mainly from dams, tanks, wells and bores.

In country areas total control has been exercised on groundwater usage in Broome, Gascoyne, Swan and South-West coastal groundwater areas. The control of other areas has been tailored to specific problems which are known to exist.

**Great Southern Towns Water Supply.** This scheme provides water to the coal mining town of Collie, together with towns and farmlands in the Great Southern Area. Water is drawn from Wellington Dam, and is supplied to towns from Brookton and Kondinin in the north to Kojonup and Gnowangerup in the south. It also supplies 600,000 hectares of farmland.

TABLE 12.5 - GREAT SOUTHERN TOWNS WATER SUPPLY

Item	1986-87	1987-88	1988-89
Number of services	13,972	13,691	13,914
Length of water mains (kilometres)	2,362	2,320	2,333
Water supplied ('000 kilolitres)	7,082	7,326	6,196

**Goldfields and Agricultural Areas Water Supply.** This scheme provides water to consumers in the Central agricultural areas and eastern Goldfields. Water is supplied to 93 towns and to 2,650,000 hectares of farmland in the central and north-eastern wheatbelt. Water is pumped from Mundaring Weir on the Helena River, augmented by the Lower Helena Pipehead Dam and supplemented by the metropolitan system when necessary. The main pipeline between Mundaring and Kalgoorlie is 554 kilometres long, with eighteen pumping stations and extensions to country towns and agricultural areas at several points.

TABLE 12.6 - GOLDFIELDS AND AGRICULTURAL AREAS WATER SUPPLY

	1986-87	1987-88	1988-89
Number of services	30,187	30,774	31,175
Length of water mains (kilometres)	8,384	8,138	7,981
Water supplied ('000 kilolitres)	23,175	25,637	27,421

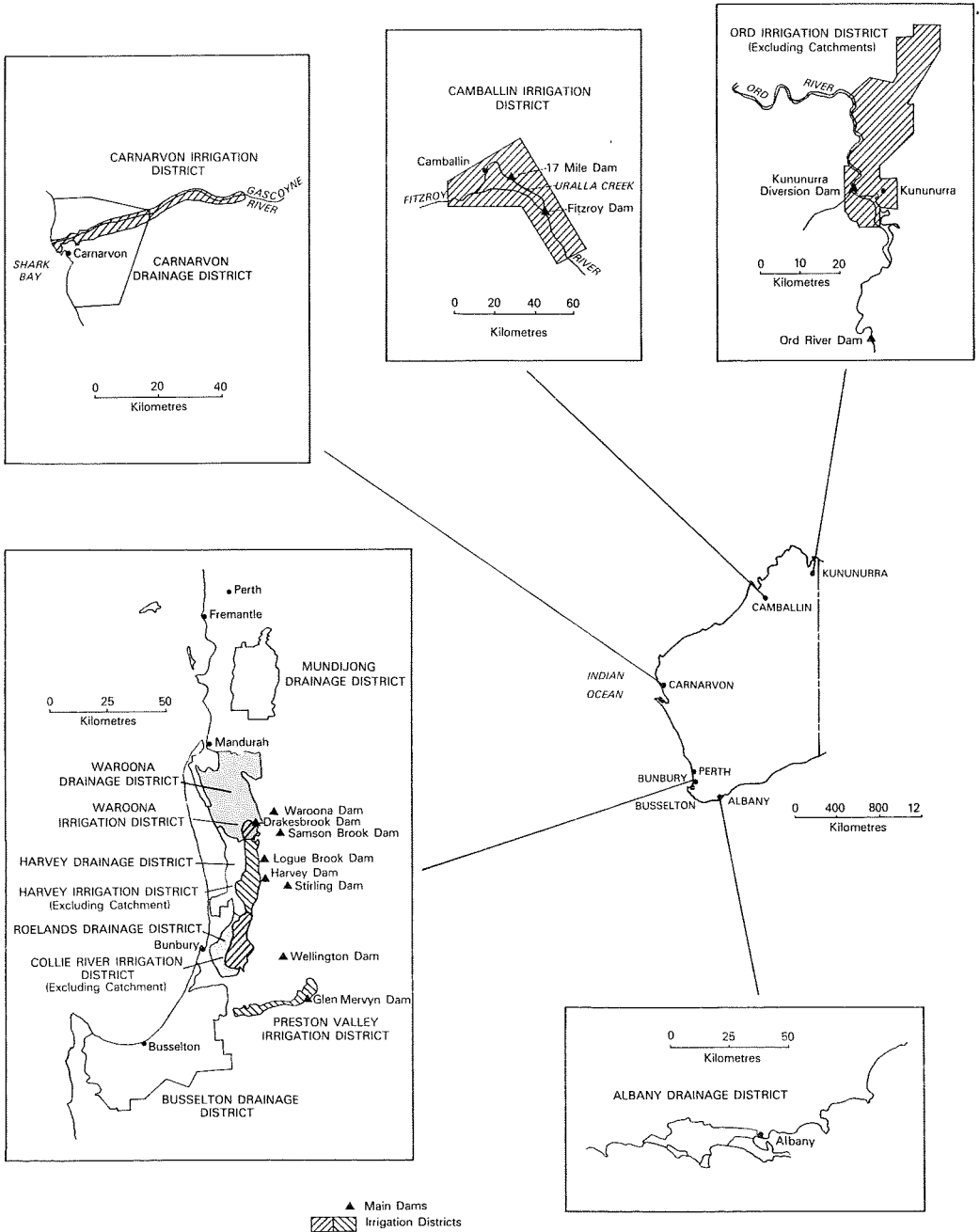
### Local and Regional Schemes

#### Lower Great Southern Towns Water Supply.

This scheme supplies the towns of Albany, Mount Barker and Kendenup. Water is drawn from three sources: Two Peoples Bay east of Albany (the water from which is treated for colour removal), Limeburners's Creek, and bores which are located on the west of Princess Royal Harbour.

**Mandurah Regional Supply.** This scheme provides water to the town of Mandurah, plus the localities of Yunderup, Furnissdale, Ravenswood, Riverside Gardens and Coodanup (located east of Mandurah), together with Erskine, Falcon, Avalon,

DIAGRAM 12.4  
IRRIGATION AND DRAINAGE DISTRICTS  
AT 30 JUNE 1989



Wannanup, Placid Waters, Florida, Melros and Dawesville (located south of Mandurah).

Approximately 90 per cent of the water consumed is supplied by gravity from the South Dandalup Dam with the remainder being injected into the supply main from bores at Ravenswood. At present the scheme supplies some 10,000 services and is the most rapidly growing scheme in the State.

**Geraldton Regional Water Supply.** The Geraldton Regional Water Supply serves consumers in the towns of Geraldton, Dongara, Port Denison, Mullewa, Walkaway, Drummonds Cove, Eradu and Nangulu with water being drawn from the Wicherina, Allanooka and Wye Springs borefields.

**Port Hedland Regional Water Supply.** The Port Hedland Regional Water Supply provides water for the consumers of Port Hedland, Finucane Island and South Hedland from the complementary De Grey and Yule River borefields.

**West Pilbara Water Supply.** The West Pilbara Water Supply serves the towns of Dampier, Karratha, Wickham and Point Samson, and also the industrial complexes at Dampier, the Burrup Peninsula and Cape Lambert in the north of the State. Water is drawn from the Harding Dam in conjunction with the Millstream aquifer.

**Supplies to other Country Towns.** One hundred and eight towns are supplied with water from stream flow, dams, tanks, wells and bores, the schemes being administered under the provisions of the Country Areas Water Supply Act 1947.

The Water Authority is also responsible for the provision and maintenance of tanks and wells as a source of cartage water for a number of small communities in gold mining and agricultural areas.

**Aboriginal Communities.** The Water Authorities involvement with Aboriginal communities throughout the State continues at a high level. Four coordinators at Kununurra, Port Hedland, Kalgoorlie and Geraldton operate in conjunction, with overall coordination by officers in Karratha.

During 1988-89 water supply and sewerage facilities were constructed at thirty-five Aboriginal communities at a cost of \$2 million, jointly funded by the Commonwealth and the State. In addition, \$1 million was spent on the maintenance of facilities at thirty-eight communities. Investigations were carried out at a cost of \$0.5

million to assess the potential for supplying groundwater to a further twenty-three communities throughout the State.

TABLE 12.7 - OTHER REGIONAL SCHEMES

	1986-87	1987-88	1988-89
Number of services	74,742	74,994	80,299
Length of water mains (kilometres)	3,913	4,124	3,993
Water supplied ('000 kilolitres)	55,415	57,929	57,867

Eight emerging communities were equipped with solar-powered water supply systems in 1988-89. The increasing number and remoteness of these communities requires reliable low maintenance installations. This move towards solar technology will help improve efficiency in the future.

#### Water Resources Assessment and Management

The Water Authority, in conjunction with the Western Australian Water Resources Council, is responsible for the assessment and management of water resources in Western Australia.

**Supply and Development.** The Authority is responsible for the evaluation, measurement and general management of surface and groundwater resources, including research, investigation and hydrological studies.

**Water Quality.** The Authority monitors and controls salinity and contamination of water supplies by an extensive sampling and treatment program. It also monitors land use management in catchment areas, particularly in relation to bauxite mining and forest management.

#### IRRIGATION SCHEMES

Irrigation activities conducted by the Water Authority are restricted to designated schemes within the North-West, Mid-West and South-West Regions.

Water entitlements vary between schemes. The Ord River Scheme at Kununurra in the North-West Region provides virtually an open water entitlement owing to the small scope of the existing irrigation area in relation to the potential capacity of the scheme. Water is used throughout the year from surface storage.

All other schemes limit water entitlement in relation to the rated irrigable land of each irrigation. Water entitlements vary according to seasonal factors and water availability.

Schemes in the South-West Region, at Waroona, Harvey, Collie River and Preston Valley, provide water only during the summer months from surface storages replenished over the preceding winter. Entitlements vary between schemes and between sub-areas of schemes depending on available storages.

The Gascoyne scheme at Carnarvon in the Mid-West Region provides water throughout the year from underground sources beneath the Gascoyne riverbed. Irrigators supplement the scheme supply from their own underground sources. Use of water from all sources is limited by individual entitlements which vary between seasons within each year. Entitlements are affected by the length of time since underground aquifers were last replenished by a river flow.

TABLE 12.8 - IRRIGATION

	1986-87	1987-88	1988-89
Length of channels and drains (kilometres)	999	890	911
Assessments (number)	1,276	1,382	1,556
Area irrigated (hectares)	22,679	18,929	18,050
Water consumed ('000 kilolitres)	195,000	148,279	215,816

## DRAINAGE

The Water Authority is responsible for the provision of a number of drainage and drainage-related services throughout Western Australia.

It is responsible for the preparation and implementation of an arterial drainage scheme for the metropolitan area, whereby it receives surplus water from local drainage systems into controlled main drains and disposes of it through outlets to the sea or rivers, or by groundwater recharge where practicable. This scheme provides a means of coordinating the Water Authority's drainage planning activities with those of local authorities, particularly for potential areas of new land development.

The Water Authority operates and maintains proclaimed Drainage Districts, which are mainly located on the coastal plain south of Perth between

Wungong/Serpentine and Busselton. Other declared Drainage Districts are between Denmark and Albany, and at Carnarvon. Many of these drainage districts are an inseparable adjunct to irrigation schemes on the coastal plain. Local authorities are responsible for drainage activities in other areas.

Advice on flood plain management and river improvement matters is provided by the Water Authority. This involves performing flood studies in order to identify and assess flood-prone areas of the State. This service has received increased attention in recent years.

## SEWERAGE SCHEMES

The Water Authority aims to ensure the effective collection, conveyance, treatment and disposal of waste-water and industrial waste so as to safeguard community health and protect the environment.

### Metropolitan Sewerage

The Water Authority operates five major waste-water treatment plants throughout the metropolitan area.

Over ninety-eight per cent of the treated effluent from these plants is discharged to the ocean where it is diluted and dispersed by currents and wave action. The remainder is discharged to effluent soakage basins for land disposal.

TABLE 12.9 - METROPOLITAN SEWERAGE SYSTEMS

	1986-87	1987-88	1988-89
Number of sewered assessments	289,499	303,640	320,113
Length of sewers (kilometres)	4,872	5,088	5,352

### Country Towns Sewerage

At 30 June 1988 the Water Authority operated sixty-three town sewerage schemes throughout the country areas of Western Australia. In addition, a further twenty-three sewerage schemes are operated by local government authorities under provisions of the Health Act, and a number by major mining companies in towns established to service mining operations. Several other local government authorities have reached an advanced stage of planning to commence schemes in future years.

TABLE 12.10 – COUNTRY SEWERAGE SYSTEMS

	1986-87	1987-88	1988-89
Number of towns sewered	61	63	65
Length of sewers (kilometres)	1,408	1,466	1,514
Number of services	58,059	59,641	62,525

## REFERENCES

Water Authority of Western Australia, *Annual Report 1989*.

Western Australian Water Resources Council, *Water Resource Perspectives Western Australia; Report No. 2 — Water Resources and Water Use*.

## Chapter 13

# AGRICULTURE, FORESTRY AND FISHING

## Agriculture

### INTEGRATED AGRICULTURAL STATISTICS

The principal source of statistics relating to the agricultural sector is the Integrated Agricultural Commodity Census, which is conducted annually by the ABS. Units (establishments)

included in the census are defined and classified in accordance with the Australian Standard Industrial Classification (ASIC).

**TABLE 13.1 – NUMBER OF ESTABLISHMENTS WITH AGRICULTURAL ACTIVITY  
INDUSTRY AND ESTIMATED VALUE OF AGRICULTURAL OPERATIONS: 1988-89**

*Reference : Catalogue No. 7102.0*

Industry of establishment ASIC code	Description	Estimated value of agricultural operations (\$'000)					Total	
		Less than 20	20- 49	50- 99	100- 199	200- 499		500 and over
0124	Poultry for meat	-	-	3	24	18	5	50
0125	Poultry for eggs	-	8	12	15	33	25	93
0134	Grapes	16	61	31	12	1	3	124
0135	Plantation fruit	2	26	55	32	6	-	121
0136	Orchard and other fruit	48	121	100	87	34	9	399
0143	Potatoes	4	12	26	49	47	9	147
0144	Vegetables (except potatoes)	22	118	111	94	56	24	425
0181	Cereal grain (incl. oil seeds)	11	30	53	104	290	215	703
0182	Sheep - cereal grains	4	58	333	1,392	2,359	707	4,853
0183	Meat cattle - cereal grains	-	3	-	7	-	2	12
0184	Sheep - meat cattle	20	129	171	141	77	18	556
0185	Sheep	82	416	727	1,151	1,058	205	3,639
0186	Meat cattle	120	426	221	100	82	37	986
0187	Milk cattle	8	29	136	266	81	5	525
0188	Pigs	5	23	24	37	34	16	139
0191	Sugar cane	-	-	-	-	-	-	-
0192	Peanuts	-	-	2	-	-	-	2
0193	Tobacco	-	-	-	-	-	-	-
0194	Cotton	-	-	-	-	-	-	-
0195	Nurseries	17	40	55	60	22	17	211
0196	Agriculture n.e.c.	32	82	70	33	13	1	231
01	<i>Total agriculture</i>	<i>391</i>	<i>1,582</i>	<i>2,130</i>	<i>3,604</i>	<i>4,211</i>	<i>1,298</i>	<i>13,216</i>
..	<i>Other industries</i>	<i>19</i>	<i>45</i>	<i>47</i>	<i>28</i>	<i>16</i>	<i>2</i>	<i>157</i>
..	<b>Total all industries</b>	<b>410</b>	<b>1,627</b>	<b>2,177</b>	<b>3,632</b>	<b>4,227</b>	<b>1,300</b>	<b>13,373</b>



While no financial data are collected in the census, an 'estimated value of agricultural operations' (EVAO) is calculated for each establishment by applying unit values to reported production and/or stock data. This procedure enables establishments in the census to be classified according to industry (ASIC) and also according to size of operations.

Since 1976-77, small establishments have been excluded from the census, to reduce ABS processing costs and minimise respondent burden. From 1976-77 to 1980-81 an EVAO cut-off of \$1,500 was used. The cut-off was raised to \$2,500 in 1981-82, and further raised to \$20,000 in 1986-87.

TABLE 13.2 - NUMBER OF ESTABLISHMENTS WITH AGRICULTURAL ACTIVITY  
INDUSTRY AND AREA OF ESTABLISHMENT: 1988-89

Reference : Catalogue No. 7102.0

Industry of establishment		Area of establishment (hectares)					Total
		0-49	50-499	500-2,499	2,500-9,999	10,000-99,999 and over	
ASIC code	Description						
0124	Poultry for meat	48	2	-	-	-	50
0125	Poultry for eggs	81	12	-	-	-	93
0134	Grapes	99	24	1	-	-	124
0135	Plantation fruit	117	2	2	-	-	121
0136	Orchard and other fruit	268	129	2	-	-	399
0143	Potatoes	29	103	15	-	-	147
0144	Vegetables (except potatoes)	333	85	6	-	1	425
0181	Cereal grains (incl. oilseeds n.e.c.)	1	41	342	309	10	703
0182	Sheep - cereal grains	-	164	3,182	1,463	44	4,853
0183	Meat cattle - cereal grains	-	3	8	1	-	12
0184	Sheep - meat cattle	3	293	217	22	3	556
0185	Sheep	33	914	2,143	296	70	3,639
0186	Meat cattle	24	647	151	14	10	986
0187	Milk cattle	10	452	63	-	-	525
0188	Pigs	36	65	35	2	1	139
0191	Sugar cane	-	-	-	-	-	-
0192	Peanuts	-	1	1	-	-	2
0193	Tobacco	-	-	-	-	-	-
0194	Cotton	-	-	-	-	-	-
0195	Nurseries	176	24	11	-	-	211
0196	Agriculture n.e.c.	106	112	12	1	-	231
01	Total agriculture	1,364	3,073	6,191	2,108	138	13,216
..	Other industries	50	64	32	5	1	157
..	Total all industries	1,414	3,137	6,223	2,113	139	13,373

TABLE 13.3 - FINANCIAL STATISTICS,  
AGRICULTURAL ENTERPRISES  
(\$ million)

Reference : Catalogue No. 7507

The effect of the pre-1986-87 cut-offs on statistics, other than counts of establishments, is minimal. The \$20,000 cut-off applying from 1986-87 does have a significant effect on some items, and estimates of the under coverage are available from the ABS.

Statistics on the financial performance of the agricultural sector are obtained from the Agricultural Finance Survey, which has been conducted periodically by the ABS. This survey, which provides estimates of turnover, expenditure, cash operating surplus, capital expenditure and indebtedness was recommenced on an annual basis from 1986-87. Detailed definitions and explanatory notes about the survey are published in the bulletin *Agricultural Industries, Financial Statistics, Australia* (Catalogue No. 7507.0).

	1986-87r	1987-88
Sales of crops	1,179.0	1,069.9
Sales of livestock	445.9	405.7
Sales of livestock products	703.3	1,088.9
Turnover	2,535.7	2,705.2
Purchases and selected expenses	1,418.9	1,475.5
Value added	1,303.9	1,408.5
Adjusted value added	1,157.5	1,266.2
Gross operating surplus	996.5	1,064.9
Total interest paid	255.1	205.6
Cash operating surplus	570.6	729.0
Total value of assets	10,412.0	12,491.6
Gross indebtedness	1,834.8	1,557.0
Net indebtedness	1,193.3	707.3
Number of enterprises	11,748	11,070

### VALUE OF AGRICULTURAL COMMODITIES PRODUCED

**TABLE 13.4 – GROSS VALUES, MARKETING COSTS  
AND LOCAL VALUES OF AGRICULTURAL  
COMMODITIES**  
(\$ million)

Reference: Catalogue No. 7502.5

	1986-87r	1987-88	1988-89
<b>Crops and pastures—</b>			
Gross value of production	1,339.0	1211.4	1,739.4
Marketing costs	209.7	r167.4	235.6
Local value of production	1,129.3	1,044.1	1,503.8
<b>Livestock slaughterings and other disposals—</b>			
Gross value of production	409.4	435.5	424.8
Marketing costs	35.9	35.5	39.0
Local value of production	373.5	400.0	385.9
<b>Livestock products—</b>			
Gross value of production	806.2	1,347.4	1,506.4
Marketing costs	32.5	33.9	39.0
Local value of production	773.7	1,313.5	1,467.4
<b>Total agriculture—</b>			
Gross value of production	2,554.7	2,994.3	3,670.7
Marketing costs	278.1	r236.8	313.5
Local value of production	2,276.6	2,757.6	3,357.1

For agricultural production the gross value is based on the wholesale price realised in the market place. Where commodities are consumed at the place of production or where they become raw material for secondary industry within the State, these points of consumption are taken as the market places.

The local value is the value at the place of production and is obtained by deducting marketing costs from the gross value. Marketing costs comprise freight, cost of containers, commission, and other charges incurred in marketing. Gross values provide a reliable measure of the value of production of any particular commodity or group but when comparing or combining values for agricultural industries with those for secondary industries the value added series of financial statistics from the Agricultural Finance Survey should be used.

Wool (including fellmongered and exported on skins) was the most important item in 1988-89 with a gross value of \$1,407 million, followed by wheat with \$1,077 million.

**TABLE 13.5 – SUMMARY OF AUSTRALIAN STATISTICS: 1988-89**

References: Catalogue Nos. 7330.0, 7503.0

	Unit	NSW	Vic	Qld	SA	WA	Tas	Australia (a)
<b>Agricultural establishments—</b>								
Number	..	37,809	32,035	25,734	14,565	13,461	3,600	127,547
Area	'000 ha	61,593	13,096	151,310	58,029	112,631	1,883	466,926
Area of crops	"	4,560	1,990	2,842	2,961	5,082	82	17,527
Sown pasture	"	6,845	6,458	4,354	3,715	7,788	853	30,185
<b>Gross value of—</b>								
Crops	\$m	2,588	1,511	2,286	1,052	1,739	232	9,426
Livestock slaughterings and disposals	"	1,520	1,142	1,497	418	424	121	5,194
Livestock products	"	2,512	2,206	713	714	1,506	248	7,916

(a) Includes Northern Territory and Australian Capital Territory.

### LAND USE ON AGRICULTURAL ESTABLISHMENTS

In 1988-89 there were 13,461 agricultural establishments with an estimated value of agricultural operations over \$20,000 in the State, comprising 113 million hectares of land, or about 45 per cent of the total area of Western Australia.

Of the total area of these establishments, 5.1 million hectares were used for crops and 7.8 million hectares were under sown pasture in

1988-89. The balance consisted mainly of uncleared land (most of which is pastoral leases held by sheep and cattle stations), but it also included cleared land which was used for grazing or which was resting during the season, fallowed areas and newly cleared land.

Table 13.6 gives details of rural land use according to statistical division for 1988-89. Maps showing the boundaries of the statistical divisions and their component statistical local areas are located inside the back cover.

**TABLE 13.6 – LAND USE IN EACH STATISTICAL DIVISION 1988-89**

Reference : Catalogue No. 7411.5

Statistical division	Agricultural establishments (number)	Land use during the season ('000 hectares)				Total area of establishments ('000 hectares)
		Cleared land	Used for crops	Under sown pastures	Lucerne (all purposes)	
Perth	1,109	61.3	7.2	34.6	0.3	81.9
South-West	2,313	660.5	30.0	540.2	1.8	795.7
Lower Great Southern	2,367	2,453.7	405.5	1,889.4	0.9	2,840.3
Upper Great Southern	1,981	3,014.6	950.2	1,750.8	0.2	3,416.1
Midlands	3,248	5,728.6	2,391.9	1,741.4	0.8	7,113.8
South-Eastern	767	1,382.4	303.6	1,073.7	1.8	16,803.2
Central	1,480	2,380.0	988.3	750.0	0.3	42,997.0
Pilbara	60	-	-	-	-	14,506.7
Kimberley	136	16.1	4.8	1.4	-	24,075.7
<b>Total</b>	<b>13,461</b>	<b>15,700.1</b>	<b>5,081.5</b>	<b>7,781.5</b>	<b>6.1</b>	<b>112,630.7</b>

**TABLE 13.7 – LAND USE**  
Reference : Catalogue No. 7411.5

Unit	1986-87	1987-88	1988-89
Agricultural establishments	No. 13,852	13,543	13,461
Land use during the season—			
Used for crops	'000 ha 5,930	5,334	5,082
Under sown pasture	" 7,105	7,556	7,781
Lucerne (all purposes)	" 6	5	6
Other	" 99,693	100,580	99,762
<b>Total area of establishments</b>	<b>" 112,734</b>	<b>113,476</b>	<b>112,631</b>

was well below the 1982-83 figure of 4.87 million hectares, which was the largest area ever sown to wheat in the State.

A summary of the history of the wheat industry in Western Australia, which covers the development of new areas, the effects of such factors as the decline in the goldmining industry, government land settlement policies and the introduction of new marketing practices is contained on pages 365-7 of the *Western Australian Year Book*, No. 20—1982.

**AGRICULTURE**

**Wheat**

**TABLE 13.8 – WHEAT FOR GRAIN AREA AND PRODUCTION**

Reference : Catalogue No. 7321.5

Unit	1986-87	1987-88	1988-89
Area	'000 ha 4,260	3,312	3,297
Production—			
Total	'000 t 5,377	3,882	5,225
Per hectare	tonnes 1.26	1.17	1.58
Gross value	\$'000 836,016	1,649,969	1,076,770

Although wheat has been grown from the earliest years of settlement, cultivation was confined to limited areas as late as 1890 when an area of approximately 14,000 hectares was grown. In 1988-89 3.30 million hectares were sown. This

**TABLE 13.9 – ESTABLISHMENTS GROWING WHEAT FOR GRAIN CLASSIFIED ACCORDING TO AREA SOWN SEASON 1988-89**

Reference : Catalogue No. 7321.5

Area of wheat for grain	Eestablishments	Total area sown to wheat for grain
Hectares	No.	'000 hectares
1 - 9	78	0.4
10 - 49	336	10.1
50 - 99	405	29.8
100 - 249	1,220	204.9
250 - 499	1,457	532.0
500 - 999	1,337	933.0
1,000 - 1,499	533	633.5
1,500 and over	429	953.9
<b>Total</b>	<b>5,795</b>	<b>3,297.4</b>

**Bulk handling of wheat.** The rapid increase in the production and export of wheat between 1910 and 1920 caused problems of transport and storage, and proposals for the bulk handling of the grain led to the formation of a company for this purpose in 1920. This original undertaking did not commence operations owing to technical difficulties and problematical savings in handling costs. Constant attempts were made during the 1920s to find cheaper methods of storage and transportation of wheat.

A series of experiments in the 1930s led to the development of an economical bulk handling system and the grower cooperative company, Co-operative Bulk Handling Limited was set up in 1933 to operate the system. A detailed account of the history of Co-operative Bulk Handling Limited's method of operation and the techniques developed for handling the State's grain production is given on pages 369-70 of the *Western Australian Year Book*, No. 20—1982.

**Marketing of wheat.** Until 30 June 1989, the Australian Wheat Board was the sole marketing authority for wheat, operating under the authority of the *Wheat Marketing Act 1984*. From 1 July 1989, marketing of wheat for use within Australia was deregulated, and producers are now free to make their own marketing arrangements for wheat for domestic use. The Australian Wheat Board retains sole authority for export of wheat.

**Exports of wheat.** Most of the State's wheat is exported as grain. Flour exports, which had been as high as 160,000 tonnes in the mid 1950s, now account for a minimal proportion of the State's wheat crop.

TABLE 13.10 – OVERSEAS EXPORTS OF WHEAT  
('000 tonnes)

	1986-87	1987-88	1988-89
Wheat	4,872	r4,201	4,996

### Oats

Although oats have been grown in Western Australia since the early development of wheat farming, cultivation was somewhat limited until stimulated by the introduction of large-scale sheep raising in the agricultural areas, when their high

nutritional worth as stock feed made them a very valuable crop. In addition to their importance as local stockfeed, significant quantities of oats are also exported. The area sown to oats for grain increased from 78,000 hectares in 1920 to a peak of 538,000 in 1960. More recently, area sown has been subject to considerable fluctuations.

TABLE 13.11 – OATS FOR GRAIN  
AREA AND PRODUCTION  
*Reference : Catalogue No. 7321.5*

	Unit	1986-87	1987-88	1988-89
Area	'000 ha	302	373	389
Production—				
Total	'000 t	414	502	618
Per hectare	tonnes	1.37	1.35	1.59
Gross value	\$'000	43,505	r52,167	81,995

### Barley

Barley grows well over a wide range of climatic and soil conditions and generally yields better than other cereals. It is more successful on saline soils where other crops may not do well, and as a first crop on newly-developed land. Both 'two-row' and 'six-row' barley are grown. Part of the crop is retained on farms for stockfeed, while the balance is sold locally and overseas for malting or stockfeed manufacture.

In terms of area sown, barley was for some years the second most important crop in the State, after wheat. The 623,000 hectares sown in 1970-71 moved barley ahead of oats for the first time. Since that year, although barley plantings fluctuated from a low of 387,000 hectares in 1974-75 to a high of 965,000 hectares in 1984-85, they exceeded oat plantings each year until 1988-89. Since 1986-87, expanded lupin plantings have exceeded the area of barley.

TABLE 13.12 – BARLEY FOR GRAIN  
AREA AND PRODUCTION  
*Reference : Catalogue No. 7321.5*

	Unit	1986-87	1987-88	1988-89
Area	'000 ha	468	461	383
Production—				
Total	'000 t	601	617	552
Per hectare	tonnes	1.28	1.34	1.44
Gross value	\$'000	71,348	r82,907	88,688

**Lupins**

The large-scale growing of lupins has been undertaken in Western Australia since the early 1970s. Apart from the drought-affected 1985-86 season, area sown has increased significantly each year from 1980-81 to 1987-88. The 1988-89 lupins area fell back as farmers continued to expand their sheep flocks at the expense of cropping. Since 1986-87, lupins have been the second most important crop in the State, after wheat.

**TABLE 13.13 - LUPINS FOR GRAIN  
AREA AND PRODUCTION**  
*Reference: Catalogue No. 7321.5*

	Unit	1986-87	1987-88	1988-89
Area	'000 ha	653	876	720
Production—				
Total	'000 t	683	730	790
Per hectare	tonnes	1.05	0.83	1.10
Gross value	\$'000	116,346	126,950	156,227

**Other grains and oilseeds.**

There was considerable interest in the production of rapeseed in the early 1970s, and plantings reached 42,000 hectares in 1972-73. Subsequent problems with disease saw plantings reach a low of 200 hectares in 1982-83. Since then area sown has expanded and reached 4,800 hectares in 1986-87. Plantings fell back to 1,200 hectares in 1988-89.

Triticale, a wheat/rye cross, was first recorded in the Agricultural Census in 1978-79, and since then plantings increased each year to 1984-85 when 39,000 hectares were sown. Area planted dropped back to 25,900 hectares in the 1988-89 season.

Field peas are another crop with significant increases in planting over the past decade. Recorded area reached one thousand hectares in the 1982-83 season, was 4,100 hectares in 1985-86, and has expanded to 47,000 hectares by 1988-89.

Grain sorghum, linseed, rye, vetches, safflower and sunflower are also grown but only in small quantities.

**Hay**

Large quantities of pasture hay are cut from clover and grass pastures, production in 1988-89 being

402,000 tonnes from 119,000 hectares. The principal cereal hay crop is oats and 354,000 tonnes of oaten hay were cut in 1988-89 from 89,000 hectares. Wheat is the only other cereal crop which is used extensively for this purpose and in 1988-89 the production was 101,000 tonnes from 34,000 hectares. Barley, vetches, rye and lupins are also used for hay making but they are of minor importance.

**TABLE 13.14 - HAY - AREA AND PRODUCTION**  
*Reference: Catalogue No. 7321.5*

	Unit	1986-87	1987-88	1988-89
Pasture (a)				
Area	'000 ha	99	103	119
Production	'000 t	321	342	402
Crop (b)				
Area	'000 ha	119	140	129
Production	'000 t	359	435	471

(a) Includes lucerne. (b) Principally from oats and wheat.

**Pastures**

Of the 7.8 million hectares of improved pastures in the south-west region over 6 million are sown to the legume subterranean clover. Other species used include medic, rose clover, serradella, lucerne and a variety of grasses, principally Wimmera ryegrass. The use of perennial grasses such as perennial ryegrass, kikuyu, phalaris and cocksfoot is restricted to a small area having a long growing season along the south coast.

Dominant legume pastures are initially easily established following the clearing of the native vegetation. As most of the soils are infertile a range of fertilisers must be used. Phosphorus, as superphosphate, is usually applied annually while minor elements such as copper, zinc and sometimes molybdenum, have to be applied at least once. Over time, other elements may also need to be applied for good pasture growth to be maintained. Potassium in particular can become deficient on the sandy soils of high rainfall areas.

While pastures are green for only four to nine months of the year, sufficient feed is produced for sheep and cattle to be maintained on the paddocks all year. Supplementary feeding of breeding stock is sometimes required, particularly if the autumn break to the season comes late. At such times the dry paddock feed is almost exhausted and the regenerating pasture is growing slowly.

An active legume breeding and selection programme, centred at Perth, has produced many cultivars. From the cultivars now available it is possible to select one or more that are suited to environments ranging in annual rainfall from 350 to 1200 millimetres and in soil type from acid to alkaline. Cultivars have been selected that are persistent, tolerant of a range of diseases and insect pests, and that are low in fertility-reducing oestrogenic compounds.

**TABLE 13.15 – PASTURE SEED HARVESTED**  
*Reference : Catalogue No. 7321.5*

	Unit	1986-87	1987-88	1988-89
<b>Subterranean clover —</b>				
Area harvested	'000 ha	13.7	18.1	23.8
Production	tonnes	2,949	3,775	4,916
<b>Lupins —</b>				
Area harvested	'000 ha	3.2	3.3	4.1
Production	tonnes	591	739	854
<b>Barrel Medic —</b>				
Area harvested	'000 ha	5.4	4.4	7.7
Production	tonnes	910	677	1,350
<b>Total pasture seed —</b>				
Area harvested	'000 ha	24.3	28.0	39.0

## Vegetables

The State's vegetable production is aimed principally at providing for the local fresh market. To a significant extent, market gardens for fresh produce are concentrated in outer suburbs of the Perth Statistical Division, although some of these areas are being lost to vegetable production as urbanisation increases. Growing of vegetables for processing was restricted to peas and beans for a long time. More recently, there has been a significant increase in both the volume and variety of vegetables grown for processing, with potatoes forming a major proportion of this market. Exports of vegetables have also assumed greater importance in recent years, with some growing operations being set up either wholly or principally for supplying the export market.

Potatoes are the major vegetable crop, accounting for over a quarter of the State's vegetable area. Production is concentrated in the higher rainfall areas of the south-west, principal growing centres being Manjimup, Busselton, Donnybrook and Albany. Compared to the total State crop, the Perth Statistical Division is relatively unimportant as a potato producer. In 1988-89 the area of potatoes was nearly 25 per cent higher than in

1986-87, as the recent opening of potato-processing facilities provided a new market for growers.

Apart from potatoes, a wide variety of other vegetables are grown in the State. Among these, carrots currently account for the greatest area grown, as an increasing export trade has encouraged expanded plantings in recent years. Nearly 13,000 tonnes of carrots were exported in 1988-89 - more than double the quantity of cauliflowers which achieved the next highest exports. Over half the State's carrot production is grown in the Perth Statistical Division.

Until 1987-88, cauliflowers were second only to potatoes in terms of area grown in Western Australia. The main area for cauliflower growing is the Manjimup district in the far south-west of the State, although significant areas are grown around Perth. Over 6,000 tonnes were exported in 1988-89 - making cauliflowers the State's second largest vegetable export.

**TABLE 13.16 – PRINCIPAL VEGETABLES AREA, PRODUCTION AND GROSS VALUE**  
*Reference : Catalogue No. 7321.5*

	Unit	1986-87	1987-88	1988-89
<b>Carrots—</b>				
Area	hectares	769	785	852
Production	tonnes	29,715	30,266	30,988
Gross value	\$'000	11,145	r11,707	13,909
<b>Cauliflowers—</b>				
Area	hectares	774	671	754
Production	tonnes	15,673	14,364	17,866
Gross value	\$'000	9,531	r9,727	10,344
<b>Lettuce—</b>				
Area	hectares	373	444	437
Production	tonnes	12,788	13,841	14,505
Gross value	\$'000	6,121	r7,052	6,530
<b>Onions—</b>				
Area	hectares	367	411	412
Production	tonnes	18,674	21,280	21,622
Gross value	\$'000	5,153	r6,564	7,796
<b>Potatoes—</b>				
Area	hectares	1,778	2,034	2,188
Production	tonnes	67,618	72,290	78,464
Gross value	\$'000	22,568	r24,124	27,784
<b>Tomatoes—</b>				
Area	hectares	275	277	246
Production	tonnes	7,896	8,059	7,910
Gross value	\$'000	8,041	r9,802	9,090
<b>All vegetables—</b>				
Area	hectares	7,018	7,786	8,141
Gross value	\$'000	89,153	r97,161	106,379

Lettuces and onions are the next most important vegetables in terms of area grown, but in terms of value of production, are exceeded by tomatoes.

A significant proportion of the State's tomato production is grown at Carnarvon, on the State's upper west coast. Because of the warmer winter climate, Carnarvon growers are able to produce 'out of season' crops of tomatoes and other vegetables for the Perth market. Similar factors are assisting the development of vegetable production at Kununurra in the far north of the State, where significant quantities of melons and pumpkins are being grown.

**Fruit**

Fruit production is largely confined to the temperate regions between Gingin to the north of Perth and Albany on the south coast. The cool, wet winters and warm, dry summers of this area permit the successful cultivation of a wide variety of fruits. In the southern and south-western sections, apples, pears and stone fruits are grown extensively, and grapes are of increasing importance, while in the districts around Perth the principal crops are apples, stone fruits, citrus fruits and grapes. Outside this main fruit-growing area, banana plantations have been established at Carnarvon in the north-west and at Kununurra in the north.

**TABLE 13.17 - FRUIT - AREA AND GROSS VALUE OF PRODUCTION**

Reference : Catalogue No. 7322.5

	Unit	1986-87	1987-88	1988-89
<b>Area—</b>				
Orchard fruit	ha	5,103	r5,292	5,287
Plantation and berry fruit	"	544	599	524
Grapes	"	1,705	1,765	1,930
<b>Total</b>	<b>"</b>	<b>7,352</b>	<b>7,656</b>	<b>7,742</b>
<b>Gross value of production—</b>				
Orchard fruit	\$'000	42,264	r39,794	41,910
Plantation and berry fruit	"	16,596	r14,017	13,461
Grapes	"	11,980	11,395	11,953
<b>Total</b>	<b>"</b>	<b>70,840</b>	<b>r65,206</b>	<b>67,324</b>

**Apples and pears**

Apples, which are the principal fruit crop, account for more than half of the total orchard area. Donnybrook, Manjimup and the hills area near Perth are the most important centres but other districts in the south-west still produce significant quantities. In 1988-89, the number of apple trees recorded in the Census was 667,000. Granny

Smiths accounted for over 70 per cent of the 46,695 tonnes produced. Pears are usually grown in conjunction with apples, and although apples are still considerably more important, pear tree numbers have increased by over 50 per cent in the last 10 years. Exports of both apples and pears are significant, mainly to South East Asian countries.

**Citrus fruit**

The Shire of Chittering, north of Perth, is a major citrus fruit producer, while other important areas near Perth are in the Shires of Kalamunda and Swan and the City of Armadale, and in the south-west, in the Shires of Harvey and Capel. Although oranges are by far the most important crop, substantial quantities of lemons and mandarins, and lesser quantities of grapefruit are also produced. Production is largely for local consumption but there is some export trade especially in lemons.

**TABLE 13.18 - ORCHARD FRUIT - TREES, PRODUCTION AND GROSS VALUE**

References : Catalogue Nos. 7322.5, 7502.5

	Unit	1986-87	1987-88	1988-89
<b>Apples—</b>				
Trees	'000	700	702	667
Production	tonnes	54,470	40,196	46,695
Gross value	\$'000	24,217	r21,329	24,041
<b>Pears—</b>				
Trees	'000	128	132	143
Production	tonnes	7,107	6,604	6,974
Gross value	\$'000	4,442	r4,409	3,797
<b>Lemons and limes—</b>				
Trees	'000	20	21	18
Production	tonnes	1,551	1,440	1,322
Gross value	\$'000	875	r741	1,223
<b>Mandarins—</b>				
Trees	'000	36	44	43
Production	tonnes	727	878	867
Gross value	\$'000	1,016	r846	978
<b>Oranges—</b>				
Trees	'000	183	r179	198
Production	tonnes	5,432	5,217	5,087
Gross value	\$'000	2,568	r2,084	2,396
<b>Nectarines—</b>				
Trees	'000	77	88	99
Production	tonnes	1,035	1,120	1,112
Gross value	\$'000	963	r1,185	1,529
<b>Peaches—</b>				
Trees	'000	106	110	112
Production	tonnes	2,500	2,503	1,819
Gross value	\$'000	2,543	r3,192	2,724
<b>Plums and prunes—</b>				
Trees	'000	r105	130	138
Production	tonnes	r2,822	2,801	2,072
Gross value	\$'000	3,482	r3,573	2,588

### Stone fruits

Stone fruits are grown mainly in the hills districts in the Darling Ranges near Perth, and in the Shires of Manjimup and Donnybrook-Balingup in the south-west of the State; however some stone fruits are grown in many other districts of the south-west.

### Vineyards

Historically, the 'Swan Valley' region in the Shire of Swan has dominated the State's viticulture industry. In the early 1970s this region accounted for some 70 per cent of the State's vineyard area. Since then, pressures of urban growth in the Swan Valley have reduced the area under vines there, and new vineyards have been developed elsewhere in the state; principally at Margaret River/Busselton, Mount Barker/Frankland and Bindoon/Gingin. As a result, the Swan Valley now accounts for just over 34 per cent of the State's vineyard area. The Margaret River/Busselton, and Mount Barker/Frankland grape production is almost entirely used for winemaking; in other areas table and drying grapes are also significant.

**TABLE 13.19 - GRAPES - AREA AND PRODUCTION**  
Reference : Catalogue No. 7322.5

	Unit	1986-87	1987-88	1988-89
Area of vines—				
Bearing	ha	1,592	1,584	1,684
Not yet bearing	"	113	182	246
Grapes for wine making and table use—				
Quantity	tonnes	9,400	8,500	9,299
Gross value	\$'000	10,101	10,145	10,782
Dried vine fruits—				
Quantity	tonnes	584	515	480
Gross value	\$'000	1,879	1,250	1,171
Wine production—				
Beverage	kilolitres	5,012	4,633	4,916
Distillation	"	35	12	4

### Other fruit

Production of bananas is mainly confined to a narrow strip of land along the Gascoyne River at Carnarvon, with small, but increasing areas at Kununurra on the Ord River. The Carnarvon plantations are dependent on water pumped from bores which tap a subterranean flow in the sands of the usually dry river bed. As a surface flow in the river channel results only from heavy rains, which do not occur every year, a problem is presented in the falling-off of water supplies and

in the increase in the salt content of the underground water during long dry periods. These conditions and also periodic damage from cyclones cause fluctuations in the area cropped and in production, as occurred in the 1988-89 season. Apart from such weather-caused interruptions, production has consistently increased over the last 20 years. The crop is transported by road to Perth and sold locally in competition with bananas imported from other Australian States.

**TABLE 13.20 - BANANAS - AREA AND PRODUCTION**  
Reference : Catalogue No. 7322.5

	Unit	1986-87	1987-88	1988-89
Area of plants—				
Bearing	ha	382	399	346
Not yet bearing	"	71	82	97
Production—				
Total quantity	tonnes	13,128	14,251	9,908
Gross value	\$'000	13,259	10,261	9,407

Strawberry production has increased significantly in recent years, although difficulties in hiring pickers saw much of the crop unharvested in 1987-88. Nearly 90 per cent of the area planted is within the Perth Statistical Division.

### Nurseries

The main concentration of commercial nurseries is in the Perth Statistical Division in the areas of Wanneroo, Kalamunda and Kelmscott. Most nurseries produce ornamental shrubs and trees; some specialise in the production of bedding plants while others concentrate on cut-flower production. Fruit trees, mainly citrus, are produced by specialist nurseries in the Perth Statistical Division while pome and stone fruit trees are mostly produced in the South-West Statistical Division at Manjimup and Donnybrook. Cultivated turf production has assumed increasing significance in recent years. The cultivation of native plants, generally on a less extensive scale than is the case with exotic plants, is also now of increasing importance.

**TABLE 13.21 - NURSERIES (a)  
AREA AND GROSS VALUE**  
Reference : Catalogue No. 7321.5

	Unit	1986-87	1987-88	1988-89
Area	hectares	1,832	1,841	1,972
Gross value	\$'000	33,890	41,603	46,464

(a) Including cultivated turf.



### Artificial fertiliser

Soils in Western Australia are acutely deficient in phosphate and regular applications of phosphatic fertiliser are required for crop and pasture growth. Newly cleared land in particular requires heavy applications of superphosphate for satisfactory yields. Nitrogen deficiencies are also common. Legume pastures and lupins have assisted greatly in increasing nitrogen supplies. Potassium deficiency is primarily a problem on sandy soils in high rainfall areas.

Many Western Australian soils and particularly sandy soils are also deficient in trace elements. The use of fertilisers is therefore a significant factor in the State's farming activity.

TABLE 13.22 - ARTIFICIAL FERTILISER USED ON RURAL HOLDINGS

Reference : Catalogue No. 7411.5

	Unit	1986-87	1987-88	1988-89
<b>Crops—</b>				
Area fertilised	'000 ha	5,123	5,000	4,592
Quantity used—				
Superphosphate	'000 t	283	314	281
Other	"	297	279	290
<b>Total</b>	"	<b>580</b>	<b>593</b>	<b>572</b>
<b>Pastures—</b>				
Area fertilised	'000 ha	3,823	4,782	5,483
Quantity used—				
Superphosphate	'000 t	392	507	622
Other	"	46	49	50
<b>Total</b>	"	<b>438</b>	<b>566</b>	<b>672</b>

### PASTORAL PRODUCTION

Throughout this section, where mention is made of the 'pastoral areas' the portion of the State referred to comprises the Kimberley and Pilbara Statistical Divisions and the Sub-divisions of Lefroy, Gascoyne and Carnegie. The balance of the State, referred to as the 'agricultural areas', comprises the Perth, South-West, Upper Great Southern, Lower Great Southern and Midlands Statistical Divisions and the Sub-divisions of Johnston and Greenough River.

In the early days of settlement, pastoral activities in Western Australia were confined largely to what are now the agricultural areas and were usually associated with the cultivation of crops. However, beginning with Captain George Grey's visit in 1838 to the area known as the West Kimberley,

explorers increasingly drew attention to the pastoral possibilities of large sections of the present Kimberley, Pilbara and Central Statistical Divisions.

In 1857 and 1858, F.T. Gregory noted the existence of good pastoral country in the Murchison and the Gascoyne districts and in the course of a journey further to the north in 1861 he discovered the Ashburton, Fortescue, De Grey and Oakover Rivers. His reports of good grazing lands in the area led to the establishment of sheep stations by pastoralists from the south, the first of such ventures in 1863, being in the De Grey district of what is now the Pilbara Statistical Division. Graziers were also turning their attention to the south-east and in the 1870s pastoral lands were being taken up in the coastal areas to the south of the Nullarbor Plain. Another development in the extension of pastoral activity began with Alexander Forrest's journey through the Kimberley in 1879 and his favourable reports on the suitability of the country for grazing. Leases along the Fitzroy and the Ord Rivers were stocked not only with livestock shipped from the south and from the other Australian Colonies but also with cattle brought overland to the area, principally from Queensland and New South Wales, by remarkable feats of droving.

### Sheep

From the end of the Second World War, the State's sheep numbers increased almost continuously until the mid 1970s, to peak at 34.8 million in 1976. Since then, numbers have fluctuated, reflecting variations in seasonal conditions and in the prices for wool and meat relative to grain prices. Since 1984, sheep numbers have risen significantly, owing to a strong wool market and relatively low wheat prices. The previous peak sheep population of 1976 was exceeded for the first time in 1989, when the flock numbered 37.1 million.

In the agricultural areas, sheep farming is usually carried out in conjunction with grain growing, while in the pastoral areas sheep are generally grazed on large specialist 'sheep stations'. As a result, large flocks predominate in the pastoral areas. In 1989, the average sheep flock in agricultural areas was 3,530; in pastoral areas 9,171. Merinos are the dominant breed - purebred merinos comprised 97.4 per cent of the State's sheep flock, while merino comebacks accounted for a further 0.7 per cent.

TABLE 13.23 – SHEEP NUMBERS AND DISTRIBUTION AT 31 MARCH

Reference : Catalogue No. 7221.5

	In agricultural areas		In pastoral areas		State total
	Number	Proportion of State total	Number	Proportion of State total	
	'000	per cent	'000	per cent	'000
1960	13,396	81.6	3,016	18.4	16,412
1970	29,844	88.7	3,790	11.3	33,634
1980	28,730	94.4	1,701	5.6	30,431
1987	30,922	92.4	2,541	7.6	33,463
1988	31,525	92.8	2,426	7.2	33,951
1989	34,760	93.7	2,330	6.3	37,090

TABLE 13.24 – SHEEP FLOCKS AT 31 MARCH 1989 CLASSIFIED ACCORDING TO SIZE OF FLOCK

Reference : Catalogue No. 7221.54

Size of flock	Flocks	Sheep
		'000
1 - 99	238	9
100 - 999	1,270	722
1,000 - 1,999	2,004	3,000
2,000 - 4,999	4,325	14,056
5,000 - 9,999	1,782	12,026
10,000 - 19,999	413	5,456
20,000 and over	62	1,821
<b>Total</b>	<b>10,094</b>	<b>37,090</b>

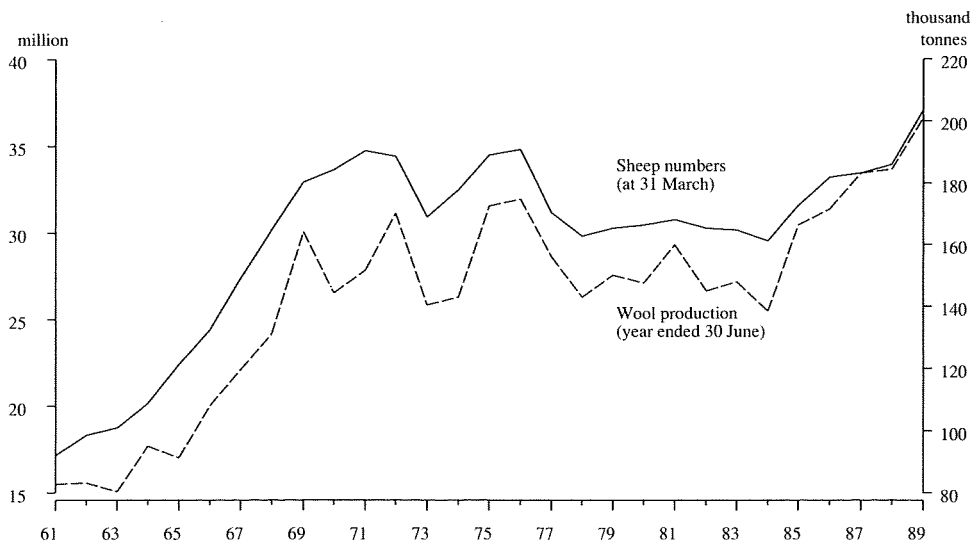
TABLE 13.25 – SHEEP SHORN AND WOOL PRODUCTION

Reference : Catalogue No. 7221.5

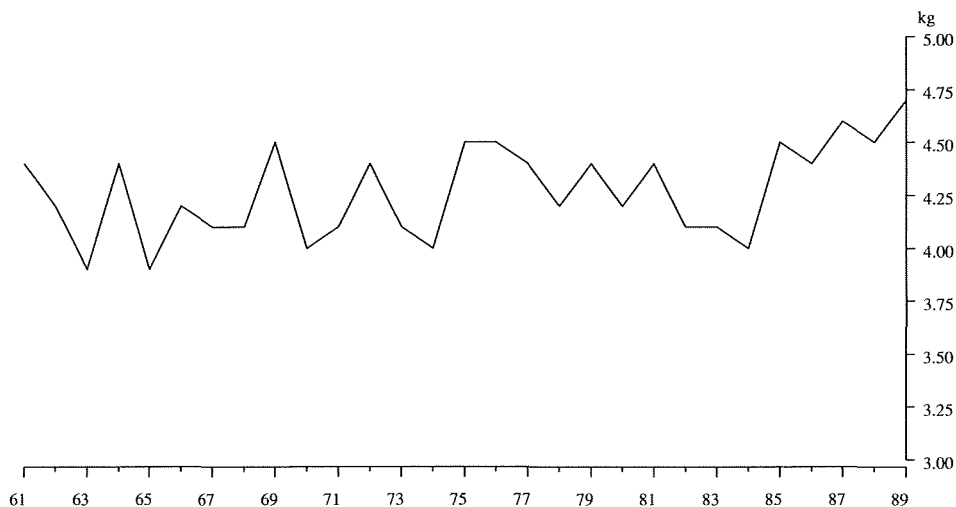
	Unit	1986-87	1987-88	1988-89
Sheep shorn	'000	30,777	31,670	33,873
Lambs shorn	"	8,583	8,912	8,875
<b>Total</b>	"	<b>39,360</b>	<b>40,582</b>	<b>42,748</b>
Average weight of wool shorn	kg	4.65	4.54	4.69
Wool production (greasy)—				
Shorn	'000 t	183	184	200
Dead, fellmongered, exported on skins	"	r6	4	3
<b>Total</b>	"	<b>189</b>	<b>r189</b>	<b>203</b>

## Marketing of lamb

**Lamb Marketing Board.** All lamb produced for slaughter south of the twenty-sixth parallel in Western Australia is marketed through the Western Australian Lamb Marketing Board. The Board was established by the *Marketing of Lamb Act 1971* and began operations in December 1972. It came into being mainly as a result of pressure from, and following a referendum of, the State's lamb producers, who looked to the Board to improve the stability of their industry and increase returns.

DIAGRAM 13.1  
SHEEP NUMBERS AND WOOL PRODUCTION 1961 TO 1989  
(EXCLUDES WOOL EXPORTED ON SKINS)

**DIAGRAM 13.2**  
**AVERAGE WEIGHT OF WOOL PER SHEEP SHORN**



The major aims of the Board are to administer an orderly method of marketing and encourage producer participation in lamb marketing, to operate an advance price schedule and a weight and grade system, and to rationalise procedures throughout the industry.

Apart from promoting lamb on the local market the Board is also responsible for lamb exports. During the period of the Board's operations there has been a marked change in the pattern of export sales of Western Australian lamb with reliance on the traditional United Kingdom market being replaced by other markets to the extent that the Board now exports to a wide diversity of overseas countries.

**Wool**

Increasing sheep numbers in recent years, combined with improving average clips per head, resulted in a further record shorn wool production in 1988-89. The 42.7 million sheep and lambs shorn returned a clip of 200,499 tonnes of wool. A further 2,657 tonnes was accounted for by dead and fellmongered wool and wool exported on skins.

During the war years wool was compulsorily acquired by the Commonwealth Government in accordance with an agreement with the United

Kingdom. Government control ceased after the war and the auction system was reintroduced. Since then, there has been a range of legislative action taken with the aim of promoting the use of wool and wool products, encouraging efficient marketing and providing a steadying influence on market prices. A summary of this government action is contained on page 386 of the *Western Australian Year Book*, No. 20—1982.

A major development in the administration of the wool industry was the passing of the *Wool Industry Act 1972*, which brought into existence the Australian Wool Corporation on 1 January 1973. The functions of the Corporation relate to wool marketing, wool use promotion, wool research and the management of wool stores.

**TABLE 13.26 - GROSS VALUE OF WOOL PRODUCTION (\$'000)**

*Reference : Catalogue No. 7502.5*

	1986-87	1987-88r	1988-89
Shorn wool	706,010	1,239,739	1,399,830
Dead wool and fellmongered wool	875	862	813
Wool exported on skins	9,379	12,072	5,942
<b>Total</b>	<b>716,263</b>	<b>1,252,674</b>	<b>1,406,585</b>

Although the greater proportion of the wool clip is exported in the grease, scouring or degreasing is done in the State and degreased wool is an appreciable item in the external wool trade. During 1988-89 exports of greasy and degreased wool

were 133,472 tonnes and 20,077 tonnes respectively. Further details of greasy and degreased wool, both interstate and overseas, are given in Chapter 20—Foreign and Interstate Trade.

## Cattle

**TABLE 13.27 - CATTLE FOR MEAT PRODUCTION AT 31 MARCH CLASSIFIED ACCORDING TO SIZE OF HERD AND LOCATION**

Reference : Catalogue No. 7221.5

Size of herd	In agricultural areas		In pastoral areas		Whole state		
	Number of		Number of		Number of		
	Herds	Cattle	Herds	Cattle	Herds	Cattle	
		'000		'000		'000	
1989—							
1 - 29	959	11.5	11	0.1	970	11.6	
30 - 99	1,139	68.8	14	0.8	1,153	69.6	
100 - 299	1,354	237.7	25	5.0	1,379	242.6	
300 - 499	325	121.6	17	6.5	342	128.2	
500 - 999	199	134.3	31	21.4	230	155.6	
1,000 - 1,999	47	62.3	30	45.5	77	107.8	
2,000 - 4,999	12	37.7	49	146.9	61	184.5	
5,000 - 9,999	2	15.1	28	194.7	30	209.8	
10,000 and over	-	-	29	481.0	29	481.0	
<b>Total herds</b>	<b>1989</b>	<b>4,037</b>	<b>688.9</b>	<b>234</b>	<b>901.8</b>	<b>4,271</b>	<b>1,590.7</b>
	1988	4,049	666.9	240	923.3	4,289	1,590.2
	1987	4,190	680.1	250	861.0	4,440	1,541.2

Cattle statistics are classified according to the two broad categories of 'meat production' and 'milk production', regardless of breed. At 31 March 1989, meat cattle comprised over 93 per cent of the State's cattle herd. Nearly 57 per cent of the State's meat cattle are located in the pastoral areas of the State, where extensive grazing on very large cattle stations is carried out. In 1989, the average meat cattle herd size in the pastoral areas was 3,854 compared to 171 in the agricultural areas. These calculated averages exclude small semi-commercial operations, of which there are significant numbers in the South West of the state.

The cattle which were originally shipped or driven overland from the other Australian Colonies to start the industry in the northern pastoral areas were predominantly shorthorn breeds and these still form the great bulk of all cattle kept for meat production in those areas. However, Brahman and Brahman infused breeds are increasing.

## Slaughtering

Beef from cattle slaughtered at Broome in the Kimberley Division is principally for export. The local market for meat is supplied mainly from abattoirs at Fremantle, Waroona, Harvey,

Bunbury, Albany, Woorooloo, Geraldton and Katanning. Most of these establishments also slaughter for the export trade. Small establishments operating in country towns also contribute to total production, and most stations and many farms slaughter sufficient for all or part of their own requirements. Over half of all exports are destined for the United States of America.

**TABLE 13.28 - LIVESTOCK SLAUGHTERED AND MEAT PRODUCED**

Reference : Catalogue No. 7221.5, 7502.5

	Unit	1986-87	1987-88r	1988-89
<b>Livestock slaughtered (a)—</b>				
Sheep	'000	3,043	3,167	2,348
Gross value (b)	\$'000	30,113	47,715	36,557
Lambs	'000	1,168	1,141	998
Gross value (b)	\$'000	23,673	27,549	23,533
Cattle and calves	'000	482	494	458
Gross value (b)	\$'000	156,172	171,131	183,641
<b>Meat produced (c)—</b>				
Mutton and lamb	tonnes	72,032	75,216	61,109
Beef and veal	"	95,353	101,523	94,312

(a) Mainly slaughterings for human consumption but also includes quantities condemned and small numbers of livestock slaughtered for boiling down.  
(b) Value on hoof at principal market. (c) Dressed carcass weight; excludes condemned carcasses and offal.

While the agricultural areas account for only forty-three per cent of the State's cattle numbers, higher productivity and turnoff than in the pastoral areas enables the agricultural areas to account for about seventy-five per cent of the State's beef production.

**OTHER LIVESTOCK**

**Dairying**

Compared with the wheat, wool and meat producing industries, dairying as a major well-organised rural activity is of fairly recent origin. Its growth was retarded initially by the difficulty of clearing heavily-timbered country in the south-west and the need for special methods of pasture establishment. As these problems were progressively overcome dairying became a significant feature of primary production. After a period of intense rationalisation in the 1970s, the

industry has been concentrated on the production of milk for the local liquid milk and fresh dairy products markets.

A summary of the history of the dairying industry in Western Australia, with specific reference to legislative and marketing arrangements, price instability and subsidy schemes, is contained on pages 391-2 of the Western Australian Year Book, No. 20—1982.

The bulk of the State's dairy cattle are concentrated in the high rainfall, near-coastal strip from Pinjarra to Augusta, with lesser numbers being found further east to Albany. Irrigation of pastures during the drier summer months plays an important role in the industry.

**TABLE 13.29 – CATTLE FOR MILK PRODUCTION AT 31 MARCH ('000)**

Reference : Catalogue No. 7221.5

	1987	1988	1989
Bulls	1	1	1
Bull calves (a)	-	-	-
Commercial dairy—			
Cows	67	65	63
Heifers	28	27	26
Heifer calves (a)	20	20	19
House cows and heifers	2	2	1
<b>Total</b>	<b>118</b>	<b>115</b>	<b>111</b>

(a) Under one year.

**TABLE 13.30 – CATTLE FOR MILK PRODUCTION CLASSIFIED ACCORDING TO SIZE OF HERD AT 31 MARCH**

Reference : Catalogue No. 7221.5

Size of herd	Number of herds	Total cattle
		'000
1 - 9	666	1.7
10 - 49	74	1.6
50 - 99	43	3.3
100 - 149	96	12.1
150 - 199	133	23.0
200 - 249	98	21.8
250 and over	132	47.5
<b>Total</b>	<b>1,242</b>	<b>111.0</b>

**TABLE 13.31 – WHOLE MILK PRODUCTION (a)**

Reference : Catalogue No. 7221.5

	Unit	1986-87	1987-88	1988-89
Quantity	million L	248	250	245
Gross value	\$'000	58,979	62,325	66,686

(a) Includes milk used for processing.

**Pig raising**

The principal pig raising districts are the grain growing areas of the Midlands and the Upper and Lower Great Southern Statistical Divisions. At 31 March 1989, 65 per cent of pigs were within these divisions. Although the greater proportion of production is consumed locally, there is some export trade.

**TABLE 13.32 – PIG NUMBERS AT 31 MARCH ('000)**

Reference : Catalogue No. 7221.5

	1986-87	1987-88	1988-89
Boars	3.3	3.4	3.0
Breeding sows	35.8	34.5	30.9
Gilts for breeding	5.6	4.9	5.3
Other pigs	250.2	264.2	245.6
<b>Total</b>	<b>294.8</b>	<b>307.0</b>	<b>284.8</b>

Intensive piggeries have assumed greater importance in recent years, and there has been a reduction in the number of pigs being raised in small or 'mixed farm' operations. While there has been little change in pig numbers since the mid 1970s, the number of herds at 31 March 1989 was

less than half the number in 1976. Over the same period the proportion of pigs which were in herds of 500 or more has increased from 20 per cent to 69 per cent.

**TABLE 13.33 – PIGS SLAUGHTERED AND MEAT PRODUCED**

Reference : Catalogue No. 7221.5

Unit	1986-87	1987-88r	1988-89	
Pigs slaughtered	'000	502	508	503
Gross value (a)	\$'000	48,221	51,694	62,924
Pigmeat produced (b)	tonnes	28,119	29,393	29,228
Bacon and ham produced	"	8,502	8,377	9,384

(a) Value 'on hoof' at principal market or at factory door. (b) Dressed carcass weight; excludes condemned carcasses and offal but includes quantities used to produce ham.

**TABLE 13.34 – PIG HERDS AT 31 MARCH 1989 CLASSIFIED ACCORDING TO SIZE OF HERD**

Reference : Catalogue No. 7221.5

Size of herd	Number of herds	Total pigs
		'000
1 - 9	124	0.5
10 - 49	292	7.9
50 - 99	146	10.2
100 - 199	133	19.4
200 - 499	166	50.8
500 - 999	88	62.2
1,000 and over	46	133.7
<b>Total</b>	<b>995</b>	<b>284.8</b>

### Livestock in Australia

**TABLE 13.35 – LIVESTOCK NUMBERS AT 31 MARCH 1989, AUSTRALIA ('000)**

Reference : Catalogue No. 7221.5

State or Territory	Sheep	Cattle		Pigs
		Milk	Meat	
New South Wales	59,109	406	4,924	855
Victoria	28,067	1,438	2,071	423
Queensland	14,880	312	8,682	611
South Australia	17,414	144	798	450
<b>Western Australia</b>	<b>37,090</b>	<b>111</b>	<b>1,591</b>	<b>285</b>
Tasmania	4,933	135	426	45
Northern Territory	-	1	1,387	3
Australian Capital Territory	111	-	10	-
<b>AUSTRALIA</b>	<b>161,603</b>	<b>2,546</b>	<b>19,888</b>	<b>2,671</b>

### Poultry farming

Poultry farming in Western Australia is a specialised industry located almost entirely within the Perth Statistical Division. A few commercial egg farms are established in the more populous of the country areas.

**TABLE 13.36 – POULTRY NUMBERS AT 31 MARCH ('000)**

Reference : Catalogue No. 7221.5

	1987	1988	1989
Fowls	5,014	5,144	5,197
Ducks	2	3	2
Turkeys	15	2	30

Almost all the egg production and a large proportion of the chicken meat production is on holdings which specialise in the production of either poultry meat or eggs. A few laying birds are kept for commercial production on orchards, dairy farms and wheat farms throughout the agricultural areas.

The Western Australian Egg Marketing Board, constituted under the *Marketing of Eggs Act 1945*, is the statutory authority controlling the commercial production of eggs. Two other Acts, the *Poultry Industry Levy Act 1965* and the *Chicken Meat Industry Act 1977*, are used to regulate and control poultry farming.

**TABLE 13.37 – EGG PRODUCTION AND POULTRY SLAUGHTERED FOR TABLE PURPOSES YEAR ENDED 30 JUNE**

Reference : Catalogue No. 7221.5

Unit	1987	1988	1989	
Egg production—				
Quantity (a)	'000 dozen	17,490	17,597	17,859
Gross value	\$'000	26,709	26,874	29,651
Poultry slaughtered for table purposes—				
Dressed weight	tonnes	r31,881	r34,449	33,623
Gross value	\$'000	47,548	r52,721	55,288

(a) Source: Western Australian Egg Marketing Board.

Details of how these Acts control and regulate poultry farming is contained on page 311 of the *Western Australian Year Book*, No. 24—1986.

**TABLE 13.38 – BEEKEEPERS, BEEHIVES AND HONEY PRODUCTION 1988-89**

Reference : Catalogue No. 7221.5

	Numbers of hives					800 and over
	Less than 200	200-299	300-399	400-499	500-799	
Beekkeepers—						
Number	5	5	16	18	11	11
Productive beehives ('000)	0.3	1.3	4.3	6.6	5.1	8.9
Honey production (tonnes)	6	80	346	635	452	663

**Beekeeping**

Commercial producers of honey in Western Australia may be divided into three categories. There are a comparatively small number of specialist apiarists, engaged solely or mainly in honey production, who operate on a large scale and transport their hives from district to district. There are also some substantial producers who are engaged in agricultural activities and use their farms as a central site from which they may transport their hives to other areas as necessary. Finally there are the many farmers and orchardists who keep a few hives and produce honey as a minor supplementary activity.

**TABLE 13.39 – BEEHIVES AND PRODUCTION OF HONEY AND BEESWAX**

Reference : Catalogue No. 7221.5

	Unit	1986-87	1987-88	1988-89
Beehives—				
Productive	'000	27	26	26
Unproductive	"	6	7	7
Honey production	tonnes	2,458	2,510	2,182
Beeswax production	"	42	45	39

**Annual Ryegrass Toxicity**

Annual ryegrass toxicity (ARGT) is a condition which can develop, in spring and summer, in pastures or crop stubbles containing annual ryegrass. It is caused by a bacterium associated with a nematode which infests annual ryegrass.

Livestock grazing affected vegetation may die. The condition was first identified as a significant problem in the early 1970s in the Great Southern districts. It has subsequently spread northwards, and now much of the wheatbelt between Dalwallinu and Tambellup is subject to ARGT.

The Australian Bureau of Statistics conducted a survey of ARGT in 1989, to provide definitive data on the extent and effects of the problem. Survey results were to assist in determining future directions and levels of research into the problem. The survey was conducted at the instigation of the Western Australian Farmers Federation and the Western Australian Department of Agriculture, with funding provided by the Australian Wool Corporation and the Australian Meat and Livestock Research and Development Corporation.

Survey forms were dispatched to 5,400 sheep and cattle farmers in areas known or thought to be at risk to ARGT. Ninety-two per cent of survey forms were returned, and aggregates of these forms were used to compile survey results.

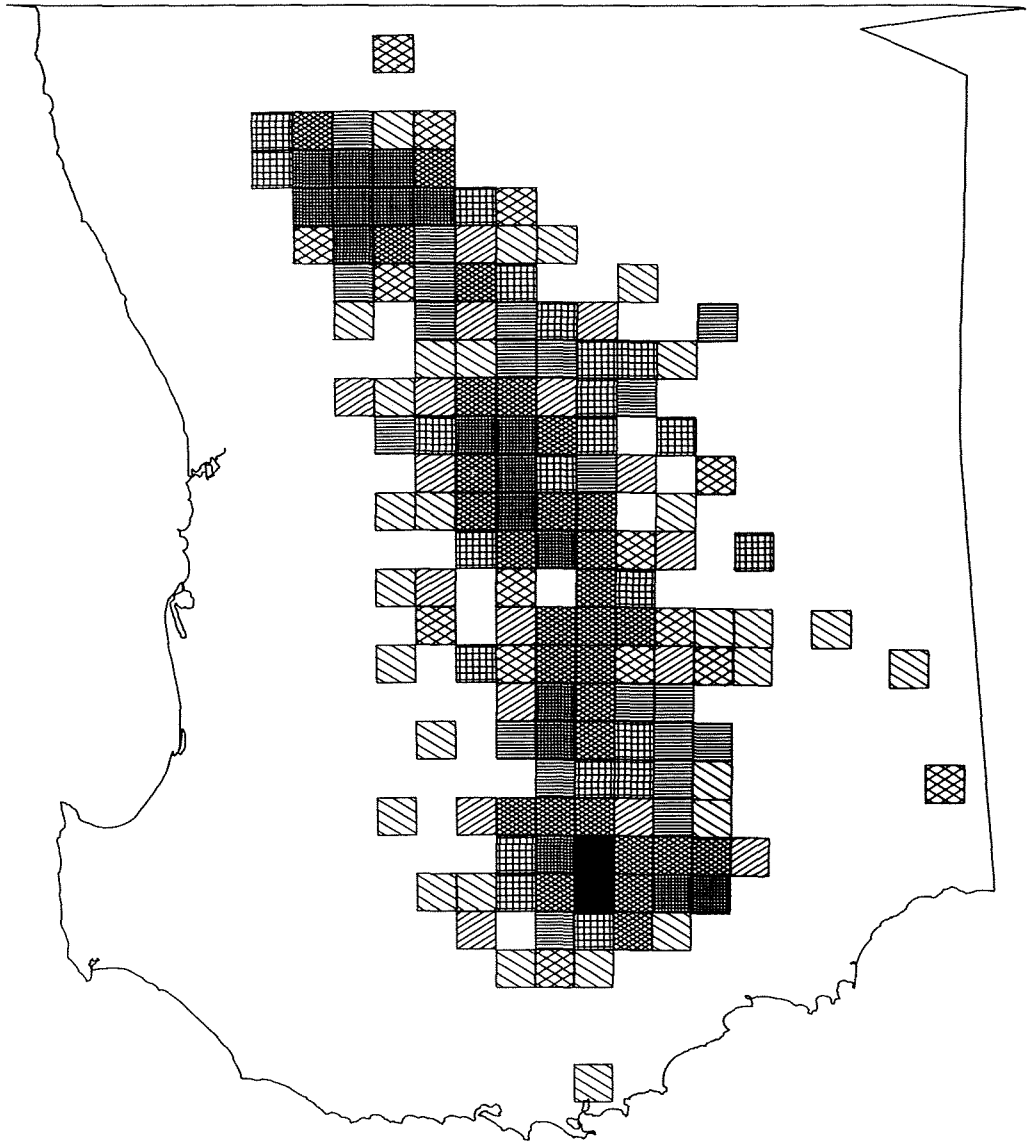
**TABLE 13.40 – ARGY – SUMMARY OF STATISTICS**









Reference : Catalogue No. 7421.5

Item	Unit of quantity	Quantity	Number reporting
Area of surveyed holdings	'000 ha	9,460	5,018
Sheep on surveyed holdings	'000	16,689	5,004
Area of paddocks containing ryegrass in 1988	'000 ha	3,619	3,747
Area of paddocks affected by ARGT			
1986	'000 ha	146	518
1987	"	175	581
1988	"	148	493
Holdings ever affected by ARGT	..	..	934
Sheep deaths from ARGT			
Before 1986	No.	78,710	484
1986	"	27,502	414
1987	"	28,854	457
1988	"	11,571	307
Cattle deaths from ARGT			
Before 1986	"	349	35
1986	"	65	13
1987	"	122	18
1988	"	31	8
Holdings ever having had sheep or cattle losses from ARGT	..	..	866
Use of herbicides/chemicals to prevent or control ARGT			
Holdings on which ever used	..	..	1,810
Area treated in 1988	'000 ha	831	1,695

Results indicated that 17 per cent of farms in the surveyed area had lost livestock owing to ARGT, although this proportion varied considerably within the survey area. Over 50 per cent of farms

DIAGRAM 13.3  
SHEEP DEATHS FROM ARGV TO END OF 1988

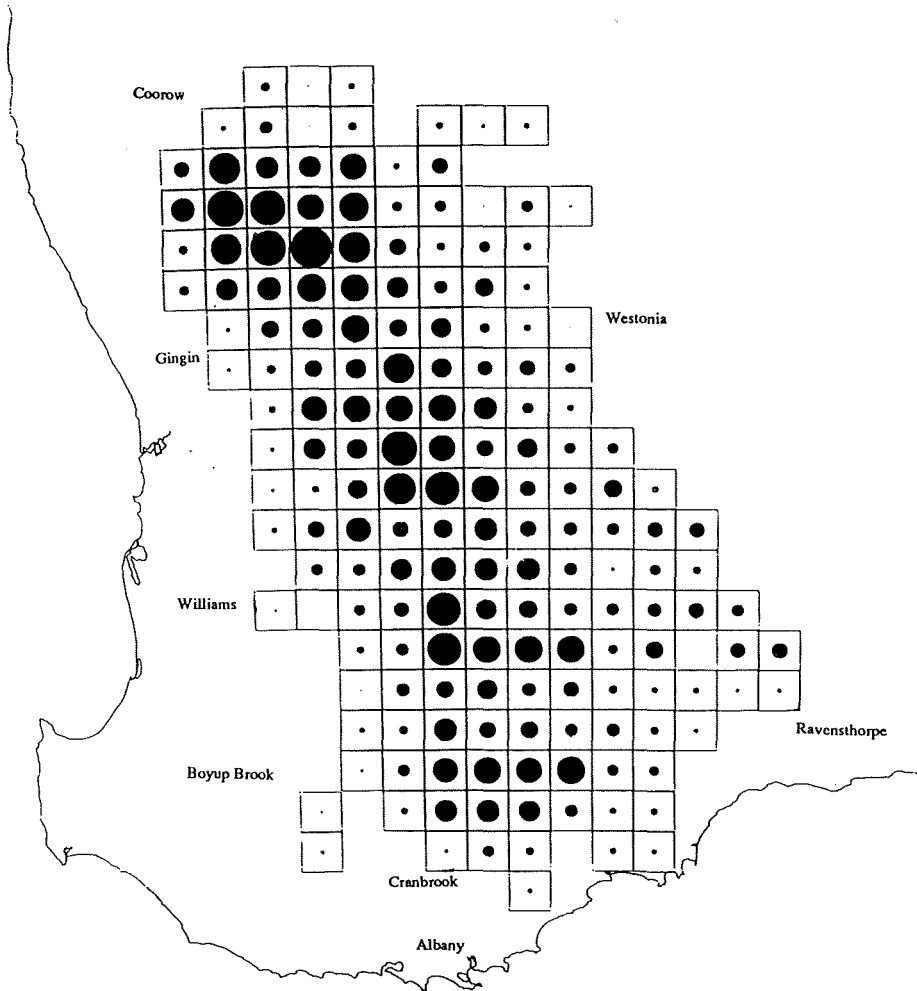


 LESS THAN 50	 50 TO 99	 100 TO 249
 250 TO 499	 500 TO 999	 1,000 TO 2,499
 2,500 TO 4,999	 5,000 AND OVER	

State Boundary Overlays Provided By National Mapping



**DIAGRAM 13.4**  
**RYEGRASS SPRAYED FOR ARGT PREVENTION/CONTROL IN 1988**  
 Circle size is proportional to the area in each grid square that was sprayed  
 in 1988 with herbicides or other chemicals to prevent or control ARG.T.



in the shires of Dumbleyung, Quairading and Wongan-Ballidu reported livestock losses. Total losses were put at 147,000 sheep and 567 cattle.

Very significant losses were reported for some individual properties. Sheep deaths exceeding 250 head were reported for 168 properties, while losses in excess of 1,000 sheep occurred on 22 properties. The survey also indicated the potential for a significant increase in the ARGV problem — while 1988 area of ARGV affected paddocks was put at 148,000 hectares, the total area of paddocks containing annual ryegrass (and hence possibly subject to infestation) was 3.6 million hectares.

In aggregate terms, livestock losses reported in the survey may not appear very significant when considered in the context of the total livestock population of the survey area. However, some of the more badly affected properties have suffered major financial losses owing to the ARGV. Apart from the direct cost of livestock losses, ARGV is also responsible for significant management costs. Many farmers in susceptible areas have avoided or minimised livestock deaths from ARGV by the use of expensive and time-consuming management practices, including spraying of ryegrass and very frequent inspection of livestock. It is thus apparent that ARGV is a problem of significance to livestock producers in susceptible areas of the state.

**TABLE 13.41 – SHEEP DEATHS FROM ARGV – AFFECTED HOLDINGS BY NUMBER OF DEATHS**

*Reference : Catalogue No. 7421.5*

<i>Number of sheep deaths</i>	<i>Number of holdings</i>
0	4,162
1 - 10	100
11 - 25	128
26 - 50	159
51 - 100	140
101 - 250	161
251 - 500	99
501 - 1,000	47
Over 1,000	22
<i>Total with deaths</i>	856
<b>Total respondents</b>	<b>5,018</b>

## THE DEPARTMENT OF AGRICULTURE

A Bureau of Agriculture was formed in 1894 and became the Department of Agriculture in 1898. At that time cleared, arable land in Western Australia was less than one per cent of present farm land.

The Department of Agriculture, which has expanded progressively, has a broad role to foster the State's agriculture and to advise on marketing of its products. By representation on the Australian Agriculture Council, it helps establish nationally acceptable policies.

It is the branch of the State Government service which communicates scientific advice to farmers, pastoralists and allied industries, conducts a wide range of research and administers relevant Acts of Parliament. It maintains services to assist farmers and its regulatory work consists of carrying out the provisions of some of the laws relating to agriculture.

The Head Office at South Perth houses the main administrative, research, specialist and diagnostic staff and there are 25 district offices and 19 research stations. Most research stations are for the wheat and sheep, beef, and dairying industries but specific stations cater for fruit, vegetables, poultry, pigs, viticulture and tropical agriculture.

The greater part of the Department's extension activities are carried out by the advisers and veterinary officers stationed at its Regional and District Offices. Research is carried out at head office, and at four outer metropolitan and 15 country research stations.

A detailed description of the Department of Agriculture, including its history, structure and the services it provides to the agricultural sector is contained in pages 313-318 of the *Western Australian Year Book*, No. 24—1986.

## AGRICULTURE PROTECTION BOARD

The Agriculture Protection Board is the body responsible for ensuring that the State's agriculture resources are protected from the sometimes devastating effects of plant and animal pests.

The Board administers the Agriculture and Related Resources Protection Act which replaced the Noxious Weed Act and the Vermin Act in 1976.

Plants and animals can be declared by the Board to be 'declared animals' for the purposes of the Act.

The Agriculture Protection Board's role is to coordinate the control effort and see that declared plants and declared animals are dealt with according to its policies. In addition to coordinating overall agriculture protection policies, the Board advises on methods of control, maintains services to prevent pest animals and plants entering the State, and conducts research into the biology and control of vertebrate pests.

#### ADVISORY COMMITTEES

Responsibility for advising the Minister for Agriculture on various aspects of agricultural activity is vested in a number of advisory committees, whose members are drawn from government departments and authorities, industry organisations and marketing and storage organisations.

These committees include the State Wheat Advisory Committee, the State Coarse Grains and Seeds Advisory Committee, the State Soil Conservation Advisory Committee, Drought Consultative Committee and the Ord Project Co-ordinating Committee.

#### HERD IMPROVEMENT SERVICE OF WESTERN AUSTRALIA

The Herd Improvement Service of Western Australia (HIS) was established in November 1984 under the provisions of the *Herd Improvement Service Act 1984*. HIS is an independent corporate body based in Bunbury. It was created to amalgamate the services previously provided by the Artificial Breeding Board and the Department of Agriculture's Dairy Herd Recording Scheme. Accordingly the purpose of HIS is to promote improvements of the quality and productive genetics of Western Australia's livestock through extensive use of advanced artificial breeding practices and scientific measurement of production as with the Dairy Herd Recording Service.

#### FARM MANAGEMENT SERVICE LABORATORY

The University of Western Australia, by resolution of the Senate, approved the establishment of the Farm Management Service Laboratory within the University in 1966. The aims of the Laboratory are to develop concepts and services in management accounting, computer planning and animal breeding which are specially suited to the needs of farmers; to make these developments available to farmers; and to use information processed by the Laboratory for teaching and research at the University of Western Australia.

## Forestry

#### FORESTS FOR WOOD, WATER AND WILDLIFE

Most of Western Australia's native hardwood forests grow in the south-west of the State, between Walpole and Perth. From these forests are drawn a wide variety of essential resources, both tangible and intangible: the beauty and durability of their timbers is renowned world-wide, and generates a considerable income for Western Australia each year; the forests also provide an increasingly popular environment for recreation, within easy reach of major cities and towns. Catchment areas, which supply high quality water for domestic and agricultural use to the most populated areas of the State, occur throughout the forests; and conservation areas for native wildlife and plants ensure the long-term survival of many species, as well as providing an invaluable scientific and educational resource.

At present 1,747,867 hectares have been permanently dedicated as State forest, 144,855 hectares are held as timber reserves, and 32,333 hectares of freehold land is vested mainly for pine production.

#### THE PRIME INDIGENOUS FORESTS

Jarrah (*Eucalyptus marginata*) is the State's principal timber and the prime forest covers almost 1.4 million hectares. Karri (*E. diversicolor*) is next in importance and is distributed over some 128,000 hectares. Wandoo (*E. wandoo*) accounts for a smaller portion of the dedicated area (104,000 hectares) and Tuart (*E. gomphocephala*), another valuable timber, has a restricted area of about 1,000 hectares. Blackbutt (*E. patens*) occurs in patches throughout the jarrah and karri forests and is an important milling timber with properties and uses similar to jarrah. Marri (*E. calophylla*),

the most widespread of the commercial eucalypts, is used to a limited extent as building scantling, pole timber and as the principal material for an export woodchip industry based in the Manjimup region.

Other eucalypts and many trees of different genera occur within the prime forest belt but they are not of major economic importance. The main distribution of the prime forests, which are practically confined to the south-western portion of the State, is shown on Diagram 13.3.

### THE INLAND FORESTS

East of the area of prime forest is an inland woodland, within which are a number of eucalypts (both tree and mallee form), as well as several types of *Acacia*, such as the wattles and mulgas, tea tree (*Melaleuca spp.*) and casuarinas. Sandalwood (*Santalum spicatum*), indigenous to the wheat belt and semi-arid areas of the State, is exported to Asian countries for use in the manufacture of incense.

The major emphasis of forestry activities in the goldfields area is the conservation of woodlands. During recent years, soil conservation in the regions of low rainfall has received increasing attention and the importance of controlling clearing, grazing and firewood cutting has been recognised. The Department of Conservation and Land Management maintains a staff to exercise these controls and to advise on tree planting. Work is proceeding with demarcation of areas representing important inland ecotypes for which long-term conservation proposals have been prepared.

### FORESTRY ADMINISTRATION

Forests in Western Australia are managed by the Department of Conservation and Land Management, within a General Working Plan of multiple use management and regulation of an allowable hardwood sawlog cut. Major uses include wood production, water production, forest and catchment protection, recreation, flora, fauna and landscape conservation, scientific study and education, public utility and mining.

Timber harvesting in both natural forests and plantations is tightly controlled and closely monitored to meet environmental protection and disease management requirements, and to achieve the most efficient use of the resource.

To supplement native forest production, pine forests have been established throughout the south-west. There are over 60,000 hectares of State owned plantations and an increasing amount of forests planted on private land. *Pinus radiata* and *pinus pinaster* are the principal species.

Other major forest-related roles of the department include reduction of forest diseases, particularly jarrah dieback (*Phytophthora cinnamomi*), fire surveillance and control measures and the granting of sawmilling permits and forest produce licences.

### FOREST PRODUCTION

Sawn timber from jarrah and karri is the principal form of forest wood production, but there will be a gradual increase in the use of pine in the future. Karri and locally grown pine logs together with imported logs are used for plywood. During recent years, there has been a greater use of local logs for plywood manufacture. Small sized logs from thinning pine plantations and manufacturing residues are used for the production of particleboard. Hardwood mill wastes and bush residues of marri and karri form the basis of an important export woodchip industry located in the southern forests.

In addition to these major wood products, the State's forest wealth includes sandalwood for export, firewood for general purposes, and various seeds and plants for propagation both in Australia and abroad. The karri, wandoo, marri and some inland scrub species are important nectar producers for apiarists, who move their bees to various forest sites to follow the nectar flow.

TABLE 13.42 - TIMBER PRODUCTION  
(cubic metres)

	1986-87	1987-88	1988-89
Sawlog production (a)—			
Hardwood	844,939	792,292	862,749
Softwood	104,000	127,556	135,737
Other log production (b)—			
Hardwood	652,616	809,851	705,162
Softwood	187,597	206,052	239,539
Sawn timber production—			
Hardwood	280,542	270,723	287,357
Softwood	36,116	47,929	47,834

(a) Sawlog timber from all sources, including veneer, but excluding chiplogs, firewood, piles and poles. Includes sawlogs and logs used in the production of plywood veneer. (b) Includes chiplogs, pine particle board material and pine rounds.

Of the hardwood chiplogs supplied from State forest in 1988-89, 24 per cent were karri and 76 per cent were marri.

Sawmilling and production are also referred to under Manufacturing in Chapter 16.

## Fisheries

### GENERAL FISHERIES

Rock lobsters are the most important item of production of the Western Australian fishing industry. The most important commercial species of rock lobster in Western Australian waters is the western rock lobster, which is fished off the south-west coast between Murchison River and Bunbury. The principal localities around which rock lobsters are caught are the Abrolhos Islands, Geraldton, Dongara, Green Head, Jurien Bay, Cervantes, Lancelin, Ledge Point and Fremantle. The industry is protected from overfishing by numerous measures and the catch is processed at shore stations licensed under the *Fisheries Act 1905* as processing establishments.

The catches of Australian salmon, which school in the bays on the south and lower south-western coasts, yield a significant proportion of the production of inshore and beach fishing and are used almost exclusively for canning. The remainder of the catch from this type of fishing comprises chiefly Australian herring, western sand whiting and sea mullet sold mainly as wet fish on

the local market, and pilchard and scaly mackerel, sold as bait and for pet food. There is an important fishery for southern bluefin tuna on the south coast of the State and investigations are being conducted on the commercial potential of tuna stocks in northern waters.

The coastal waters northward from the mouth of the Murchison River to North West Cape and Exmouth Gulf are the source of several species of commercial importance. Snapper are caught between the Murchison River and North West Cape during the northern schooling season from May to August. Cod and Spanish mackerel, though in smaller quantities, are also caught between the Murchison River and North West Cape.

Prawn fisheries have been established at Shark Bay and Exmouth Gulf, with the catch processed at Carnarvon and Learmonth respectively. The major species caught are western king prawns and brown tiger prawns, as well as quantities of banana and endeavour prawns. In these areas and the smaller fisheries at Nickol Bay and Onslow the

TABLE 13.43 - FISH, CRUSTACEANS AND MOLLUSCS - CATCH AND VALUE  
Reference : Catalogue No. 7601.5

Species—Common name	Quantity (a) (tonnes)			Value (b) (\$'000)		
	1985-86	1986-87	1987-88p	1985-86	1986-87r	1987-88p
Fish—						
Barramundi (Giant perch)	55	69	199	254.9	393.7	1,133.2
Cobbler	173	97	162	624.4	493.0	843.9
Emperor (North-west snapper)	252	257	518	586.2	636.9	1,392.9
Herring, Australian	837	980	1,266	476.9	817.1	1,211.3
Jewfish, Westralian	297	206	217	1,872.4	1,607.2	1,890.9
Mackerel, Spanish	322	222	270	907.6	783.4	821.9
Mullet, sea	449	509	639	444.1	534.7	785.2
Mullet, yellow-eye	390	246	454	273.0	200.9	411.5
Pilchard	5,391	6,161	7,389	1,994.5	2,625.2	3,733.6
Salmon, Australian	2,064	1,538	1,315	722.3	794.0	747.5
Scaly mackerel	1,287	478	221	605.0	357.7	207.0
Shark, bronze whaler	462	392	463	1,239.0	1,499.0	1,875.7
Shark, whiskery	310	256	341	717.2	834.6	1,182.8
Shark, other	828	633	1,344	1,112.6	1,566.1	3,051.7
Snapper	1,319	1,064	912	3,363.6	3,254.3	3,107.6
Tuna, southern bluefin	1,697	947	1,278	1,391.7	1,115.7	2,241.6
Whiting, western sand	231	139	181	579.7	337.0	533.6
Other species	1,913	1,699	2,279	3,788.5	3,544.5	6,102.6
<b>Total fish</b>	<b>18,276</b>	<b>15,893</b>	<b>19,448</b>	<b>20,953.5</b>	<b>21,395.0</b>	<b>31,274.5</b>

TABLE 13.43 – FISH, CRUSTACEANS AND MOLLUSCS – CATCH AND VALUE — *continued*  
*Reference : Catalogue No. 7601.5*

Species—Common name	Quantity (a) (tonnes)			Value (b) (\$'000)		
	1985-86	1986-87	1987-88	1985-86	1986-87	1987-88
Crustaceans—						
Crabs	190	193	204	504.4	676.7	595.9
Prawns—						
Banana	127	217	207	1,219.0	2,154.7	2,411.4
Brown tiger	610	693	655	6,461.0	8,864.3	8,835.2
Endeavour	291	175	299	1,576.5	1,005.6	2,108.9
Western king	1,714	1,630	1,823	13,216.6	17,609.4	21,529.5
Other species	154	130	259	247.2	309.2	752.3
Total prawns	2,896	2,845	3,243	22,720.4	29,943.1	35,637.4
Rock lobsters	7,391	7,718	10,573	91,076.3	119,461.2	169,457.5
<b>Total crustaceans</b>	<b>10,477</b>	<b>10,756</b>	<b>14,020</b>	<b>114,301.1</b>	<b>150,081.0</b>	<b>205,690.8</b>
Molluscs—						
Abalone	249	224	260	3,326.2	2,963.3	3,363.6
Scallops	2,046	2,370	2,564	3,726.0	7,314.1	8,467.3
Other molluscs	554	366	627	727.6	667.5	1,086.1
<b>Total molluscs</b>	<b>2,849</b>	<b>2,960</b>	<b>3,451</b>	<b>7,779.7</b>	<b>10,944.9</b>	<b>12,917.0</b>
<b>TOTAL WESTERN AUSTRALIA</b>	<b>31,602</b>	<b>29,609</b>	<b>36,919</b>	<b>143,034.3</b>	<b>182,420.9</b>	<b>249,882.3</b>

(a) Live (whole) weight. (b) Gross value paid to fishermen.

number of boats licensed to fish for prawns is restricted as a conservation measure.

Significant catches of scallops are taken in Shark Bay while a smaller fishery occurs at the Aboholhos Islands. In 1987-88 the value of the scallop fisheries was over \$8.5 million.

Shark fishing is an important activity on the lower west and south coasts. The other major species caught offshore in this region is the Westralian jewfish.

Abalone are taken by licensed divers in the southern half of the State with most production coming from the south coast. Species taken are greenlip, blacklip, brownlip and Roe's abalone. The 1987-88 value of the catch was almost \$3.4 million.

The first fishing grounds to be exploited were the estuaries and rivers and, although they are not now as important as other grounds, they still provide substantial quantities of fish of a fairly wide variety. The principal species are cobbler and yellow-eye mullet, sea mullet and Perth herring most of which are caught in the Swan and Harvey Estuaries and the Peel and Leschenault Inlets. Other species taken include sand whiting, King

George whiting, tailor, garfish and pilchard. Crabs, school prawns and western king prawns are also caught commercially in these waters.

## FISHERIES ADMINISTRATION

The Western Australian Fisheries Department conducts research on a wide range of commercially important fish species such as rock lobsters, prawns, snapper, Australian salmon, pearl oysters and tuna. The Department is also involved in research on recreational fisheries, estuaries, freshwaters and environmental matters relating to fisheries. Much of this research is carried out in association with the Commonwealth Scientific and Industrial Research Organization, other State and Commonwealth bodies and tertiary education institutions.

Research is carried out chiefly at two centres. The marine research centre at Waterman, was built for the Fisheries Department and incorporates several separate laboratories and a large aquarium with circulating water, for experiments and studies on a wide range of species. A second centre, the Commonwealth Scientific and Industrial Research Organization marine research centre at Marmion was opened in 1976.

## AQUACULTURE AND INLAND FISHING

Limited commercial production of marron began in 1977 following the passing of legislation which established fish farming guidelines, including licensing of marron farms. A number of other aquaculture ventures are proposed, including the commercial rearing of prawns, Atlantic salmon, brine shrimp and abalone.

Brown trout, rainbow trout and English perch have been introduced into the streams of the south-west, and rainbow trout are also reared commercially on a number of fish farms. These species together with indigenous stocks of freshwater cobbler, marron, barramundi and cherabin, provide sport for amateur inland fishermen.

## PEARL-SHELL FISHING AND PEARL CULTURE

Pearl and pearl-shell fishing has been a valuable industry for many years, the main centre being Broome. The natural pearls obtained were once an important feature of production but the success of the industry now depends almost entirely on the shell produced and the price obtainable for it, and cultured pearl production from licensed farms.

## AUSTRALIAN FISHING ZONE

The Australian Fishing Zone (A.F.Z.) covering waters within 200 nautical miles of Australia was declared on 1 November 1979. Under licence from the Commonwealth Government, foreign fishing vessels are permitted to fish within the Zone. A number of joint-venture feasibility studies and test fishing programs have been conducted in the Zone since its declaration.

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## CHAPTER 14

### MINING

**Western Australia is a world-scale producer of a range of minerals. The export-orientated mining industry is one of the most significant contributors to the State economy.**

#### MINING IN WESTERN AUSTRALIA

Gold mining was the mainstay of the State's mining industry from the 1890s through to the 1960s, when iron ore, nickel, bauxite and oil assumed prominence. Since the late 1970s, however, high gold prices and technological advances in processing methods have led to renewed growth in the industry. Production has increased significantly every year since 1981-82, and in 1987-88 gold again became the single most valuable mineral produced. Major gold mine developments and expansions have occurred, not only in the traditional areas around Kalgoorlie and other Eastern Goldfields centres, but also in the Pilbara and at Boddington in the South-West.

Other significant mineral projects in Western Australia are the giant iron ore mines in the Pilbara, nickel in the Eastern Goldfields, bauxite on the Darling Scarp, mineral sands principally at Capel and Eneabba, and diamonds in the Kimberley. Coal and solar salt production are also commercially important. Copper and zinc mining recommenced in 1988 and production of both is expected to reach significant levels.

The North-West Shelf Project, which supplies liquefied natural gas (LNG) for export, gas for industrial and domestic purposes and condensate, is the most important project in the State's oil and gas sector. Over \$12 billion is expected to be spent on the development of this project, which will generate annual exports worth over \$2 billion. (Further information on this project is contained in Chapter 15, Energy). Several significant oil projects have also recently been developed in

shallow waters near the existing Barrow Island field.

Apart from the 1989 commissioning of the LNG plant, other 'value-added' developments in the mining industry include synthetic rutile production from ilmenite, and the extraction of liquefied petroleum gas (LPG) at Kwinana from gas piped from the north-west. Other significant recent developments relate to the further processing of minerals, and are covered in Chapter 16, Manufacturing.

The map at the end of this chapter shows the locations of major projects.

A more comprehensive picture of the history of mining and mineral exploration can be found in the *Western Australian Year Book—No. 24, 1986*.

In Western Australia the development of minerals occurs under a variety of statutes, notably the Mining Act administered by the Department of Mines. Coordination of major resource development projects is undertaken by the Department of Resources Development which was established by the State Government in 1980 in recognition of the special approach required to effectively support projects of the magnitude undertaken in this State.

#### The Western Australian Department Of Mines

The primary role of the Department is to facilitate the orderly exploration and development of minerals and petroleum in Western Australia for the benefit of the community, now and in the



future. It also provides scientific and technical advice to Government agencies and the public on geo-technical and mining related matters, provides chemical consultancy services, regulates and records the ownership of mining tenements and regulates for public safety in matters concerning explosives and dangerous goods.

The Department is responsible for the collection of royalties for minerals owned by the Crown. Royalties for the State Government in 1988-89 amounted to \$176 million.

### The Western Australian Department Of Resource Development

By presenting a single point of contact with the Government, the Department of Resources Development facilitates development projects by coordinating the activities of government agencies in relation to a particular project and resolves issues between agencies and the developer or between agencies themselves.

## MINING STATISTICS

### Australian Standard Industrial Classification (ASIC)

Information presented in this and the following three chapters comes mainly from a system of integrated economic censuses based on the Australian Standard Industrial Classification (ASIC). ASIC classifies all economic activities

into four hierarchic levels. At the broadest level of the classification, economic activities are grouped into 'industry divisions'. Each industry division is further divided into industry sub-divisions, groups and classes.

For a detailed explanation of ASIC refer to *Australian Standard Industrial Classification, Volume 1*—1983 edition (Catalogue No. 1201.0)

### Census of Mining Establishments

The metallic minerals subdivision was by far the largest contributor to mining industry statistics in 1987-88, owing largely to the rapidly expanding gold sector and the well-established iron ore industry.

At a national level, Western Australia was the most significant state in 1987-88 in terms of turnover and value added for mining. Nearly sixty per cent of national capital expenditure on mining was spent in Western Australia, principally on the LNG phase of the North West Shelf Project and several major new gold mines.

The record employment figure of 20,796 persons in the mining industry represented three per cent of the total State labour force. In addition, the industry was directly responsible for the employment of a further 11,000 people involved in the associated processing, transport and port industries, and as contractors.

TABLE 14.1 - MINING ESTABLISHMENTS - SUMMARY OF OPERATIONS BY INDUSTRY SUB-DIVISION  
Reference : Catalogue No. 8404.5

Industry sub-division	Persons Number of employed establishments (a)	Wages and (a)(b)	salaries (c)	Value	Capital		
				Turnover	added	expenditure	
			\$m	\$m	\$m	\$m	
			1987-88				
Metallic minerals	145	16,024	556.9	4,847.3	3,094.0	835.2	
Coal, oil and gas	12	3,127	123.9	943.5	810.0	1,337.9	
Construction materials (d)	39	231	5.0	58.5	32.1	5.3	
Other non-metallic minerals	33	1,414	50.9	409.4	291.2	35.6	
<b>Total mining</b>	<b>1987-88</b>	<b>229</b>	<b>736.6</b>	<b>6,258.7</b>	<b>4,227.2</b>	<b>2,214.1</b>	
	1986-87	214	19,864	670.5	5,147.0	3,468.6	n.a
	1985-86	205	19,744	623.0	4,644.4	2,970.1	n.a

(a) At 30 June. (b) Includes working proprietors. (c) Excludes drawings of working proprietors. (d) Excludes sand and gravel.

DIAGRAM 14.1  
MINING ESTABLISHMENTS; VALUE ADDED  
WESTERN AUSTRALIA AND AUSTRALIA

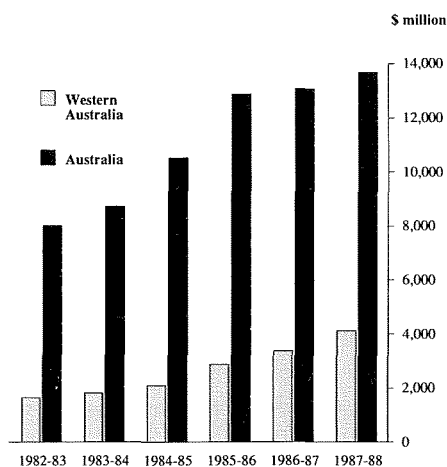


DIAGRAM 14.2  
MINING ESTABLISHMENTS; VALUE ADDED  
METALLIC MINERALS AND TOTAL MINING

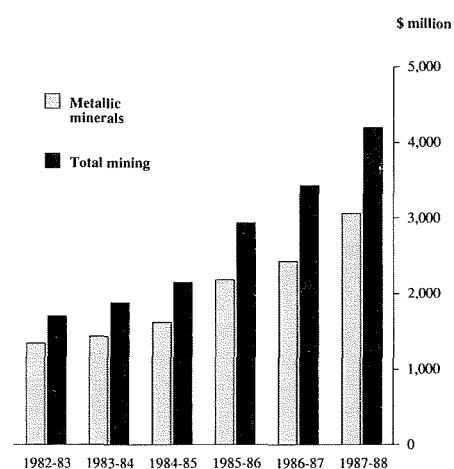


TABLE 14.2 - MINING ESTABLISHMENTS - PERSONS EMPLOYED, VALUE ADDED AND CAPITAL EXPENDITURE BY INDUSTRY SUB-DIVISION  
WESTERN AUSTRALIA AND AUSTRALIA : 1987-88  
Reference : Catalogue No. 8404.5

Industry sub-division	Persons employed (a)			Value added			Capital expenditure		
	Western Australia	Western Australia as a percentage of		Western Australia	Western Australia as a percentage of		Western Australia	Western Australia as a percentage of	
		Australia	Australia		Australia	Australia		Australia	
	'000	'000	%	\$m	\$m	%	\$m	\$m	%
Metallic minerals	16.0	31.5	51	3,094.0	5,162.9	60	835.2	1,341.6	62
Coal, oil and gas	3.1	36.0	9	810.0	7,608.7	11	1,337.9	2,291.2	58
Construction materials (b)	0.2	5.9	3	32.1	568.4	6	5.3	64.0	8
Other non-metallic minerals	1.4	3.3	42	291.2	414.2	70	35.6	69.2	51
<b>Total mining</b>	<b>20.8</b>	<b>76.8</b>	<b>27</b>	<b>4,227.2</b>	<b>13,754.1</b>	<b>31</b>	<b>2,214.1</b>	<b>3,766.1</b>	<b>59</b>

(a) At 30 June. Includes working proprietors. (b) Excludes sand and gravel.

### Mineral Production

Gold displaced iron ore as the most valuable mineral produced in Western Australia during 1987-88, owing to a twenty per cent increase in production over the previous year to 91 tonnes of contained metal. Ten years ago gold was the fifth most valuable mineral, with production of only 13.5 tonnes.

Other minerals that have contributed strongly to the significant increase in the State's value of mineral production in the past decade are diamonds, which were first extracted in 1982, condensate and natural gas.

TABLE 14.3 – MINERAL PRODUCTION  
Reference : Catalogue No. 8404.5

Mineral	Unit	1985-86		1986-87		1987-88	
		Quantity	Value (a)	Quantity	Value (a)	Quantity	Value (a)
			\$'000		\$'000		\$'000
<b>Metallic minerals—</b>							
Bauxite (b)	'000 tonnes	19,413	n.p.	20,438	n.p.	20,957	n.p.
Copper concentrate	"	15	n.p.	—	—	(c)10	n.p.
Gold bullion	'000 grams	56,852	704,367	75,450	1,295,854	106,764	1,839,478
Iron ore	'000 tonnes	92,990	1,794,972	92,468	1,801,585	97,967	1,669,762
<b>Mineral sands concentrates—</b>							
Ilmenite (incl. synthetic rutile)	"	1,058	53,019	1,070	78,840	1,265	141,914
Leucoxene	"	n.p.	n.p.	26	10,437	23	5,704
Monazite	"	16	9,227	11	7,135	(b)10	(b)6,961
Rutile	"	n.p.	n.p.	(d)88	n.p.	(b)85	(b)51,169
Xenotime	tonnes	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.
Zircon	'000 tonnes	339	43,525	291	51,672	(d)340	n.p.
<i>Total value mineral sands</i>	..	..	149,257	..	196,851	..	n.p.
Nickel concentrate (b)	'000 tonnes	455	n.p.	(b)406	n.p.	(b)389	n.p.
Tin concentrate	"	(b)679	n.p.	(b)731	n.p.	(b)434	(b)2,856
Zinc concentrate	'000 tonnes	14	n.p.	—	—	n.p.	n.p.
Other (e)	..	..	549,459	..	511,011	..	834,737
<b>Total value metallic minerals</b>	..	..	<b>3,154,571</b>	..	<b>3,756,524</b>	..	<b>4,552,580</b>
<b>Coal, oil and gas—</b>							
Coal	'000 tonnes	(b)3,765	(b)126,841	(f)3,782	n.p.	(b)3,702	(b)150,965
Crude oil (including condensate) (d)	megalitres	1,812	n.p.	2,174	n.p.	3,100	n.p.
L.P.G. (d)	"	1	n.p.	—	n.p.	1	n.p.
Natural gas (d)	gigalitres	2,928	n.p.	3,377	n.p.	3,887	n.p.
<b>Total value coal, oil and gas</b>	..	..	<b>712,993</b>	..	<b>n.p.</b>	..	<b>n.p.</b>
<b>Construction materials—</b>							
Building and monumental stone	'000 tonnes	94	1,394	79	n.p.	78	n.p.
<b>Crushed and broken stone—</b>							
Limestone	"	2,972	15,566	2,124	n.p.	1,613	n.p.
Other	"	4,680	47,796	4,605	39,915	4,089	42,419
<b>Total value construction materials</b>	..	..	<b>64,757</b>	..	<b>n.p.</b>	..	<b>n.p.</b>
<b>Other non-metallic minerals—</b>							
<b>Clays—</b>							
Brick clay and shale	'000 tonnes	n.p.	n.p.	1,756	11,729	n.p.	11,183
Other (g)	"	92	2,564				
Diamonds (b)	'000 carats	17,472	147,568	32,165	284,095	30,218	248,203
Gypsum	'000 tonnes	370	3,634	201	1,331	107	694
Limestone	"	2,045	7,065	1,507	6,134	n.p.	n.p.
Salt	"	4,676	88,632	(b)5,051	(b)107,382	(b)5,534	107,165
Silica	"	414	2,864	332	2,349	461	3,137
Spodumene	tonnes	n.p.	n.p.	(c)9,150	n.p.	27,466	n.p.
Talc	'000 tonnes	(c)146	n.p.	(c)181	n.p.	n.p.	n.p.
Other (h)	..	..	19,473	..	14,679	..	26,658
<b>Total value other non-metallic minerals</b>	..	..	<b>271,801</b>	..	<b>427,698</b>	..	<b>397,040</b>
<b>TOTAL VALUE ALL MINERALS</b>	..	..	<b>4,204,122</b>	..	<b>5,009,887</b>	..	<b>5,935,544</b>

(a) Ex-mine value. (b) Source: Department of Mines. (c) Source: Production from published producers' reports. (d) Source: Department of Primary Industries and Energy. (e) Includes copper ore for fertiliser, gold concentrate, gold ore, lead concentrate, tantalite-columbite concentrate and those metallic minerals for which values are not publishable. (f) Source: Joint Coal Board. (g) Includes attapulgite. (h) Includes barite, diatomite, dolomite, feldspar, garnet concentrates, mica, peat, semi-precious stones, sillimanite, vermiculite and those minerals for which values are not available separately for publication.

### PRIVATE MINERAL EXPLORATION (Other than for petroleum)

Mineral exploration (other than for petroleum) is carried out over a large portion of the State. In recent years the search has been largely concentrated on gold, as indicated in the accompanying table and graph.

Expenditure in 1988-89 decreased by sixteen per cent after six successive annual gains. This was almost wholly owing to a drop in gold exploration from the record level of 1987-88, because of lower gold prices and the passing of legislation removing gold's exemption from tax after 1991.

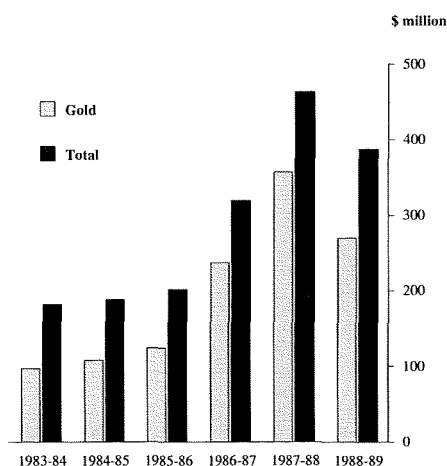
Despite the fall, Western Australia continued to be the dominant state for exploration, both in total and for most individual minerals.

**TABLE 14.4 – PRIVATE MINERAL EXPLORATION (OTHER THAN FOR PETROLEUM) EXPENDITURE BY TYPE OF MINERAL SOUGHT (\$million)**

Reference : Catalogue No. 8412.0

Type of mineral sought	Total private exploration		
	1986-87	1987-88	1988-89
Coal	3.7	1.4	5.4
Construction materials	0.3	0.5	0.5
Copper, lead, zinc, silver, cobalt and nickel	27.7	40.9	42.2
Diamonds	10.8	18.1	22.5
Gold	240.3	360.9	273.0
Iron ore	10.6	10.9	6.2
Mineral sands	3.7	3.8	9.1
Tin/tungsten	0.9	2.0	0.2
Uranium	14.2	12.7	13.3
Other	11.0	14.8	18.3
<b>Total</b>	<b>323.3</b>	<b>466.3</b>	<b>390.8</b>

**DIAGRAM 14.3 PRIVATE MINERAL EXPLORATION GOLD AND TOTAL**



**TABLE 14.5 – PRIVATE MINERAL EXPLORATION WESTERN AUSTRALIA IN RELATION TO AUSTRALIA : 1988-89 (\$m)**

Reference : Catalogue No. 8412.0

Mineral	Western Australia	Australia	Western Australia as a percentage of Australia
Gold	273.0	451.4	60
Base metals	42.2	98.1	43
Diamonds	22.5	32.7	69
Other minerals	53.1	114.2	46
<b>Total</b>	<b>390.8</b>	<b>696.4</b>	<b>56</b>

### PETROLEUM EXPLORATION

Petroleum exploration in Western Australia is centred on the onshore Canning and offshore Carnarvon Basins, and to a lesser extent in the Perth and Bonaparte Basins.

Exploration activity increased in 1987-88 as oil prices improved and new off-shore recovery techniques became available. Thirty-five exploration wells were completed, compared with only twelve in 1986-87. However, activity was still well below the levels of the early 1980s.

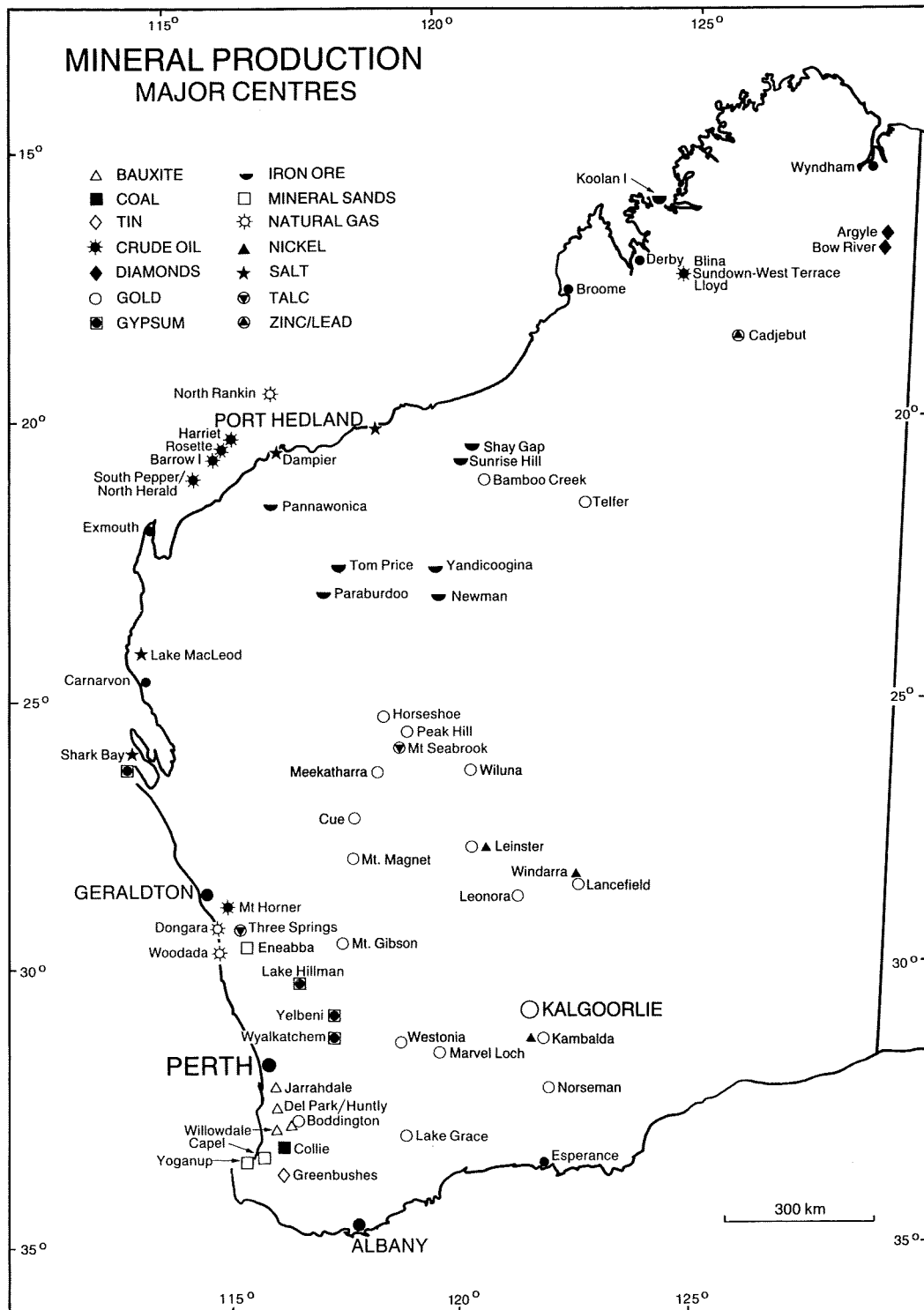
Successful wells were drilled to extend resources at the Saladin and Harriet fields off Onslow, while a new discovery was made at Lloyd in the Canning Basin.

**TABLE 14.6 – PRIVATE PETROLEUM EXPLORATION – WELLS AND DEPTH DRILLED**

Reference: Catalogue No. 8404.5

Unit	1985-86	1986-87	1987-88
Wells drilled (i.e. those which reached final depth)—			
As oil producers	No. 4	3	4
As gas producers	" 4	1	-
As oil and gas producers	" -	-	1
Plugged and abandoned	" 29	8	30
<b>Total</b>	<b>" 37</b>	<b>12</b>	<b>35</b>
Drilling still in progress at 30 June (uncompleted holes)	" 1	4	3
Wells drilled or drilling over 3,000 metres	" 6	1	1
Depth drilled—			
Completed wells metres	68,449	24,734	51,570
Uncompleted holes	" 3,211	5,286	2,384
<b>Total</b>	<b>.. 71,660</b>	<b>28,175</b>	<b>53,954</b>

DIAGRAM 14.4



Source: Western Australian Department of Mines

**REFERENCES****ABS Publications**

*Actual and Expected Private Mineral Exploration, Australia* (8412.0)

*Census of Mining Establishments: Details of Operations by Industry Class, Australia* (8402.0)

*Mineral Production, Australia* (8405.0)

*Mining, Western Australia* (8404.5)

*Principal Mining Statistics, Western Australia* (8405.5)

**Other Publications**

*Statistical Digest of Mineral Production 1987-88*,  
Department of Mines, Western Australia

## Chapter 15

### ENERGY

The availability of energy is an important factor in the economic and social development of any country, and this is no less so in Australia, which ranks among the highest per capita energy users in the world. In Western Australia, the per capita energy consumption is some 10 per cent higher than that for the rest of Australia, primarily because of two factors:

- (a) the vast area of the State in relation to its population and the resultant high demand for transport energy;
- (b) the development and expansion of large scale mining and mineral processing industries since the mid 1960s which has added considerably to energy demand.

For many years, Western Australia's only major indigenous source of primary energy (other than firewood and wind power) was black coal, which has been mined in the Collie region since the 1890s. Production of crude oil at Barrow Island (1967) and natural gas at Dongara (1971) further broadened the State's energy resource base. More recently, large deposits of natural gas in the North West Shelf area off Western Australia have been developed. Production from this source commenced in 1984.

Several deposits of energy minerals are at various stages of exploration, evaluation or development. In addition, research and development work continues on the various alternative sources of energy including solar and wind energy.

While Western Australia is still dependent on imports of some petroleum products, it is considerably more energy self-sufficient than it was in the early 1960s. One of the factors influencing previous economic development of this State has been the limited availability of local energy supplies. With the development of the North West Shelf natural gas project, a substantial energy surplus was created for the first time in the history of the State.

#### ENERGY RESOURCES

Western Australia's resources of energy minerals are shown in Table 15.1. To put these resources data into perspective, recent State production data have also been shown.

TABLE 15.1 — FUEL MINERALS  
RESOURCES AND PRODUCTION, 1988-89  
(Sources: Joint Coal Board;  
Western Australian Department of Mines)

Type	Unit	Resources (a)	Pro- duction
Hydrocarbon liquids—			
Crude oil	million cu m	(b)18.9	2.1
Condensate	million cu m	(b)88.9	1.1
Natural Gas	million cu m	(b)854,926	4,290
Black coal	million tonnes	(c)4,220	3.9
Uranium	tonnes U3O8	79,508	-

(a) At 30 June 1989. (b) Probability greater than 90 per cent that resources shown are recoverable. (c) Represents open cut and underground resources, both demonstrated and inferred.

The resources data, except for black coal, represent amounts which are expected to be profitably extractable, given existing knowledge of mineral deposits, current prices and technology.

Resources data are therefore subject to considerable revision if any of these factors change.

While it is not possible to quantify such resources, Western Australia's geographical and climatic characteristics are such that it has considerable potential to take advantage of advances in the use of solar, wind and biomass energy, as well as tidal and wave power.

### ENERGY PRODUCTION, CONVERSION AND UTILISATION

#### Electricity

Most of the electricity production in the State is generated by the State Energy Commission of Western Australia (SECWA) whose responsibilities include ensuring the effective and efficient use of the State's energy resources and the provision of economical and reliable supplies of electricity and gas. Significant amounts of electricity are also generated by private enterprise, particularly large-scale mining companies in the Pilbara region.

TABLE 15.2 - PRODUCTION OF ELECTRICITY  
(million kWh)

Generated by	1986-87	1987-88	1988-89
Government	7,562	8,179	9,123
Private	2,850	2,917	2,829
<b>Total</b>	<b>10,412</b>	<b>11,096</b>	<b>11,952</b>

SECWA operates two power grid systems which supply the electricity needs of 98 per cent of the State's population. The two systems are:

(a) *The South-West interconnected system* servicing an area from Kalbarri in the north to Bremer Bay in the south and from Perth east to Kalgoorlie. Three major thermal power stations provide the bulk of electricity for the system. They are located at Muja (1,040MW capacity) and Bunbury (120MW), both coal fired and generating around 60 per cent of electricity supplied through the system during 1988-89; and at Kwinana (880MW), fuelled

by coal and North West Shelf natural gas. Gas turbines at Kwinana, Geraldton and Kalgoorlie (each of 20MW capacity) provide peak and emergency power. At 30 June 1989, the installed capacity of generating plant within this system was 2,100MW. An additional eleven 36MW gas turbine generating units will be commissioned progressively through to the end of 1990 at Mungarra (east of Geraldton) and Pinjar (north of Wanneroo)—both remote controlled—and at Kalgoorlie.

(b) *The Pilbara interconnected system* interconnecting Karratha, Dampier, Cape Lambert, Wickham, Roebourne, Port Hedland and Goldsworthy. Electricity is supplied from Cliffs Robe River Iron Associates' gas-fired power station at Cape Lambert. Additional power can be drawn from the SECWA stand-by diesel generating facility at Port Hedland, from Hamersley Iron Proprietary Limited's power station at Dampier and from a SECWA gas turbine generating unit also located in Dampier.

Outside the electricity grid systems, SECWA operates another twenty-eight smaller diesel power stations with a total capacity at 30 June 1989 of 178MW. It also provides support services for the Federal Department of Aboriginal Affairs to help run thirty-four Aboriginal village power stations in remote areas of the State.

At 30 June 1989, SECWA had 596,609 customer accounts for electricity throughout Western Australia.

Studies to determine the feasibility of locating a privately owned coal fired power station near Hill River, 250 kilometres north of Perth, are nearing completion. The proposed station would have a generating capacity of 600 MW and use coal from the substantial Hill River open cut deposit nearby.

TABLE 15.3 - FUELS USED FOR ELECTRICITY GENERATION

Source : State Energy Commission Of Western Australia

Fuel	Unit	1986-87	1987-88	1988-89
Coal	'000 tonnes	2,333	2,363	3,233
Fuel oil	'000 tonnes	19	15	16
Distillate	'000 tonnes	54	56	70
Natural gas	Terajoules	34,442	42,128	33,973



### Petroleum fuels

Until 1954, Western Australia was wholly dependent on imports for its supplies of petroleum fuels. The opening of an oil refinery at Kwinana in that year brought some local input into petroleum fuel production although, initially, all the feedstock for the refinery was imported.

The first commercial deposits of oil were found on Barrow Island, off the north-west coast of the State, in 1964 and shipments commenced in 1967. This oil is refined at several Australian refineries, including Kwinana.

In 1966, natural gas was discovered at Dongara, to the north of Perth. At that time, gas manufactured from (mainly Collie) coal and naphtha (a light distillate) was being reticulated by SECWA and the Fremantle Gas and Coke Company within the Perth Metropolitan Area. A pipeline was later constructed linking Dongara with the metropolitan gas mains system and with Pinjarra south of Perth. The replacement of manufactured gas commenced in December 1971 and was completed before the end of 1972. On 1 October 1986, SECWA purchased the gas reticulation facility operated by the Fremantle Gas and Coke Company.

The North West Shelf provides most of the gas supplied to SECWA with a small amount of gas being received by SECWA from the onshore Woodada gas field (near Dongara). In addition to reticulating (principally) North West Shelf natural gas to customers linked to the Dampier to Bunbury pipeline, SECWA also reticulates tempered liquefied petroleum (TLP) gas, using feedstock provided by a Kwinana refinery, to customers in Albany on the south coast.

At 30 June 1989, there were 224,405 customer accounts for natural gas and 2,459 customer accounts for TLP gas.

The North West shelf project is based on the use of the North Rankin and Goodwyn gasfields which contain expected recoverable hydrocarbons currently estimated at 297,500 million cubic metres of gas and 52 million cubic metres of condensate (with a 90 per cent probability that these volumes are recoverable). In North Rankin, the first field to be developed, the natural gas reservoir is trapped in layers of porous sandstone, more than three kilometres below the sea floor. The gas-saturated sandstone beds have a cumulative thickness of approximately 300 metres and extend over an area of more than 50 square kilometres.

Construction of the offshore and onshore facilities for the project involved two phases; the first (the Domestic Gas Phase) to supply gas to Western Australia, while the second (the Liquefied Natural Gas (LNG) phase) is to supply LNG to Japan.

**TABLE 15.4 – SALES (a) OF PETROLEUM PRODUCTS**  
(Source: Australian Bureau of Agricultural and Resource Economics)  
(megalitres)

	1986-87	1987-88	1988-89
LPG	81	67	67
Automotive gasoline—			
Premium Leaded	1,437	1,399	1,323
Unleaded	122	221	337
<i>Total</i>	<i>1,559</i>	<i>1,621</i>	<i>1,661</i>
Aviation gasoline	16	16	16
Aviation turbine fuel	300	285	283
Automotive diesel oil	1,442	1,609	1,840
Industrial and marine diesel fuel	59	64	44
Fuel oil	301	320	334
Lubricating oils and greases	57	60	66
Bitumen	59	54	67
Other products (b)	86	37	36
<b>Total products</b>	<b>3,958</b>	<b>4,134</b>	<b>4,414</b>

(a) Includes reporting companies' own use, but excludes refinery fuel. (b) Includes lighting kerosene and heating oil.

The Domestic Gas Phase is complete. The LNG phase began in 1985. It involved the construction of three LNG processing 'trains', four 65,000 cubic metre capacity LNG storage tanks to store the refrigerated LNG ready for export, and seven 125,000 cubic metre capacity LNG tankers to ship the LNG to Japan.

By October 1989, two of the three processing trains, all storage tanks and two of the seven tankers were in service with the total plant and fleet due to be fully operational by 1993. LNG exports to Japan commenced at the end of July 1989, nearly two months ahead of the contract schedule.

When both phases are fully operational at planned plateau production levels, output from the project will include:

- (a) 10.5 million cubic metres (414 Terajoules) of gas per day for the domestic market in Western Australia;

(b) 6 million tonnes of LNG per year to eight Japanese electricity and gas utilities which service areas embracing 90 million people;

(c) 1.9 million cubic metres of condensate per year (33,000 barrels per day). Production could treble once the Goodwyn Platform is in operation.

During the year ended 30 June 1989, the North Rankin field produced 3,557 million cubic metres of gas and 1,133,937 cubic metres of condensate. The field currently produces about 22 million cubic metres of gas per day of which 12 million cubic metres is re-injected into the reservoir, resulting in increased condensate production. The peak daily flow rate of gas supplied to SECWA during 1988-89 was 443 Terajoules (11.6 million cubic metres).

Development of the condensate rich Goodwyn field is now underway. Contracts have commenced to be let for construction of the \$1.7 billion Goodwyn A platform due for completion in 1993. It will be connected to the North Rankin A platform 23 kilometres to the south east by undersea pipeline. The Goodwyn development will have the capacity to process 25.5 million cubic metres of gas per day and up to 12,700 kilolitres a day of condensate.

In 1984 SECWA constructed a 660 millimetre capacity pipeline, 1,500 kilometres long, from Dampier to Wagerup, at a cost of approximately \$1,000 million, to carry gas to its Perth distribution network, and to major industrial customers in the south-west of the State. The pipeline has been extended to serve major industrial customers in the Pilbara and to supply smaller gas supply systems at Carnarvon, Geraldton, Pinjarra and Bunbury.

Petroleum exploration has continued at a high level in recent years. Statistics relating to this activity and to the production of crude oil and natural gas are contained in tables in Chapter 14.

An LPG extraction plant based at Kwinana and using North West Shelf gas to produce propane and butane became fully operational in October 1988. About 100,000 of the 150,000 tonnes produced each year is being exported to Japan.

Table 15.4 shows sales of petroleum products in Western Australia. The data relate only to sales of refinery products (whether produced in this State or imported), and hence exclude products such as

natural gas, which do not go through a refining process; or crude oil, which is a refinery input.

### Coal

Commercial production of coal commenced in the 1890s at Collie. For many years coal was the major source of energy in the State, being used to generate electricity, to manufacture 'town' gas and to provide fuel for steam locomotives and industry generally. Today, the major user of coal mined in the Collie basin is SECWA. Coal is the main fuel for electricity generation for SECWA's South-West interconnected system.

Substantial deposits of black steaming coal suitable for power generation have recently been demonstrated at Hill River, 250 kilometres north of Perth near the coastal town of Jurien. The deposit, at 600 megatonnes (demonstrated and inferred), has the potential to be a major long term supplier of energy to the state.

Data showing trends in coal production since 1900 are contained in the Statistical Summary, Chapter 26.

Apart from the Collie and Hill River deposits, several other deposits of both black and brown coal have been identified and are at present being evaluated. Chapter 14 contains statistics relating to exploration and production of coal.

### Solar energy

The use of solar radiation for the production of domestic hot water is well established in Western Australia, and is the most common application of solar energy. In 1985-86, over 23 per cent of private dwellings in the State had solar hot water systems, and such systems are accepted as being competitive with other forms of domestic water heating.

There is also a well established use of photovoltaic cells which convert light directly into electrical energy for the refrigeration of food, and basic lighting and radio communications equipment in remote localities. More recent developments have been the use of solar energy for water and space heating in commercial applications and in agriculture, where solar power can be used to pump water from reservoirs and to electrify fencing.

At present, economical application of solar energy is largely restricted to relatively small scale heating purposes, with some more sophisticated

applications in remote localities where factors such as the transport costs of conventional fuels are significant.

### **Biomass**

Biomass refers to living matter which can be used as a source of energy and it includes matter which can be used directly as a fuel (e.g. firewood) or after conversion (e.g. sugar cane converted to sugar, sugar converted to ethanol). The concept of biomass includes organic waste materials such as sawdust and crop refuse, but excludes fossil fuels such as coal and petroleum. The most significant form of biomass to have been used as an energy source in Western Australia is firewood, and this is still an important source of household energy.

Research is at present continuing on the further use of biomass as an energy source. This is largely concerned with the use of oil from oil-seed crops in diesel-type engines, and the production of ethanol from sugar, grain crops and organic waste materials. The Orbital Engine Company of Perth provided one of the two key engine components used by CSIRO in converting and testing a production model fuel-injected sedan run on ethanol.

### **Uranium**

No uranium has been mined on a commercial basis in Western Australia to date, though small amounts of ore have been extracted and processed for test purposes. A number of uranium ore bodies have been identified in the State, and exploration for this mineral is continuing. Further details of uranium exploration are contained in Chapter 14.

### **Wind energy**

Wind power was of some significance as an energy source in the early days of settlement and is still used extensively in agricultural and pastoral areas for pumping water for stock.

Development of the use of wind power to generate electricity has intensified in recent years. In 1986, wind turbines were installed at a test site near South Fremantle. In March 1987, SECWA commissioned six 60 kilowatt wind turbines at Salmon Beach, a few kilometres west of the south coastal town of Esperance, to augment the local electricity supply. A wind power generator is also being used to augment the electricity supply on Rottnest Island.

Wind energy is now considered close to becoming cost effective for power production in areas with reliable wind and there are prospects for extending the use of wind beyond its present major application in the pumping of water. SECWA are currently studying the use of wind energy generators on the interconnected grid and have identified sites near Geraldton and Cowaramup as being suitable for wind farms of up to 20MW capacity.

### **Other energy sources**

There are several other energy sources which have potential use in Western Australia. Sites have been identified in the Kimberley region in the north of the State which would be suitable for hydro-electricity generation, including the existing dam on the Ord River. Parts of the Kimberley coastline, where very large tidal ranges occur, have been identified as suitable sites for tidal electricity generation, while wave power is proposed to be harnessed in waters near Esperance. Some small deposits of oil shale have been identified in the south-east of the State.

### **Research**

The Renewable Energy Advisory Council was recently established to advise the Western Australian Government on all aspects of research, development, demonstration and general promotion of renewable energy technologies.

The principal energy research organisations in Western Australia are SECWA, the Minerals and Energy Research Institute of Western Australia (MERIWA) and Murdoch University's Energy Research Institute (MURI).

SECWA is primarily responsible for the efficient and effective use of energy resources available to the State of Western Australia. Consistent with this responsibility it is engaged in an active program of investigation and evaluation of renewable energy sources and applications of energy which may become significant in the future.

SECWA has undertaken studies into the use of alternative fuels for power generation and for use in motor vehicles. Vegetable oils have been tested with some success as alternative liquid fuels for generating electricity and tests are continuing into the use of LPG and compressed natural gas (CNG) in light vehicles. The Metropolitan (Perth)

Passenger Transport Trust is involved in a project to convert thirty buses to operate exclusively on CNG.

SECWA have also been participating in opportunities to harness waste heat from industrial machinery to achieve energy savings.

MERIWA approves and arranges funding for projects intended to develop or demonstrate uses of solar and alternative forms of energy which have potential for economically viable application in the short to medium term. These include projects ranging from energy storage systems to the use of various forms of biomass.

MURI is principally involved in research and development of renewable energy sources, especially solar energy (solar radiation) systems. In addition, MURI carries out a range of tests for manufacturers and research workers on a confidential basis.

Since 1984, staff engaged at MURI have undertaken field trials in remote areas on photovoltaic systems for producing electricity. Staff are now engaged in developing systems suitable for remote Aboriginal communities, under funding from the Federal Departments of Aboriginal Affairs and Primary Industries and Energy.

There are also a number of other testing facilities in the State, some operating under contract. These facilities, and the institutions responsible for operating them include:

- (a) Corrosion Testing Facility—Curtin University of Technology;
- (b) Materials Performance Testing Facility—Curtin University of Technology;
- (c) Materials Standards Laboratory—University of Western Australia.

At the national level, CSIRO and the Commonwealth Department of Primary Industries and Energy (through the National Energy Research Development and Demonstration Program (NERDDP)) are involved in a number of energy research programs. NERDDP is a grant scheme to encourage energy research. A major new study is being commissioned under NERDDP

which, in conjunction with the private sector will investigate and make recommendations on the timing, planning and coordination of further research and development into the use of natural gas for vehicles.

### ENERGY AND THE ENVIRONMENT

A rapidly increasing demand for energy is creating growing concern about air pollution and the greenhouse effect, particularly from gas emissions resulting from combustion of fossil fuels.

In response to these concerns, the Western Australian Government has established a Greenhouse Advisory Council to recommend goals and specific measures to address greenhouse issues.

SECWA, in association with the Murdoch University, is researching the effects of power station emissions on the environment and in particular native plant species. The impact of an extensive tree planting program aimed at alleviating the greenhouse effect and reducing land degradation is being studied. SECWA is also seeking to ensure that underground water reserves in the vicinity of power generation stations are protected.

### NATIONAL ENERGY SURVEY OF HOUSEHOLDS

National Energy Surveys were conducted by the ABS in November 1980, June 1983 and over the twelve months commencing 17 June 1985. The surveys were based on a sample of private dwellings but excluded certain types of dwellings, such as non-private dwellings (hospitals, hotels, motels, etc.), caravan parks and dwellings occupied by more than one household. Also excluded were foreign diplomatic personnel and members of non-Australian defence forces stationed in Australia.

The 1985-86 Survey sought information about the types of domestic appliances and water heating facilities, room heating, air-conditioning, insulation and swimming pools installed. Additional data obtained were: the number of adults and children and gross income of the household; consumption of electricity and reticulated gas by households over a twelve-month period; and the number of rooms in the dwelling.

TABLE 15.5 – HOUSEHOLDS BY MAJOR APPLIANCES AND FACILITIES: JUNE 1983 AND 1985-86  
WESTERN AUSTRALIA AND AUSTRALIA

Reference: Catalogue No. 8212.0

	Western Australia		Australia	
	June 1983 Per cent (a)	1985-86 '000 Per cent (a)	June 1983 Per cent (a)	1985-86 '000 Per cent (a)
Refrigerator	99.7	460.7	99.6	5,023.5
Freezer	46.4	210.3	45.5	2,342.4
Hot plates	97.5	455.7	98.5	4,953.1
Oven	99.1	456.0	98.6	4,980.4
Microwave oven (b)	12.9	154.8	33.5	1,509.5
Electric frypan/skillet (b)	35.9	301.1	65.1	3,521.2
Vertical grill (b)	5.7	53.7	11.6	777.7
Dishwasher	13.1	68.5	14.8	995.2
Washing machine	92.1	425.8	92.0	4,684.6
Clothes dryer	30.1	159.1	34.4	2,428.3
Ceiling fan (c)	(d)	113.0	24.4	852.7
Air conditioning	37.1	186.4	40.3	1,783.0
Main heating, non-shared--				
Electric	30.4	130.3	28.2	2,103.1
Gas	15.3	82.8	17.9	1,232.1
Oil	12.9	42.3	9.2	281.3
Wood/solid fuel	21.3	120.1	26.0	794.6
<i>Total</i>	92.5	421.9	91.2	4,646.8
Hot water system (e)	99.0	459.6	99.2	5,001.8
Wall insulation (f)	4.6	21.3	4.9	672.8
Roof insulation (f)	39.2	201.5	46.2	2,239.4
Swimming pool (f)	12.7	56.6	13.0	518.3
Bore/well pump (f)	(d)	96.4	22.1	279.5
<b>Total households</b>	<b>100.0</b>	<b>462.6</b>	<b>100.0</b>	<b>5,044.1</b>

(a) Percentage of total households. (b) For June 1983, included only if used more than once a week. For 1985-86, included if the household had any of the appliances as distinct from actually using them. (c) Permanently fixed large bladed fans only. (d) Not asked. (e) Includes shared systems. (f) Not asked at flats, mobile, and improvised dwellings. \* Care should be exercised when using this figure—subject to sampling variability too high for most practical purposes.

## REFERENCES

### ABS Publications

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## Chapter 16

### MANUFACTURING

The manufacturing industry in Western Australia is heavily concentrated in the south-west of the State. The production of food and beverages and the processing of mineral products are the most valuable industries.

#### MANUFACTURING IN WESTERN AUSTRALIA

Historically, manufacturing in Western Australia was centred around processing of local raw materials to produce meat, milk, seafood, wood, clay and cement products for both local consumption and export.

While these industries still remain important, the development in recent decades of the State's enormous mineral wealth and the availability of cheap, plentiful energy in the form of natural gas have seen the emphasis switch to value-added processing of minerals such as alumina and nickel for export. More recent mineral-related developments include expansion of gold and alumina refining capacities, the establishment of a silicon smelter and several projects related to downstream processing of mineral sands.

Concurrent with these developments and the strong growth in the mining industry (particularly in the gold and oil and gas sectors) has been the growth of manufacturing industries involved in the construction and servicing of new resources projects, especially in the fabrication and machinery and equipment sectors. Industrial chemicals for the resource industry, such as sodium cyanide, caustic soda, chlorine and ammonium nitrate are also now being produced locally.

Manufacturing activity is largely centred in the Perth metropolitan area. Heavy industry is chiefly located at Kwinana, with other important industrial

areas in Canning Vale, Osborne Park-Balcatta, Kewdale-Welshpool and O'Connor. Increased decentralisation of industry to areas like Kemerton, near Bunbury, is being encouraged.

A more comprehensive picture of the history of manufacturing in Western Australia can be found in the *Western Australian Year Book*, No. 24—1986.

Two Government bodies are responsible for encouraging the establishment of new industries in Western Australia.

#### Technology and Industrial Development Authority (TIDA)

TIDA was established in June 1987. Its goal is to broaden the State's industrial and technological base by encouraging the establishment of new industries based on advanced technology.

The Authority monitors world movements in specific areas of technological growth. It identifies opportunities for, and assists with investments in, technology and industry in Western Australia. It also develops strategic overseas markets and helps companies access these markets.

#### Department of Resources Development

As mentioned in Chapter 14, Mining, this Department facilitates major development projects based on Western Australia's huge mineral resources, with a strong emphasis on downstream processing.

## MANUFACTURING STATISTICS

The 1987-88 Census of Manufacturing Establishments shows that the Perth Statistical Division had about eighty per cent of all manufacturing establishments, eighty-two per cent of manufacturing employment and seventy-four per cent of turnover. The South-West Statistical

Division, where several of the State's larger mineral and timber processing establishments are located, was the only other region with a significant proportion of manufacturing activity.

**TABLE 16.1 – MANUFACTURING ESTABLISHMENTS  
SUMMARY OF OPERATIONS BY STATISTICAL DIVISION: 1987-88**  
(Note: Data in this table exclude operations by single establishment manufacturing enterprises employing fewer than four persons.)  
Reference : Catalogue No. 8202.5

Statistical division	Establishments operating (a)	Persons employed (a)(b)	Wages and salaries (c)	Turnover
	No.	No.	\$m	\$m
Perth Statistical Division	2,147	59,549	1,305.2	6,996.7
Other divisions—				
South-West	205	6,920	173.4	1,497.6
Lower Great Southern	62	1,086	25.8	146.8
Upper Great Southern	25	234	3.0	17.5
Midlands	54	665	10.7	79.7
South-Eastern	59	1,232	31.2	314.6
Central	62	1,204	20.5	240.0
Pilbara	41	870	29.2	90.6
Kimberley	20	309	5.8	33.4
<i>Total other divisions</i>	<i>528</i>	<i>12,520</i>	<i>299.6</i>	<i>2,420.2</i>
<b>Western Australia</b>	<b>2,675</b>	<b>72,069</b>	<b>1,604.8</b>	<b>9,416.9</b>

(a) At 30 June. (b) Includes working proprietors. (c) Excludes amounts drawn by working proprietors.

**TABLE 16.2 – MANUFACTURING ESTABLISHMENTS OPERATING AT 30 JUNE 1988  
SELECTED VARIABLES BY EMPLOYMENT SIZE  
WESTERN AUSTRALIA AND AUSTRALIA**  
Reference : Catalogue Nos. 8203.5, 8204.0

	Fewer than 4 persons	4-19 persons	20-49 persons	50-99 persons	100 or more persons	Total
<b>WESTERN AUSTRALIA</b>						
No. of establishments	1,489	1,948	438	162	127	4,164
Employment ('000)	4.2	15.2	13.2	11.1	31.5	75.3
Wages and salaries (\$m)	36.0	269.6	258.0	239.9	803.8	1,607.3
Turnover (\$m)	212.5	1,484.2	1,437.7	1,602.3	4,870.9	9,607.6
<b>AUSTRALIA</b>						
No. of establishments	13,869	22,702	4,896	1,913	2,095	45,475
Employment ('000)	29.5	182.1	149.1	133.5	577.7	1,071.8
Wages and salaries (\$m)	248.9	3,033.1	2,957.5	2,908.3	14,166.1	23,313.9
Turnover (\$m)	1,494.3	15,604.6	16,287.4	18,186.7	83,033.6	134,606.5
<b>WESTERN AUSTRALIA AS A PERCENTAGE OF AUSTRALIA</b>						
No. of establishments	10.7	8.6	8.9	8.5	6.1	9.2
Employment	14.2	8.3	8.9	8.3	5.5	7.0
Wages and salaries	14.5	8.9	8.7	8.2	5.7	6.9
Turnover	14.2	9.5	8.8	8.8	5.9	7.1

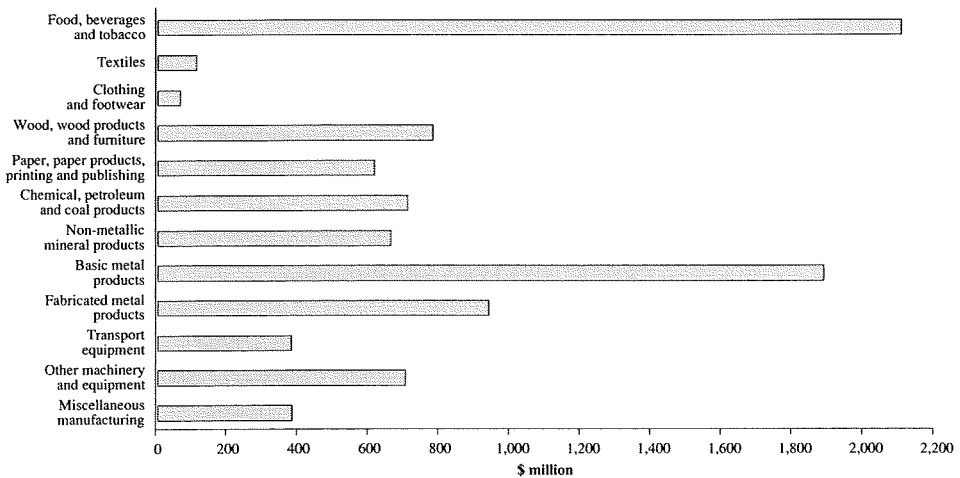
Factories employing fewer than twenty persons accounted for over eighty-three per cent of establishments. However, the large establishments employing more than 100 persons, which comprised only three per cent of establishments, contributed forty-two per cent of employment, fifty per cent of wages and salaries and fifty-one per cent of turnover.

Despite the recent growth in Western Australia's manufacturing sector, the State's contribution to Australian manufacturing statistics was relatively small. The Wood, Non-metallic minerals and Basic metal products sub-divisions were the only

industries to contribute more than ten per cent to turnover at the Australian level. The Western Australian industries that made the smallest contribution at the national level were the Clothing and footwear, Textiles and Transport equipment industries.

At the ASIC sub-division level, Food, beverages and tobacco became the highest contributor to turnover in 1987-88, displacing Basic metal products for the first time since 1973-74. Big increases in turnover were also recorded in the Wood, wood products and furniture and Fabricated metal products sub-divisions.

**DIAGRAM 16.1**  
**MANUFACTURING ESTABLISHMENTS**  
**TURNOVER BY INDUSTRY AND SUB-DIVISION**  
**1987-88**





**TABLE 16.3 – MANUFACTURING ESTABLISHMENTS  
SUMMARY OF OPERATIONS BY INDUSTRY SUB-DIVISION (a)**  
(Note: Data in this table exclude operations by single establishment manufacturing enterprises employing fewer than four persons.)  
Reference : Catalogue No. 8202.5

<i>Industry sub-division</i>		<i>Establishments operating (c)</i>	<i>Persons employed (c)</i>	<i>Wages and salaries (d)</i>	<i>Turnover</i>	
<i>ASIC code (b)</i>	<i>Description</i>					
		No.	No.	\$m	\$m	
		1987-88				
21	Food, beverages and tobacco	376	12,734	293.3	2,112.4	
23	Textiles	45	1,382	24.3	117.3	
24	Clothing and footwear	74	1,754	24.9	72.2	
25	Wood, wood products and furniture	451	8,997	161.4	786.7	
26	Paper, paper products, printing and publishing	247	7,413	159.1	621.7	
27	Chemical, petroleum and coal products	76	3,114	86.6	715.7	
28	Non-metallic mineral products	199	4,769	116.0	668.0	
29	Basic metal products	48	5,882	182.3	1,892.9	
31	Fabricated metal products	430	9,386	199.8	944.9	
32	Transport equipment	165	4,848	105.9	387.2	
33	Other machinery and equipment	368	8,367	187.4	708.9	
34	Miscellaneous manufacturing	196	3,423	63.7	388.9	
	<b>Total Manufacturing</b>	<b>1987-88</b>	<b>2,675</b>	<b>72,069</b>	<b>1,604.8</b>	<b>9,416.9</b>
		<b>1986-87(e)</b>	<b>2,660</b>	<b>69,452</b>	<b>1,407.0</b>	<b>8,215.1</b>
		<b>1984-85</b>	<b>2,451</b>	<b>64,581</b>	<b>1,137.6</b>	<b>6,788.5</b>

(a) Includes establishments operating part year and ancillary locations. (b) Australian Standard Industrial Classification. (c) At 30 June. Includes working proprietors. (d) Excludes amounts drawn by working proprietors. (e) A census was not conducted for the year 1985-86.

**TABLE 16.4 – SMALL MANUFACTURING ESTABLISHMENTS:  
SUMMARY OF OPERATIONS BY INDUSTRY SUB-DIVISION**  
(Single establishment manufacturing enterprises employing fewer than four persons.)  
Reference : Catalogue No. 8202.5

<i>Industry sub-division</i>		<i>Establishments operating</i>	<i>Persons employed (b)(c)</i>	<i>Wages and salaries (d)</i>	<i>Turnover</i>	
<i>ASIC code(a)</i>	<i>Description</i>					
		No.	No.	\$m	\$m	
		1987-88				
21	Food, beverages and tobacco	100	351	2.4	17.8	
23	Textiles	31	74	0.6	4.2	
24	Clothing and footwear	34	109	0.7	3.2	
25	Wood, wood products and furniture	402	1,071	6.6	41.3	
26	Paper, paper products, printing and publishing	122	362	3.4	17.1	
27	Chemical, petroleum and coal products	17	40	0.3	2.0	
28	Non-metallic mineral products	73	206	1.9	14.1	
29	Basic metal products	7	18	0.3	1.4	
31	Fabricated metal products	253	771	7.3	45.4	
32	Transport equipment	107	324	3.7	18.1	
33	Other machinery and equipment	164	491	5.9	26.1	
34	Miscellaneous manufacturing	179	417	2.9	21.9	
	<b>Total Manufacturing</b>	<b>1987-88</b>	<b>1,489</b>	<b>4,234</b>	<b>36.0</b>	<b>212.5</b>
		<b>1986-87</b>	<b>1,403</b>	<b>2,853</b>	<b>18.0</b>	<b>138.4</b>
		<b>1984-85(e)</b>	<b>1,451</b>	<b>2,996</b>	<b>14.1</b>	<b>(f)</b>

(a) Australian Standard Industrial Classification. (b) At 30 June. (c) Includes working proprietors. (d) Excludes amounts drawn by working proprietors. (e) A census was not conducted for the year 1985-86. (f) Turnover was not collected for these establishments in 1984-85.

DIAGRAM 16.2  
MANUFACTURING ESTABLISHMENTS  
EMPLOYMENT AT 30 JUNE

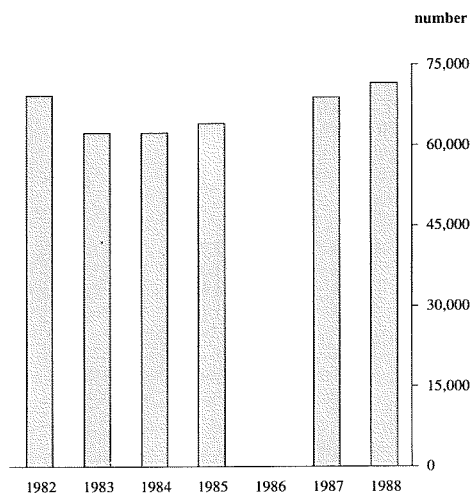
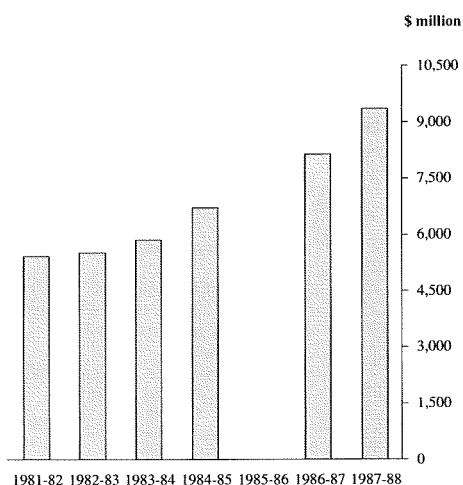


DIAGRAM 16.3  
MANUFACTURING ESTABLISHMENTS  
TURNOVER



(Note: A census was not conducted for the year 1985-86.  
Data in this table exclude operations by single establishment manufacturing enterprises employing fewer than four persons.)

TABLE 16.5 – PRODUCTION OF SELECTED COMMODITIES (a)  
(Includes quantities produced and used in own establishment)  
Reference: Catalogue No. 1305.5

Commodity	Unit	1986-87	1987-88	1988-89
Aerated and carbonated waters	'000 L	107,010	n.p.	n.p.
Alumina (b)	'000 t	5,727	6,063	6,172
Bacon and ham	tonnes	8,502	8,377	9,384
Butter (c)	"	1,400	1,505	1,139
Cheese (c)	"	3,727	3,772	3,541
Footwear	pairs	287,816	288,843	304,384
Ice cream	'000 L	19,045	17,136	n.p.
Inedible tallow	tonnes	31,251	34,464	30,592
Paints	'000 L	5,875	5,942	7,439
Ready-mixed concrete	'000 cu m	1,261	1,339	1,636
Rock lobster tails	tonnes	2,642	4,259	3,545
Scoured wool from greasy shorn wool	"	29,109	25,820	22,921
Soap and soap substitutes	"	6,605	6,779	6,888
Stock and poultry foods—				
Meat and bone meal	"	37,844	39,471	35,621
Prepared stock and poultry food	"	351,388	316,675	300,960
Solar collectors	sq m	92,627	104,566	91,787
Terracotta and concrete tiles	'000 sq m	2,967	3,369	4,541
Timber (d)—				
Local logs sawn	cu m	941,794	919,848	998,486
Sawn timber produced	"	316,658	318,652	335,191

(a) Data from ABS sources exclude production by single establishment manufacturing enterprises employing fewer than four persons and establishments predominantly engaged in non-manufacturing activities. (b) Source: Department of Mines. (c) Source: Australian Dairy Corporation. (d) Derived from data supplied by the Department of Conservation and Land Management.

In 1987-88, persons employed in Western Australia's manufacturing industry accounted for ten per cent of the employed labour force. While this percentage has remained stable for the last five years, it has shown a gradual decline from the 1976-77 level of 13.6 per cent.

A wide range of manufactured commodities is produced in Western Australia, as indicated in Table 16.5. It should be noted that details of quantities produced for many other significant commodities are confidential or not collected, and therefore are not available for release.

## REFERENCES

### ABS Publications

*Census of Manufacturing Establishments: Industry and Area Data, Western Australia (8202.5)*

*Census of Manufacturing Establishments: Selected Items of Data Classified by Industry and Employment Size, Western Australia (8203.5)*

*Manufacturing Industry, Details of Operations by Industry Class, Australia (8203.0)*

*Manufacturing Industry, Selected Items of Data Classified by Industry and Employment Size, Australia (8204.0)*

*Manufacturing Commodities: Principal Articles Produced, Australia (8303.0)*

## Chapter 17

# INTERNAL TRADE AND SERVICES

### WHOLESALE TRADE

Wholesale trade is described as the re-sale of new or used goods to retailers and other business users (including farmers, builders, government and professional bodies).

A sample survey of wholesale establishments was conducted for the year ended 30 June 1982 and provides the latest information available about the wholesale sector. Estimates were produced at the national level and are contained in *Wholesale Establishments, Details of Operations by Industry Class, Australia* (Catalogue No. 8638.0).

### RETAIL TRADE

Retail trade is described as the resale of new or used goods to final consumers for personal or household consumption. Detailed information about the retail sector has been collected using Censuses of Retail Establishments, the first of which was taken for the year 1947-48. Eight censuses have been taken since then as part of the ABS's program of rotating economic censuses. Results from each census are published for each State and Territory and for Australia as a whole. Surveys of retail trade, which were introduced from 1956, have enabled the production of estimates of retail trade on a less detailed but more frequent basis.

### Census of Retail Establishments

The most recent census was taken for the year ended 30 June 1986 and included all establishments classified to the Retail Trade subdivision of the Australian Standard Industrial Classification (ASIC), excluding bread and milk vendors, shoe repairers and electrical appliance

repairers n.e.c. Builders' hardware dealers were included for the first time.

### Survey of Retail Establishments

TABLE 17.1 - RETAIL TURNOVER - ANNUAL ESTIMATES AT CURRENT PRICES, BY INDUSTRY GROUPS(a) : 1986-87 TO 1988-89 (\$ million)

Reference : Catalogue No. 8501.0

Industry group	1986-87	1987-88	1988-89
Grocers, confectioners, tobacconists	1,947.8	2,113.3	2,191.0
Butchers	94.6	91.1	75.0
Other food stores	327.2	353.5	372.1
Hotels, liquor stores, licensed clubs	678.5	729.6	816.1
Cafes and restaurants	n.a.	n.a.	225.6
Clothing and fabric stores	434.8	448.2	446.5
Department and general stores	704.2	771.9	858.6
Footwear stores	77.1	82.7	92.7
Domestic hardware stores, jewellers	149.5	161.5	147.1
Electrical goods stores	421.2	448.2	480.9
Furniture stores	124.7	136.4	147.9
Floor coverings stores	85.0	83.8	90.6
Pharmacies	238.9	247.4	270.6
Newsagents	189.3	205.1	194.6
Other	n.a.	n.a.	339.5
<b>Total</b>	<b>(b)5,856.8</b>	<b>(b)6,325.0</b>	<b>6,749.1</b>

(a) Excludes motor vehicle dealers, petrol and tyre retailers. (b) Totals also include figures for the industry groups which are unavailable separately.

Since 1956 intercensal estimates of the value of retail sales have been produced by means of sample surveys. Surveys were initially conducted quarterly but are now conducted on a monthly basis. The surveys are reviewed periodically, generally to account for changes reflected in the

DIAGRAM 17.1  
MONTHLY CHANGE IN RETAIL TURNOVER  
Trend Estimates Data

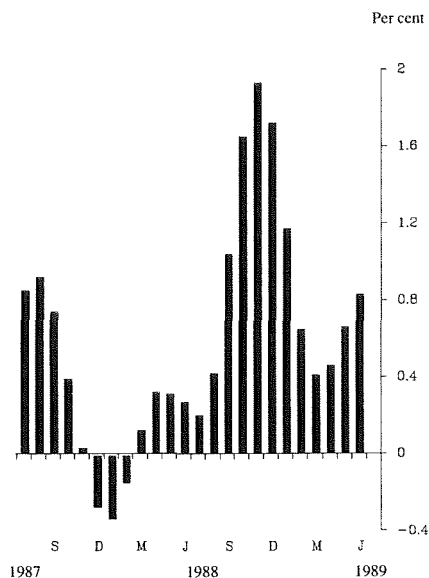
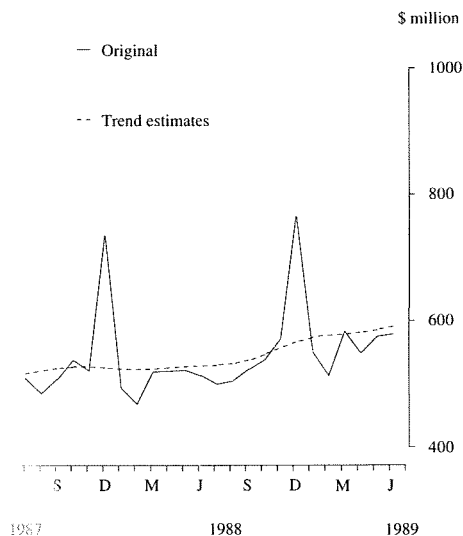


DIAGRAM 17.2  
MONTHLY ESTIMATES OF RETAIL TURNOVER



results of each retail census. The survey conducted since June 1988 is based on the results of the 1985-86 Retail Census and produces estimates of 'turnover' by retail establishments rather than the narrower estimates of 'retail sales'. The surveys are conducted monthly (quarterly prior to April 1982) and estimates are published in *Retail Trade, Australia* (Catalogue No. 8501.0).

Estimates of turnover (in original current price terms) by industry group for 1986-87 to 1988-89 are provided in Table 17.1. Data for 1986-87 and 1987-88 were derived by linking the old survey (of retail sales) to the new survey (of turnover).

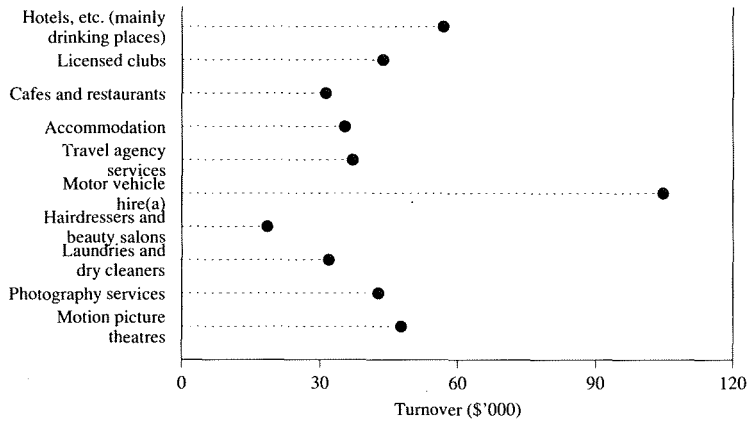
Diagrams 17.1 and 17.2, which relate to the 24 month period July 1987 to June 1989, illustrate the seasonal nature of retail turnover, the long term upward trend in retail turnover and the monthly variations that can occur. Data are presented as trend estimates in current price terms.

## SERVICE INDUSTRIES

Statistics on selected service industries have previously been collected in conjunction with censuses of retail establishments conducted prior to 1985-86. For the year 1986-87, a Service Industries Survey was conducted on ten recreation, personal and travel related industries. The industries covered were Hotels etc. (mainly drinking places, Licensed clubs, Cafes and restaurants, Accommodation, Travel agency services, Motor vehicle hire, Hairdressers and beauty salons, Laundries and dry cleaners, Photography services and Motion picture theatres.

Table 17.2 and Diagram 17.3 show summary results from the survey. More detailed results can be obtained from publications referenced at the end of the chapter.

DIAGRAM 17.3  
SELECTED SERVICE INDUSTRIES - TURNOVER PER PERSON EMPLOYED : 1986-87



(a) State turnover figures not available for this industry. takings from rental cars, which account for the major portion of total turnover, was used as an approximation.

TABLE 17.2 - SELECTED SERVICES INDUSTRIES  
SUMMARY OF OPERATIONS : 1986-87  
Reference : Catalogue No. 8650.0

Industry	Enterprises	Persons	Turnover	Value added
	operating (a)	employed (a)		
	No.	No.	\$ m	\$ m
Hotels, etc (mainly drinking places) p	418	8,210	467.4	187.6
Licensed clubs	346	2,516	109.6	53.4
Cafes and restaurants	636	7,267	226.4	109.9
Accommodation p	351	4,845	171.6	104.2
Travel agency services p	224	1,179	43.7	37.1
Motor vehicle hire p	41	324	(b)34.0	n.a.
Hairdressers and beauty salons	839	3,756	70.0	46.9
Laundries and dry cleaners	128	1,151	36.8	27.0
Photography services	126	321	13.7	7.4
Motion picture theatres	17	542	25.8	14.5

(a) At 30 June 1987. (b) State turnover figures are not available for this industry. \$34 million relates to takings from rental cars which accounts for the major portion of total turnover.

## TOURISM

Responsibility for the development of the tourism industry in Australia is exercised by government bodies at Commonwealth, State and regional levels. At the State level the Western Australian Tourism Commission (WATC) is responsible for marketing Western Australia as a tourist destination for international, interstate and intrastate visitors.

Information provided by the WATC shows that, during 1988-89, interstate and intrastate visitors (persons aged 14 years and over) made 4.2 million trips to or within Western Australia. This represents 9.2 per cent of total domestic trips made within Australia. The main purpose of trips to or within the State was 'pleasure or holiday' (43 per cent) followed by 'visiting friends and relatives' (24 per cent). The main destination regions for domestic travel were Perth and the South-West.

TABLE 17.3 - TOURIST ACCOMMODATION (a)  
31 December 1988  
Reference : Catalogue No. 8635.5

	Perth Statistical Division	Rest of State	Western Australia
<b>HOTELS AND MOTELS, WITH FACILITIES (b)</b>			
Establishments	93	219	312
Guest rooms	6,847	6,879	13,726
Bed spaces	16,776	17,878	34,654
<b>HOTELS AND GUEST HOUSES, WITHOUT FACILITIES (b)</b>			
Establishments	12	144	156
Guest rooms	486	2,132	2,618
Bed spaces	730	3,881	4,611
<b>CARAVAN PARKS (c)</b>			
Establishments	33	258	291
Sites	3,671	21,778	25,449

(a) Hotels, motels and guest houses must have breakfast available for guests. Caravan parks must provide powered sites and toilet, shower and laundry facilities for guests. (b) Establishments providing predominantly short term accommodation (i.e. for periods of less than two months). (c) Establishment providing short term or long term accommodation.

Tourism is one of the largest growing industries in Western Australia as evidenced by the increased development of luxury hotels and tourist attractions over the last three years. As the State

capital, Perth receives the majority of interstate and international visitors and, therefore, has experienced a major share of the development in tourist accommodation. In the three years to December 1988, four and five star hotel and motel accommodation in the Perth metropolitan area increased by 45 per cent—from 2,232 guest rooms to 3,243 guest rooms. There are seven international standard five star hotels in the Perth area.

Development of tourism has not been restricted to Perth. The towns of Broome and Kalbarri in the north and Margaret River in the south are also experiencing significant growth.

The popularity of statistical local areas as tourist destinations can be indicated by the number of guests arriving to stay in commercial accommodation. A comparison of guest arrivals during 1987-88 and 1988-89 for areas attracting the most visitors is shown in the following table.

TABLE 17.4 - HOTELS, MOTELS, GUEST HOUSES  
AND CARAVAN PARKS

Guest arrivals	Statistical Local Area (a)	
	1987-88	1988-89
Over 200,000	1. Perth(C)	1. Perth(C)
150,001-200,000	2. Busselton	2. Busselton
100,001-150,000	3. Albany(T & S)	3. Geraldton(C)
	4. Geraldton (C) and Greenough	4. Albany(T & S)
	5. Augusta- Margaret River	5. Bunbury(C)
	6. Bunbury(C)	6. Augusta- Margaret River
	7. Kalgoorlie- Boulder(C)	7. Kalgoorlie- Boulder(C)
	8. Dundas	8. Belmont(C)
	9. Belmont(C)	9. Dundas
	10. Mandurah(T)	10. Manjimup
80,001-100,000	11. Manjimup	11. Carnarvon
	12. Carnarvon	12. Broome
	13. Mandurah(T)	
	60,001-80,000	13. Wyndham-East Kimberley
	14. Stirling(C)	15. Wyndham-East Kimberley
	15. Broome	16. Northampton
	16. Esperance	17. Gingin and Dandaragan
	17. Northampton	18. Stirling(C)
	18. Gingin and Dandaragan	19. Shark Bay

(a) Cities, Towns and Shires are marked (C), (T) and (S) respectively

**TABLE 17.5 – HOTELS, MOTELS AND GUEST HOUSES***Reference : Catalogue No. 8635.5*

Year	Room Guest occupancy		Guest arrivals	Takings (b)
	rooms (a)	rate		
	No.	Per cent	'000	\$'000
1986	15,149	46	1,635	109,937
1987	16,161	46	1,809	134,300
1988	16,344	47	1,880	147,038

(a) At 31 December. (b) Takings only from accommodation.

**TABLE 17.6 – CARAVAN PARKS***Reference : Catalogue No. 8635.5*

Year	Site occupancy		Guest arrivals	Takings (b)
	Sites (a)	rate		
	No.	Per cent	'000	\$'000
1986 (c)	22,751	36	1,032	20,948
1987	23,749	37	1,145	25,530
1988	25,449	37	1,129	29,307

(a) At 31 December. (b) Takings only from accommodation. (c) Up to 30 June 1986, includes caravan parks providing predominantly short term accommodation. From 1 July 1986 includes both short term and long term caravan parks.

**TABLE 17.7 – HOLIDAY FLATS, UNITS AND HOUSES***Reference : Catalogue No. 8635.5*

Year	Unit occupancy		Unit lettings	Takings (b)
	Units (a)	rate		
	No.	Per cent	'000	\$'000
1987 (c)	1,495		n.a.	
1988	1,667	58	65	12,258
1989	1,654	60	69	14,429

(a) At 31 December. (b) Takings only from accommodation. (c) Collection of data commenced from July 1987.

## CONSUMER AFFAIRS

The Department of Consumer Affairs was formed in April 1983 and in January 1988 became the Ministry of Consumer Affairs. The Ministry has as its corporate mission the encouragement and

establishment of a marketplace framework in which participants follow the principles of fairness and equity.

The Ministry promotes the principle of fair trading and will intervene when the aggrieved party has exhausted the key elements of a 'self sufficiency' orientated strategy.

Since 1986-87 the Ministry has reviewed its structures to reflect its changing role, particularly as a result of legislative initiatives and now comprises four Divisions, namely:

Consumer Services Division,

Industry Standards Division,

Community Information Division and Policy and

Corporate Services Division.

The Consumer Services Division is responsible for the consumer advice and consumer assistance programs, and research into areas of consumer interest.

The Industry Standards Division is responsible for the occupational licensing program which features administrative support for the Commercial Tribunal, Licensing Boards and the Weights and Measures Unit.

The Community Information Division aims to increase community awareness of fair trading in the marketplace, by increasing awareness of consumer rights, responsibilities and issues and to develop consumer skills to solve disputes and operate more effectively in the marketplace.

In February 1987 the Government's Price Monitoring Unit (now part of the Community Information Division) was established to monitor grocery prices in metropolitan and country supermarkets (Price Check Campaign). The unit receives and investigates complaints about prices and researches and publishes information concerning prices and shopping skills. Other functions include increasing consumer awareness, stimulating competition and providing Government with information on price movements as part of its commitment to the prices and income accord.



As part of its activities the Ministry provides specialised legal advice on a wide range of consumer related legal issues involved in the handling of complaints, investigates offences and, where necessary, initiates prosecution.

**TABLE 17.8 – MINISTRY OF CONSUMER AFFAIRS:  
SUMMARY OF PRODUCT COMPLAINTS RECEIVED**  
(Source: Ministry of Consumer Affairs)

Product classification	Number of product complaints	
	1987-88r	1988-89
Food, beverages, tobacco	124	128
Clothing, footwear, drapery	188	212
Appliances and furnishings	877	932
Motor vehicles and transport equipment	1,773	1,627
Building and construction	937	1,327
Miscellaneous products	491	434
Transport and energy services	643	416
Insurance and finance	698	724
Real estate and accommodation	689	628
Miscellaneous services	1,403	992
Not specified	35	88
<b>Total</b>	<b>7,858</b>	<b>7,508</b>

**TABLE 17.9 – MINISTRY OF CONSUMER AFFAIRS:  
COMPLAINTS FINALISED**  
(Source: Ministry of Consumer Affairs)

	1987-88r	1988-89
Full redress obtained for consumer	2,190	2,089
Partial redress obtained for consumer	443	442
Situation clarified between consumer and trader	19	149
Complaint justified – trader warned	322	267
Proceedings initiated under State or Federal law	40	70
Insufficient evidence to resolve complaint	207	197
Incapable of resolution owing to conflict of evidence	176	200
Trader bankrupt or in liquidation	662	122
Trader unable to be located	93	69
Complaint referred to Small Claims Tribunal	760	913
Complaint referred to Commercial Tribunal	167	80
Complaint outside Ministry's jurisdiction (includes referrals to other organisations)	504	470
Complaint withdrawn or lapsed	264	551
Complaint not justified	676	767
Complaint lodged for information purposes only	88	338
Result code not specified	4	-
Other reason	1,100	881
<b>Total</b>	<b>7,715</b>	<b>7,605</b>

## REFERENCES

### ABS Publications

*Cafes and Restaurants Industry, Australia, 1986-87* (8655.0)

*Hairdressers and Beauty Salons Industry, Australia, 1986-87* (8659.0)

*Laundries and Dry Cleaners Industry, Australia, 1986-87* (8658.0)

*Licensed Clubs Industry, Australia, 1986-87* (8657.0)

*Motion Picture Theatre Industry, Australia, 1986-87* (8654.0)

*Photography Services Industry, Australia, 1986-87* (8660.0)

*Retail Trade, Australia* (8501.0)

*Selected Tourism and Personal Service Industries, Summary of Operations, Australia, 1986-87, Preliminary* (8650.0)

*Tourist Accommodation, Western Australia* (8635.5)

### Other Publications

Western Australian Tourism Commission, *Domestic Travel in Western Australia, July 1986-June 1987*

Western Australian Tourism Commission, *Western Australian Regional Tourism Research Monitor, July 1986-June 1987*

Ministry of Consumer Affairs, *Annual Report*

## Chapter 18

### HOUSING AND CONSTRUCTION

The typical dwelling in Western Australia is single, detached, of double brick construction, on its own block of land. It has three bedrooms and is owned or being purchased by the occupier. Information from the 1986 Census of Population and Housing indicates that throughout the State 80.1 per cent of the 456,515 private households lived in single detached houses. Only 7,016 (1.5 per cent) private households occupied multi-storey high rise flats (3 or more storeys). The remainder were accommodated in duplexes, row or terrace houses or similar medium density housing.

#### HOUSING AND THE CENSUS

The definitions below relate to data derived from the Census of Population and Housing.

*Occupied dwellings.* For the purpose of the census an occupied dwelling is any habitation occupied on census night by a household group living together as a domestic unit, and may comprise the whole of a building or only part of it. This means the total number of occupied dwellings, as measured by the census, may be greater than the known number of structures.

*Unoccupied private dwellings.* An unoccupied private dwelling is defined as a structure built specifically for private living purposes and capable of being lived in, though unoccupied at the time of the census.

*Private dwellings* comprise houses, including self-contained flats, and other dwellings such as sheds, tents, garages, caravans, houseboats, etc., occupied on a permanent or semi-permanent basis.

*Non-private dwellings* are dwellings which provide communal eating facilities, and include hospitals, homes for the aged, motels, hotels, boarding houses, gaols, religious and charitable institutions, defence establishments etc.

Between the censuses of 1981 and 1986, the number of private occupied dwellings in the State

increased by 13.1 per cent. The number of persons enumerated in private dwellings showed an increase of 9.7 per cent.

TABLE 18.1 - DWELLINGS AND PERSONS  
ENUMERATED : CENSUSES, 1981 AND 1986  
( '000)

Reference : Catalogue No. 2465.0

	1981	1986
DWELLINGS ('000)		
Occupied dwellings—		
Private (a)	403.6	456.5
Non-private	2.4	2.2
Caravans, etc in parks (b)	n.a.	10.7
<b>Total occupied dwellings (b)</b>	<b>406.0</b>	<b>469.5</b>
Unoccupied private dwellings	42.1	53.9
PERSONS ('000)		
Persons enumerated in—		
Private dwellings	1,205.8	1,322.6
Caravans, etc in parks (b)	n.a.	26.4
Other structures	67.8	58.0
<b>Total persons</b>	<b>1,273.6</b>	<b>1,406.9</b>

(a) Excludes caravans in caravan parks. (b) In 1981, caravan parks were treated as non-private dwellings. The number of caravans in caravan parks was not recorded and the figures for total occupied dwellings in 1981 and 1986 are not comparable.

#### CONTROL OF BUILDING

Each of the local government authorities as constituted under the provisions of the *Local*

*Government Act 1960* has the power to exercise general control over the erection of buildings in its own district. The powers of local government authorities to control building derive from the *Town Planning and Development Act* and the *Local Government Act*.

A more detailed description of these Acts appears on page 374 of the *Western Australian Year Book No.24 — 1986*.

## BUILDING STATISTICS

### Scope

The statistics in this section relate to the erection of new buildings and alterations and additions.

Non-building construction of railways, roads, bridges, earthworks, etc. is excluded. Also excluded are particulars of repairs and maintenance to buildings.

### Sources of data

Data relating to the building approvals, dwelling unit commencements and building activity series are based on permits issued by local government authorities together with contracts let or day labour work authorised by Commonwealth, State, semi-government and local government authorities. Major building activity which takes place in areas not subject to the normal administrative approval processes (e.g. buildings on remote mine sites) is also included.

### Definitions

*Ownership.* The ownership of a building is classified as either 'public sector' or 'private sector' according to the sector of the intended owner of the completed building as evident at the time of approval.

*Residential buildings.* A residential building is defined as a building predominantly consisting of one or more dwelling units. Residential buildings can be either 'houses' (a detached building predominately used for long term residential purposes and consisting of only one dwelling unit), or 'other residential buildings'.

*Non-residential building.* Relates to construction work on buildings other than residential buildings. Additions and alterations to 'non-residential building' are also included.

*Commenced.* A building job is regarded as commenced when the first physical building activity has been performed on site.

*Completed.* A building job is regarded as completed when building activity has progressed to the stage where the building can fulfil its intended function.

*Value of building completed.* Represents the actual completion value based on the market or contract price of building jobs.

*Value of building work done.* Represents the estimated value of building work actually carried out during the period on building jobs which have commenced.

TABLE 18.2 - VALUE OF BUILDING APPROVED  
BY SECTOR  
(\$ million)

Reference : Catalogue No. 8731.5

Class of building	1986-87	1987-88	1988-89
<b>PRIVATE SECTOR</b>			
New residential building (a)—			
Houses	669.9	931.9	1,307.2
Other	116.9	151.2	313.1
<b>Total</b>	<b>786.9</b>	<b>1,083.0</b>	<b>1,620.3</b>
Alterations and additions to residential buildings (b)	72.1	92.9	132.5
Non-residential building (c)	495.0	881.5	766.8
<b>Total building</b>	<b>1,354.0</b>	<b>2,057.4</b>	<b>2,519.7</b>
<b>PUBLIC SECTOR</b>			
New residential building (a)—			
Houses	31.7	40.5	53.9
Other	21.9	24.0	41.2
<b>Total</b>	<b>53.6</b>	<b>64.4</b>	<b>95.1</b>
Alterations and additions to residential buildings (b)	2.0	1.4	1.8
Non-residential building (c)	241.6	200.1	218.3
<b>Total building</b>	<b>297.2</b>	<b>266.0</b>	<b>315.2</b>
<b>TOTAL</b>			
New residential building (a)—			
Houses	701.6	972.3	1,361.1
Other	138.9	175.1	354.4
<b>Total</b>	<b>840.5</b>	<b>1,147.5</b>	<b>1,715.5</b>
Alterations and additions to residential buildings (b)	74.2	94.3	134.3
Non-residential building (c)	736.6	1,081.6	985.1
<b>Total building</b>	<b>1,651.3</b>	<b>2,323.4</b>	<b>2,834.8</b>

(a) From 1 July 1988 valued at \$5,000 and over. (b) Valued at \$10,000 and over. (c) From 1 July 1988 valued at \$30,000 and over.

The number of houses and total dwelling units approved during 1988-89 exceeded previous record levels. Houses, other residential buildings and total dwelling units were respectively 17.7, 65.5 and 27.9 per cent higher than in 1987-88.

The private sector accounted for 94.2 per cent of total dwelling units approved. The total value of building approved at current prices increased by 22 per cent over the previous year. The value of new residential building approved during 1988-89 increased by 49.5 per cent over 1987-88 while the value of non-residential building decreased by 8.9 per cent in the corresponding period.

**TABLE 18.3 - NEW RESIDENTIAL BUILDING APPROVED BY SECTOR (Number of dwelling units)**  
Reference : Catalogue No. 8731.5

Class of building	1986-87	1987-88	1988-89
PRIVATE SECTOR			
Houses	12,885	16,296	19,229
Other residential buildings	3,066	3,976	6,769
<b>Total</b>	<b>15,951</b>	<b>20,272</b>	<b>25,998</b>
PUBLIC SECTOR			
Houses	484	666	738
Other residential buildings	510	634	861
<b>Total</b>	<b>994</b>	<b>1,300</b>	<b>1,599</b>
TOTAL			
Houses	13,369	16,962	19,967
Other residential buildings	3,576	4,610	7,630
<b>Total</b>	<b>16,945</b>	<b>21,572</b>	<b>27,597</b>

### Building Activity Survey

The total value of building commenced during 1988-89 was \$3,226.6 million, an increase of 54.7 per cent over the previous year. This rise comprised increases of 63.9 and 46.8 per cent respectively in new residential and non-residential building. Office projects accounted for 51 per cent of the value of non-residential building commenced.

The total value of building completed during 1988-89 maintained the increases experienced in previous years. The value of new residential building completed was \$1,100.5 million, an increase of 31.8 per cent over 1987-88.

**TABLE 18.4 - VALUE OF BUILDING COMMENCED BY CLASS OF BUILDING (\$ million)**

Reference : Catalogue No. 8752.5

Class of building	1986-87	1987-88	1988-89
New residential building—			
Houses	657.7	846.2	1,343.6
Other	134.5	163.6	311.6
<b>Total new residential building</b>	<b>792.3</b>	<b>1,009.7</b>	<b>1,655.2</b>
Alterations and additions to residential buildings (a)	72.3	87.8	121.4
Non-residential building (b)—			
Hotels, etc	25.7	45.3	34.3
Shops	152.7	144.7	137.0
Factories	47.6	106.3	74.9
Offices	119.5	233.0	739.2
Other business premises	80.8	143.8	199.7
Educational	100.3	94.5	133.9
Religious	6.3	6.7	4.3
Health	34.8	70.3	27.6
Entertainment and recreational			
recreational	44.1	50.3	42.4
Miscellaneous	42.2	93.0	56.7
<b>Total non-residential building</b>	<b>654.1</b>	<b>987.9</b>	<b>1,450.0</b>
<b>Total building</b>	<b>1,518.7</b>	<b>2,085.5</b>	<b>3,226.6</b>

(a) Valued at \$10,000 and over (b) Valued at \$30,000 and over.

**TABLE 18.5 - VALUE OF BUILDING COMPLETED BY CLASS OF BUILDING (\$ million)**

Reference : Catalogue No. 8752.5

Class of building	1986-87	1987-88	1988-89
New residential building—			
Houses	651.5	694.4	906.9
Other	144.3	140.6	193.6
<b>Total new residential building</b>	<b>795.8</b>	<b>835.0</b>	<b>1,100.5</b>
Alterations and additions to residential buildings (a)	70.4	80.2	99.5
Non-residential building (b)—			
Hotels, etc	116.3	86.4	20.1
Shops	124.0	143.8	186.3
Factories	39.0	63.4	81.3
Offices	155.8	208.1	263.6
Other business premises	100.9	101.7	123.9
Educational	99.2	120.9	65.1
Religious	5.1	6.4	4.8
Health	80.8	36.7	112.9
Entertainment and recreational			
recreational	18.0	58.2	37.6
Miscellaneous	55.8	58.8	63.8
<b>Total non-residential building</b>	<b>794.9</b>	<b>884.5</b>	<b>959.5</b>
<b>Total building</b>	<b>1,661.1</b>	<b>1,799.7</b>	<b>2,159.5</b>

(a) Valued at \$10,000 and over. (b) Valued at \$30,000 and over.

The total value of building work done during 1988-89 was \$2,558.2 million, an increase of 36 per cent over the previous year. The value of work done on new residential building increased from \$888.3 million to \$1,406.2 million while the value of work done in non-residential building increased from \$906.8 million to \$1,041 million.

### Dwelling Unit Commencement Series

**TABLE 18.6 – HOUSES AND OTHER RESIDENTIAL BUILDINGS COMMENCED CLASSIFIED BY OWNERSHIP**

Reference : Catalogue No.8741.5

Class of building	1986-87	1987-88	1988-89
Private sector—			
Houses (a)	11,680	13,920	18,980
Other residential buildings (b)	2,856	3,660	6,216
Public sector—			
Houses	503	653	698
Other residential buildings (b)	534	500	726
<b>Total—</b>			
<b>Houses (a)</b>	<b>12,190</b>	<b>14,570</b>	<b>19,680</b>
<b>Other residential buildings (b)</b>	<b>3,390</b>	<b>4,160</b>	<b>6,942</b>

(a) Figures are rounded to nearest ten units. (b) Number of dwelling units.

**TABLE 18.7 – HOUSES COMMENCED, BY MATERIAL OF OUTER WALLS**

Reference : Catalogue No. 8741.5

Type of material	1986-87	1987-88	1988-89
Double brick (a)	10,548	12,470	16,639
Brick veneer	806	716	925
Fibre cement	575	644	896
Other	276	426	603
<b>Total new houses</b>	<b>12,205</b>	<b>14,256</b>	<b>19,063</b>

(a) Includes houses built with outer walls of stone or concrete.

A consequence of the sampling techniques used for private sector house building in the Building Activity Survey is that estimates for this class of building cannot be produced at finer levels of geographic disaggregation than State/Territory levels without incurring unacceptably high sampling errors.

To compensate for this loss of detail, a monthly Dwelling Unit Commencement series was implemented in July 1980. The data are compiled from monthly returns supplied by local and other government authorities. However, because this methodology is different from that of the Building Activity Survey, total figures for Western Australia differ between the two series by a small margin.

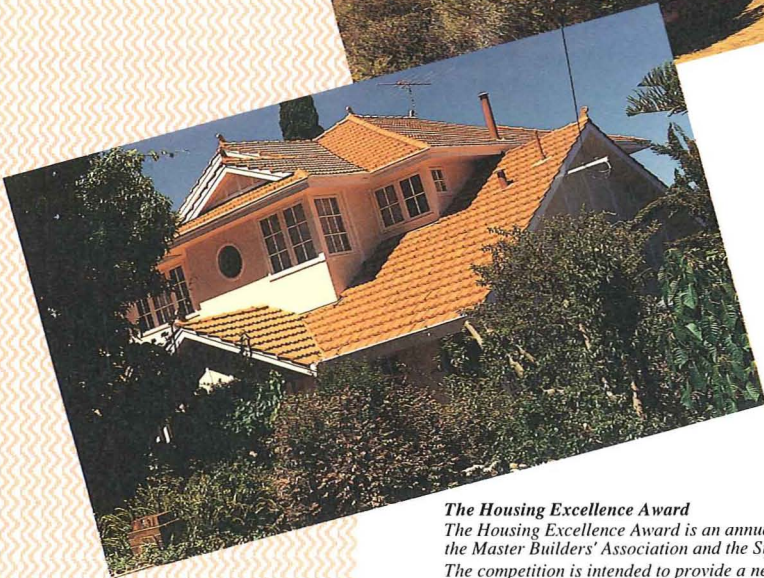
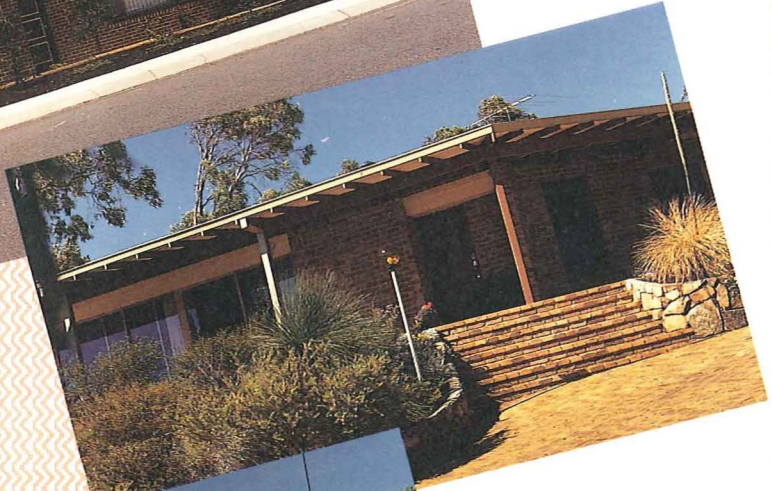
**TABLE 18.8 – DWELLING UNITS COMMENCED IN STATISTICAL DIVISIONS BY OWNERSHIP : 1988-89**

Reference : Catalogue No. 8741.5

Statistical division	Private sector			Public sector			Total		
	Houses	Other residential buildings	Total	Houses	Other residential buildings	Total	Houses	Other residential buildings	Total
Perth Statistical Division	13,997	5,184	19,181	366	609	975	14,363	5,793	20,156
Other divisions—									
South-West	2,405	488	2,893	52	18	70	2,457	506	2,963
Lower Great Southern	458	44	502	5	8	13	463	52	515
Upper Great Southern	59	-	59	5	6	11	64	6	70
Midlands	477	32	509	25	-	25	502	32	534
South-Eastern	251	171	422	55	58	113	306	229	535
Central	477	168	645	65	40	105	542	208	750
Pilbara	47	30	77	38	-	38	85	30	115
Kimberley	128	81	209	153	37	190	281	118	399
<b>Total</b>	<b>4,302</b>	<b>1,014</b>	<b>5,316</b>	<b>398</b>	<b>167</b>	<b>565</b>	<b>4,700</b>	<b>1,181</b>	<b>5,881</b>
<b>Total Western Australia</b>	<b>18,299</b>	<b>6,198</b>	<b>24,497</b>	<b>764</b>	<b>776</b>	<b>1,540</b>	<b>19,063</b>	<b>6,974</b>	<b>26,037</b>



THE HOUSING EXCELLENCE AWARD



**The Housing Excellence Award**

The Housing Excellence Award is an annual competition conducted jointly by the Master Builders' Association and the Sunday Times. The competition is intended to provide a neutral arena in which workmanship within the housing industry can be assessed and compared. All registered builders are eligible to enter the competition in the categories of their choice. Judging is conducted in April, July and September by an independent panel of judges and the awards are announced in October of each year. The houses featured on this page were winning entries in the various categories for 1989.



## **Australian Construction Services**

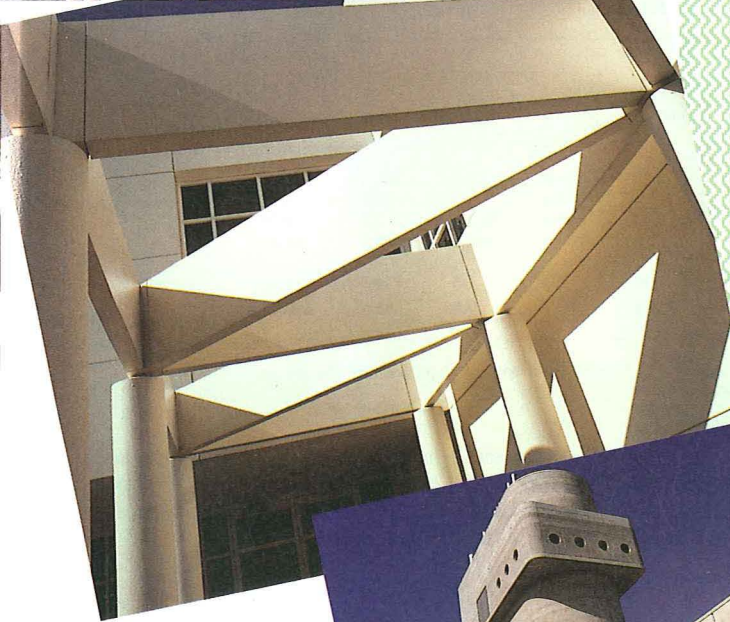
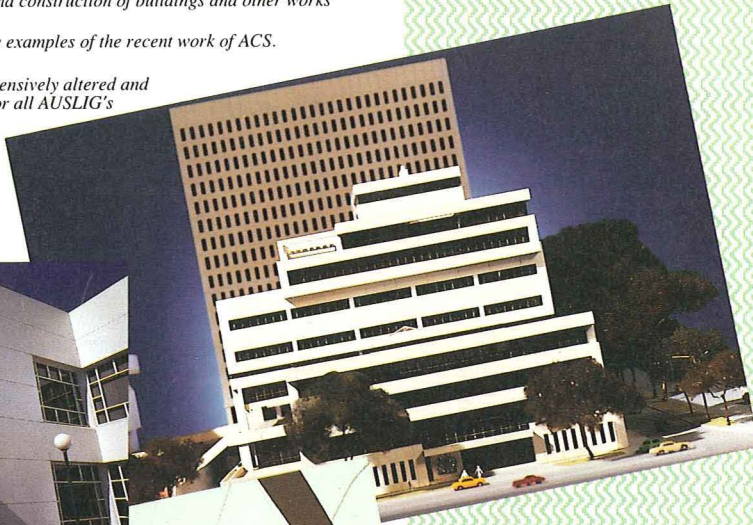
Australian Construction Services (ACS), a division of the Department of Administrative Services is the Commonwealth Government's central works authority. It is responsible for planning, design and construction of buildings and other works for the Commonwealth.

The buildings featured on this page are examples of the recent work of ACS.

### **AUSLIG Offices, Victoria Park**

The existing building on the site was extensively altered and enlarged to provide accommodation for all AUSLIG's functions.

The stepped design evolved naturally from the site constraints and reflects the precision and control that is synonymous with AUSLIG's surveying function.



### **Federal Court of Australia and Family Court of Western Australia, Victoria Avenue, Perth**

Perth's first permanent Commonwealth Court building has been designed to harmonise with surrounding buildings and the environment. It is one of several purpose-designed court buildings being constructed in a number of State capital cities and will result in improved conditions for the public, legal practitioners and members of the judiciary.



### **Submarine Escape Training Facility (SETF), HMAS Stirling, Garden Island**

The SETF is a facility for training submariners in methods of underwater escape from a disabled submarine by classroom methods and practical instruction in simulated conditions. The facility is simple in concept but ensures the highest practical degree of safety. Its design was developed after an appraisal of similar systems overseas by Australian authorities and is reflective of its function in its appearance.

# AUSTRALIAN CONSTRUCTION SERVICES

### HOUSING PREFERENCES AND INTENTIONS 1988

A Survey of Housing Preferences and Intentions was conducted throughout the Perth Statistical Division in October 1988 as a supplement to the Monthly Population Survey. Figures were obtained from a sample of approximately 2,600 households.

The survey was conducted at the request of the Department of Planning and Urban Development and it covered topics such as dwelling type, nature of occupancy, period of residence, advantages and disadvantages of dwelling and location, movement patterns, and time taken to travel to work.

The results of the survey were released in the publication *Housing Preferences and Intentions, Perth Statistical Division* (Catalogue No.8790.5). A summary of the findings of the survey follows.

#### Occupancy

It is estimated that 307,300 households (80 per cent) living in private dwellings at the time of the survey occupied separate houses. Three-quarters of Perth households (290,800) either owned or were buying their dwelling, and almost all of the remaining quarter (88,700) were renting.

TABLE 18.9 – CURRENT DWELLING TYPE BY NATURE OF OCCUPANCY  
(\*000 households)

Current dwelling type	Being		Some other		Total	Per cent
	Owned	purchased	Rented	arrangement		
Separate house	131.8	129.2	41.9	4.4	307.3	79.5
Semi-detached house	7.2	3.3	11.1	(a)	22.0	5.7
Row or terrace house	(a)0.8	(a)	(a)0.9	(a)1.0	2.8	0.7
Medium density housing	11.0	5.6	31.8	(a)1.0	49.5	12.8
Flat, unit in building over 3 storeys	(a)1.3	(a)	3.0	(a)	4.6	1.2
<b>Total (b)</b>	<b>152.4</b>	<b>138.4</b>	<b>88.7</b>	<b>7.0</b>	<b>386.6</b>	<b>100.0</b>

(a) Use estimate with caution, relative standard error between 25 per cent and 40 per cent. (b) Also includes caravans not in caravan parks; improvised homes.

#### Period of residence

Over one half (59 per cent) of all households had lived in their dwelling for five years or less. Of these, 75,400 households were renting (85 per cent

of all rented homes), 55,000 households owned (36 per cent of owned homes) and 94,400 households were purchasing their homes. (68 per cent of homes being purchased).

TABLE 18.10 – PERIOD OF RESIDENCE BY NATURE OF OCCUPANCY  
(\*000 households)

Period of residence	Being		Some other		Total	Per cent
	Owned	purchased	Rented	arrangement		
0 – 5 years	55.5	94.4	75.4	4.5	229.7	59.4
6 – 10 years	29.0	20.1	7.6	(a)1.2	57.9	15.0
11 – 15 years	17.9	12.1	2.2	(a)0.8	33.0	8.5
16 – 20 years	12.3	5.4	*	*	18.7	4.8
More than 20 years	37.7	6.4	2.8	*	47.2	12.2
<b>Total</b>	<b>152.4</b>	<b>138.4</b>	<b>88.7</b>	<b>7.0</b>	<b>386.6</b>	<b>100.0</b>

(a) Use estimate with caution, relative standard error between 25 per cent and 40 per cent. \* Subject to sampling variability too high for most practical uses.



### Advantages and disadvantages of dwelling

Some 26 per cent of householders living in separate houses considered that owning their own home was the main advantage of their dwelling, whereas living in a good quality residence was the most important advantage to many (20 per cent) medium density dwellers

The majority of those surveyed (53 per cent) were satisfied with their current residence and said that their dwelling had no disadvantages.

**TABLE 18.11 – MAIN ADVANTAGES AND DISADVANTAGES OF DWELLING BY CURRENT DWELLING TYPE ('000 households)**

	<i>Separate house</i>	<i>Semi-detached house</i>	<i>Medium density housing</i>	<i>Total (a)</i>	<i>Per cent</i>
<b>Main advantage of current dwelling—</b>					
Good quality residence	49.6	3.1	9.9	64.0	16.6
Large residence	30.5	*	(b)1.3	32.0	8.3
Owning own home	90.5	3.4	4.8	99.6	25.8
Privacy	36.9	3.7	7.8	50.4	13.0
Large lot or yard	26.1	(b)0.9	*	27.4	7.1
Small lot or yard	3.9	(b)1.3	3.9	9.4	2.4
Pleasant appearance/character	22.0	2.4	4.8	29.3	7.6
Small residence	4.9	2.3	4.3	12.4	3.2
Like to have own yard/garden	19.9	2.2	(b)1.7	24.0	6.2
No advantages	14.2	(b)1.9	6.8	23.4	6.1
Other	8.9	*	3.9	14.5	3.7
<b>Total</b>	<b>307.3</b>	<b>22.0</b>	<b>49.5</b>	<b>386.6</b>	<b>100.0</b>
<b>Main disadvantage of current dwelling—</b>					
Poor quality residence	10.6	*	(b)1.2	12.4	3.2
Residence too small	24.7	2.1	4.7	31.8	8.2
Not owning own home	13.1	2.6	6.0	22.5	5.8
Lack of privacy	9.3	(b)0.9	4.8	15.8	4.1
Lot or yard is too small	10.0	*	(b)1.0	11.5	3.0
Lot or yard is too big	15.4	*	*	16.3	4.2
Traffic noise/industrial noise	30.1	2.1	4.3	36.9	9.5
Residence too big	3.7	*	-	4.1	1.1
Lack of own outdoor area	*	*	3.9	5.3	1.4
Parking here is a problem	9.4	*	2.2	12.3	3.2
No disadvantages	169.2	11.1	19.3	203.2	52.6
Other	11.5	*	(b)1.8	14.1	3.6
<b>Total</b>	<b>307.3</b>	<b>22.0</b>	<b>49.5</b>	<b>386.6</b>	<b>100.0</b>

(a) Also includes row or terrace house; flats, units in buildings over 3 storeys; caravans not in caravan parks; improvised homes.(b) Use estimate with caution, relative standard error between 25 per cent and 40 per cent. \* Subject to sampling variability too high for most practical uses.

### Movement patterns

Buying a residence was the most common main reason for householders having moved (26 per

cent) and planning to move (22 per cent). It is interesting to note that most households planning to move (72 per cent) had lived in their residences only five years or less.

**TABLE 18.12 – FUTURE TENURE INTENTIONS BY CURRENT NATURE OF OCCUPANCY**  
(\*000 households)

Future tenure intentions	Being		Total(a)	Per cent
	Owned	purchased		
Build or move into a new residence	4.8	5.5	9.9	34.9
Buy an established residence	7.1	8.6	7.7	39.5
Rent	*	*	9.6	18.2
Don't know	(a)1.1	(a)1.5	(a)1.4	6.7
<b>Total (b)</b>	<b>14.2</b>	<b>16.3</b>	<b>28.6</b>	<b>100.0</b>

(a) Includes households planning some other arrangement. (b) Includes households planning to move into special dwellings.  
\* Subject to sampling variability too high for most practical uses.

### Travel Time

Travel time to work is less than 20 minutes for more than half (53 per cent) of the households in Perth, while 27 per cent take from between 20 and 30 minutes and 20 per cent take more than 30 minutes to travel to work. These figures exclude those in a variable workplace and those who did not know the time taken to travel to work.

**TABLE 18.13 – TIME TAKEN TO TRAVEL TO WORK**  
**BY CURRENT LOCATION**  
(\*000 households)

Time taken to travel to work	Total	Per cent
Less than 10 minutes	51.2	19.1
10 to less than 20 minutes	78.4	29.3
20 to less than 25 minutes	38.5	14.4
25 to less than 30 minutes	27.9	10.4
30 to 45 minutes	35.0	13.1
More than 45 minutes	13.4	5.0
Variable workplace	22.0	8.2
Don't know	(b)1.2	0.4
<b>Total</b>	<b>267.7</b>	<b>100.0</b>

(a) Excludes 118,900 households where neither the head nor the spouse has a job. (b) Use estimate with caution, relative standard error between 25 per cent and 40 per cent.

### ENGINEERING CONSTRUCTION SURVEY

This survey measures all engineering construction work undertaken whereas the survey it replaced only measured work undertaken by the private sector.

**TABLE 18.14 – ENGINEERING CONSTRUCTION**  
**ACTIVITY BY STAGE OF CONSTRUCTION**  
(\$ million)

Reference : Catalogue No. 8762.5

Stage of construction	1986-87	1987-88	1988-89
Commenced during period	1,199.1	1,196.7	1,441.1
Work done during period	1,220.3	1,556.8	1,599.3
Work yet to be done	687.7	404.1	429.0

## REFERENCES

## ABS publications:

*Estimated Stocks of Dwellings in Census Collection Districts and Statistical Local Areas, Western Australia* (8705.5).

*Building Approvals, Western Australia* (8731.5).

*Dwelling Unit Commencements Reported by Approving Authorities* (8741.5).

*Building Activity, Western Australia* (8752.5).

*Construction Industry Survey: Private Sector Construction Establishment, Details of Operations, Australia* (8772.0).

*Engineering Construction Survey, Australia* (8762.0).

## Chapter 19

# TRANSPORT AND COMMUNICATION

## Transport

Western Australia's main transport systems are centred generally on Perth, the capital, and on Fremantle, the principal port. Subsidiary systems are centred on a number of outports north and south of Fremantle and on some inland towns. International flights operate through the airports at Perth and the north-west town of Port Hedland.

### ROAD TRANSPORT

#### Roads

The Main Roads Department is the principal road authority in Western Australia. In conjunction with local government authorities it is responsible for the planning, design, construction and maintenance of the State road network.

The basis of the Western Australian road system is a series of declared highways and main roads which are the responsibility of the Department. These highways and roads carry traffic to major internal centres and interstate. Other connecting or local roads, declared as secondary or unclassified, are controlled by individual local councils.

Road statistics at 30 June 1989 were:

Highways	8,162 km
Main Roads	7,458 km
Secondary Roads	8,658 km
Unclassified Roads	117,640 km

The figure for highways includes 202 kilometres of undeclared highway between Newman and Port Hedland.

State sealed road length totalled 41,585 kilometres.

Excluded from these statistics are forestry roads, which are the responsibility of the Department of Conservation and Land Management.

A comprehensive route numbering system for roads was established in Western Australia during 1986. The system consists of 43 State routes in the metropolitan area and 15 in the country. Other road developments include the construction of bypass and arterial or perimeter routes in major metropolitan and country areas.

Perth now has 34.7 kilometres of freeway from South Street, Leeming to Ocean Reef Road, Edgewater. A reserved bus lane was opened on the Kwinana Freeway in December 1989 to improve access for public transport to Perth. Upgrading of the Eyre, Great Northern and North-West Coastal Highways is continuing.

**Motor vehicles**

The responsibility for the registration and licensing of vehicles and the licensing of motor vehicle drivers has been delegated to the Commissioner of Police by the Traffic Board of Western Australia. The Traffic Board is responsible for the collection and analysis of road traffic accident statistics, and research into the causes and prevention of road traffic accidents.

A survey of motor vehicle usage is undertaken by the ABS every three years, the latest survey results relating to the twelve months ended 30 September 1988. The survey is based on a sample of approximately 67,000 vehicles across Australia

(7,000 vehicles in Western Australia), of which 75 per cent were trucks and other commercial vehicle types.

**TABLE 19.2 – CURRENT DRIVERS LICENCES**  
(Source: Western Australian Police Service)

Age group	At 30 June 1989		
	Male	Female	Total
Under 17	357	70	427
17 - 20	42,011	36,553	78,564
21 - 24	45,728	42,350	88,078
25 - 29	63,246	60,144	123,390
30 - 39	122,565	117,931	240,496
40 - 49	99,686	86,816	186,502
50 - 59	64,671	50,561	115,232
60 and over	74,902	46,266	121,168
<b>Total</b>	<b>513,166</b>	<b>440,691</b>	<b>953,857</b>

**TABLE 19.1 – MOTOR VEHICLE REGISTRATIONS**  
References: Catalogue Nos. 9304.5, 9305.5

	1987	1988	1989
<b>New motor vehicle registrations—</b>			
Year ended 30 June—			
Motor cars and station wagons	33,642	36,040	44,100
Utilities and panel vans	5,758	5,403	7,376
Trucks and buses	4,440	5,214	6,773
Motor cycles	2,305	2,215	2,522
<b>Total</b>	<b>46,145</b>	<b>48,872</b>	<b>60,771</b>
<b>Vehicles on register—</b>			
At 30 June—			
Motor cars and station wagons	647,734	670,158	708,253
Utilities and panel vans	133,588	135,850	140,893
Trucks and buses	89,442	94,311	100,805
Motor cycles	35,287	35,442	36,294
<b>Total</b>	<b>906,051</b>	<b>935,761</b>	<b>986,245</b>

**TABLE 19.3 – DRIVERS LICENCES DISQUALIFICATIONS AND CANCELLATIONS (a)**  
1988-89

(Source: Western Australian Police Service)

Nature of offence	Number
<b>Alcohol related—</b>	
Driving under the influence	4,401
Driving with 0.08% or more	6,842
Refusing test	389
Other	541
<b>Dangerous, reckless or careless driving</b>	<b>1,766</b>
Speeding	833
Driving under disqualification	2,424
Driving without a licence	2,480
Demerit points suspension	4,013
Other	3,060
<b>Total</b>	<b>26,749</b>

(a) Includes some cases carried forward from the previous year.

**TABLE 19.4 – ANNUAL KILOMETRES TRAVELLED (a)**  
**YEAR ENDED 30 SEPTEMBER 1988**  
(Million kilometres)  
Reference: Catalogue No. 9208.0

Vehicle type	Area of travel			Total
	Perth Statistical Division	Rest of State	Interstate	
Cars and station wagons	7,972.4	2,964.1	178.0	11,114.5
Utilities and panel vans	1,430.0	1,212.5	22.3	2,664.8
Rigid trucks	446.5	391.2	6.3	843.9
Articulated trucks	79.1	240.0	27.2	346.4
Other truck types	14.0	9.7	-	23.8
Buses	89.1	88.7	23.7	201.5
Motor cycles	146.0	57.3	2.7	206.0
<b>Total</b>	<b>10,177.1</b>	<b>4,963.6</b>	<b>260.2</b>	<b>15,400.9</b>

(a) Vehicles registered in Western Australia

**TABLE 19.5 – FUEL CONSUMPTION AND TONNES CARRIED (a)**  
**YEAR ENDED 30 SEPTEMBER 1988**  
*Reference: Catalogue No. 9208.0*

Vehicle type	Fuel consumption (million litres)				Tonnes carried (Million)
	Petrol	Diesel	Other (b)	Total	
Cars and station wagons	1,247.4	33.3	18.2	1,298.9	-
Utilities and panel vans	287.4	69.9	2.1	359.4	11.0
Rigid trucks	57.1	167.4	4.3	228.7	67.3
Articulated trucks	0.9	186.9	2.9	190.7	42.8
Other truck types	2.6	2.4	0.7	5.6	-
Buses	4.7	46.9	0.4	52.1	-
Motor cycles	12.6	-	-	12.6	-
<b>Total</b>	<b>1,612.7</b>	<b>506.8</b>	<b>28.5</b>	<b>2,148.0</b>	<b>121.0</b>

(a) Vehicles registered in Western Australia. (b) Including LPG and dual fuelled.

### Bicycle services

In the metropolitan area and regional centres of Western Australia a range of bicycle facilities have been developed to cater for the growing number of pedal cyclists. The responsibility for bicycle policy lies with the Minister for Local Government and his department. A State Bicycle Committee is responsible for coordinating the various inputs to bicycle policy. 'Bike West' (comprising the State Bicycle Committee and a Bicycle Management Team) was established within the Department of Local Government and is responsible for the development and implementation of the Bikeplans with assistance from local groups. Community participation is a key objective of Bike West's aim to educate the community on the need for safer cycling.

An estimated 500,000 Western Australians (one-third of the population) currently use bicycles, the greatest growth being in adult cycling. In the Perth metropolitan region an estimated 6 per cent of all daily vehicle trips are made by bicycle with most of these trips replacing private car trips.

Outside the metropolitan area, Bike Plans have been completed for the following areas: Albany; Augusta-Margaret River; Bunbury; Carnarvon; Esperance; Geraldton and Mandurah.

### Bus and ferry services

The Metropolitan (Perth) Passenger Transport Trust (Transperth) bears overall responsibility for all of Perth's metropolitan public transport (bus, ferry and train services). The metropolitan area is designated as being within a 50 kilometre radius of the Perth Town Hall as well as the area west of

the South-West Highway between Perth and Pinjarra. The ferry service operates on the Swan River between Perth and South Perth. Buses and ferries are also available for charter from Transperth.

A new bus station is being constructed in the City of Perth and is expected to be completed in 1991. The Perth City Bus Junction will connect directly with the new bus lane on the Kwinana Freeway.

A growing number of privately owned ferry companies operate tours to the wine growing regions of the Swan River as well as river and harbour cruises around Perth and Fremantle, and trips to Rottnest Island.

**TABLE 19.6 – TRANSPERTH BUS AND FERRY SERVICES (a)**  
*(Source: Metropolitan (Perth) Passenger Transport Trust)*

	1986-87	1987-88	1988-89
<b>Buses—</b>			
Number (b)	r900	r899	898
Route kilometres	1,771	1,784	1,836
Bus kilometres ('000)	46,031	46,172	46,878
Passenger journeys ('000)	52,368	52,108	54,804
<b>Ferries—</b>			
Number (b)	5	4	4
Route kilometres	3	3	3
Kilometres run ('000)	51	52	51
Passenger journeys ('000)	512	544	606

(a) Includes private charter and tourist services and, in the case of buses, clipper and school specials. (b) At 30 June.

Road transport of passengers outside the metropolitan area is provided by both the railway road services (see the section 'Rail Services') and privately operated bus services. The railway coach

services operate in the southern part of the State (a private company competes with Westrail on the Perth-Augusta and Perth-Pemberton routes), and the privately operated bus services cater predominantly for those areas north of Geraldton. Privately operated express bus services operate a restricted service between Perth and Kalgoorlie.

Intratown bus services are provided in a number of the larger country towns by private operators, although in the Kalgoorlie-Kambalda-Boulder region services are undertaken by the Eastern Goldfields Transport Board.

In certain country areas private operators, under Government contract, run school bus services taking country children to and from school.

**Taxi services**

The Taxi Control Board controls the operations of taxis in the Perth Metropolitan Traffic Area and any other designated areas.

In addition to unrestricted use taxis, private taxi-cars (luxury type vehicles used mainly for VIP work and tours where a chauffeur driven limousine is required) are licensed to cater for a demand for this type of vehicle. To cater for peak demand and 'special event' situations restricted hour taxi licences are issued. Restricted area licences have been issued for areas that would otherwise be poorly serviced. Multi-purpose taxis, for use primarily by disabled people, have also been licensed.

The Department of Transport is responsible for taxi operations in country areas.

**TABLE 19.7 - LICENSED TAXI CARS: 30 JUNE 1989**  
(Source: Taxi Control Board, (State) Department of Transport)

Metropolitan area—	
Metered taxis	
Unrestricted	855
Premium restricted	30
Temporary restricted	48
Multi-purpose	6
Area restricted	7
Private	25
<b>Total</b>	<b>971</b>
Country areas	268

**Road traffic accidents**

Statistics of road traffic accidents are prepared from information concerning accidents in public thoroughfares, as supplied by the Western Australian Police Department. The statistics are confined to accidents which satisfied all of the following conditions: (a) the accident was reported to the police; (b) the accident occurred on a road, street etc. open to the public, including railway level crossing; (c) it involved a road vehicle or driven animal which at the time of the accident was in motion; (d) the accident resulted in the death of a person within 30 days after the accident or bodily injury to a person to an extent requiring surgical or medical treatment.

**TABLE 19.8 - ROAD TRAFFIC ACCIDENTS**  
*Reference: Catalogue No. 9406.5*

	<i>Casualty accidents</i>	<i>Persons killed</i>	<i>Persons injured</i>
1987			
Nature of accident—			
Multi-vehicle accident	5,564	70	7,280
Single vehicle accident—			
Struck object	939	48	1,197
Struck pedestrian	574	34	567
Overturning	690	56	989
Falling (a)	225	3	250
Other	67	-	82
Unknown	123	2	156
<b>Total</b>	<b>8,182</b>	<b>213</b>	<b>10,521</b>
Feature of roadway—			
Intersection	4,137	56	5,341
Straight road	3,023	106	3,814
Curve or bend	863	50	1,142
Other	159	1	224
<b>Total</b>	<b>8,182</b>	<b>213</b>	<b>10,521</b>
1988			
Nature of accident—			
Multi-vehicle accident	6,380	77	8,304
Single vehicle accident—			
Struck object	928	74	1,215
Struck pedestrian	592	33	591
Overturning	708	35	1,062
Falling (a)	223	9	235
Other	91	-	110
Unknown	144	2	193
<b>Total</b>	<b>9,066</b>	<b>230</b>	<b>11,710</b>
Feature of roadway—			
Intersection	4,658	53	6,013
Straight road	3,314	106	4,187
Curve or bend	915	62	1,293
Other	179	9	217
<b>Total</b>	<b>9,066</b>	<b>230</b>	<b>11,710</b>

(a) Includes all motor cycle and pedal cycle accidents where the driver or passenger fell from the vehicle regardless of whether the vehicle overturned.

**TABLE 19.9 – ROAD TRAFFIC ACCIDENTS  
CASUALTIES BY TYPE OF ROAD USER**

Reference: Catalogue No. 9406.5

Type of road user	1986	1987	1988
<b>PERSONS KILLED</b>			
Drivers of motor vehicles	85	91	85
Motor cyclists (a)	18	22	23
Pedal cyclists	14	4	7
Passengers—			
Motor vehicle	61	56	76
Motor cycle	2	-	4
Pedestrians	48	38	33
Other (b)	-	2	2
<b>Total</b>	<b>228</b>	<b>213</b>	<b>230</b>
<b>PERSONS INJURED</b>			
Drivers of motor vehicles	5,144	5,351	6,050
Motor cyclists (a)	824	784	758
Pedal cyclists	464	505	600
Passengers—			
Motor vehicle	2,880	3,003	3,415
Motor cycle	125	120	106
Pedestrians	540	551	575
Other (b)	208	207	206
<b>Total</b>	<b>10,185</b>	<b>10,521</b>	<b>11,710</b>

(a) Includes riders of motor scooters. (b) Includes passengers on pedal cycles, bystanders, train crews, riders of horses, drivers of animal-drawn vehicles and road user type not stated.

**TABLE 19.10 – ROAD TRAFFIC ACCIDENTS  
CASUALTIES CLASSIFIED BY AGE**

Reference: Catalogue No. 9406.5

Age group	1986	1987	1988
<b>Persons killed—</b>			
Under 5	9	6	9
5 - 9	9	6	4
10 - 16	15	7	16
17 - 20	33	40	48
21 - 24	27	39	37
25 - 29	31	20	30
30 - 39	24	27	27
40 - 49	20	15	17
50 - 59	17	15	15
60 and over	43	37	27
Not stated	-	1	-
<b>Total</b>	<b>228</b>	<b>213</b>	<b>230</b>
<b>Persons injured—</b>			
Under 5	180	211	198
5 - 9	272	272	313
10 - 16	784	790	844
17 - 20	2,039	2,042	2,219
21 - 24	1,402	1,496	1,508
25 - 29	1,163	1,229	1,395
30 - 39	1,578	1,600	1,822
40 - 49	966	964	1,160
50 - 59	593	625	697
60 and over	641	688	772
Not stated	567	604	782
<b>Total</b>	<b>10,185</b>	<b>10,521</b>	<b>11,710</b>

## RAIL SERVICES

A railway system extends from Fremantle, Perth and Midland into the mining, agricultural and forestry areas in the southern half of the State. The railways in this part of the State are operated by the Western Australian Government Railways Commission (trading under the name Westrail). The system is linked with railways in other States at Kalgoorlie where it joins Australian National Railways. In addition to the Westrail service for general and passenger traffic there are private railways for the haulage of iron ore in the north of the State and timber and alumina in the south.

Westrail also operates road services for passengers and freight, and interstate, intrastate and charter tours involving rail and road services.

**TABLE 19.11 – WESTRAIL SERVICES (a)**

(Source: Westrail)

	1986-87	1987-88	1988-89
<b>Kilometres of railway (a)—</b>			
Route kilometres	5,553	5,553	5,553
Track kilometres (b)	7,021	6,986	6,982
<b>Kilometres run ('000)—</b>			
Train	9,436	9,465	9,472
Road bus (c)	2,309	2,447	2,773
<b>Passenger journeys ('000)—</b>			
Rail	214	288	323
Road (c)	1173	1174	177
Tonnes carried ('000) (d)	21,264	21,946	24,294

(a) Excludes suburban rail. Excludes charter and tourist services. (b) Includes sidings. (c) In addition to its rail services, Westrail operates a system of road services for passengers and freight. (d) Paying goods only.

At 30 June 1989 there were 5,553 kilometres of railway owned and operated by Westrail, with a further 731 kilometres of rail owned by the Commonwealth Government and operated by Australian National Railways.

Westrail introduced a new faster Australind passenger service (between Perth and Bunbury) in November 1987. Railway facilities at Albany and Geraldton are being relocated to facilitate foreshore redevelopment in these towns for tourism and commercial purposes.

Suburban passenger rail operations are administered and operated by Westrail for Transperth, with Transperth being responsible for policy and finance.



Electrification of the suburban rail network is currently underway. The first electric service is planned to commence between the city and Armadale by mid 1990. A full electric service from the city to both Midland and Fremantle planned for late 1991 will complete the project. A new line extending northward from Perth to Joondalup will be constructed to cater for the rapidly expanding northern suburbs.

**TABLE 19.12 – SUBURBAN RAIL SERVICES**  
(Source: Metropolitan (Perth) Passenger Transport Trust)

	1986-87	1987-88	1988-89
Rail cars and carriages (number)	106	106	102
Route kilometres	67	63	63
Train kilometres ('000)	2,177	2,314	2,236
Passenger journeys ('000)	9,837	9,564	9,396

The exploitation of extensive inland deposits of iron ore in Western Australia has necessitated the construction of private railways for the transport of ore from the mines to the coast. Conditions applying to the construction and operation of these railways are incorporated in agreements made between the State Government and mining companies. The private railways operate from Newman to Port Hedland (426 kilometres), Paraburdoo to Dampier (400 kilometres), Shay Gap to Port Hedland (185 kilometres) and Pannawonica to Cape Lambert (187 kilometres).

**TABLE 19.13 – IRON ORE RAILWAYS**

	1986-87	1987-88	1988-89
Kilometres	1,185	r1,191	1,198
Locomotives in service	124	r127	129
Ore wagons	5,514	r5,458	5,462
Tonnes carried ('000)	88,037	r90,128	84,655

A number of private organisations operate tourist railways in the south-west of the State principally on lines owned and maintained by Westrail. The tourist railways own the steam locomotives used on the tourist services. A tourist tramway operates in the south-west of the state between Pemberton and Northcliffe.

## AIR SERVICES

An extensive system of regular air services operates in Western Australia for the transport of passengers, freight and mail. Perth has frequent and direct links with major Western Australian regional centres, other Australian capital cities and Alice Springs. It also has direct overseas links which include Europe, Asia, Africa and New Zealand. Pacific and American connections are made via the Eastern States. Port Hedland, the second international airport in Western Australia, has direct international links with Bali.

The Civil Aviation Authority has responsibility for setting safety standards and day to day regulatory control of air services throughout Australia as well as operational responsibility for air traffic control, flight advisory services, communication, navigation and surveillance systems and rescue and fire fighting services at airports.

The Bureau of Air Safety Investigations investigates aircraft accidents and incidents involving civil aircraft in Australia.

The operation of regular passenger air services over the main domestic routes, or trunk routes such as Perth to Adelaide, will no longer be restricted to the two major domestic airlines after October 1990.

**TABLE 19.14 – PASSENGER TRAFFIC BETWEEN PERTH AND PRINCIPAL AIRPORTS (a)**  
(Source: Department of Transport and Communications)

	Passengers		
	1986	1987	1988
Domestic —			
Adelaide	216,117	235,637	249,470
Alice Springs	34,746	42,481	41,313
Brisbane	6,798	6,365	4,678
Cairns	3,003	9,232	10,954
Melbourne	353,244	392,526	395,514
Sydney	228,448	290,067	290,222
International —			
Auckland	54,361	r67,917	72,730
Denpasar	r72,742	r70,211	79,982
Hong Kong	r62,095	r56,464	54,057
Kuala Lumpur	r51,071	r73,649	73,060
London	66,671	r65,498	68,646
Singapore	r183,859	r220,697	251,296

(a) Total of embarkations and disembarkations.

The Federal Airports Corporation is responsible for the operations at Perth (and Jandakot) airports, including the new Perth International Terminal which is located twelve kilometres from the domestic terminal.

The domestic and international airports at Perth are currently used by:

- 8 international operators
- 2 interstate operators
- 1 intrastate operator
- 3 commuter operators connecting Perth with 19 country centres.

Other commuter services connect townships and stations with ports on jet routes.

Excluding Jandakot and Perth, there were forty-seven aerodromes used for civil aviation in Western Australia at 30 June 1988, including the Department of Defence aerodrome at Learmonth and sixteen aerodromes operated under the Aerodrome Local Ownership Plan.

Derby airport in the far north-west of the State will be redeveloped to allow the operation of larger aircraft in the region.

At 31 December 1988, there were 961 aircraft undertaking general aviation work (charter, private, aerial agriculture and other) based in Western Australia.

TABLE 19.15 - PASSENGER AND AIRCRAFT MOVEMENTS AT PRINCIPAL AIRPORTS

Airport	Passengers (a)			Aircraft movements (b)		
	1986	1987	1988	1986	1987	1988
Broome	32,067	34,384	47,262	1,837	1,890	2,306
Carnarvon	17,212	17,643	18,680	1,060	982	967
Derby	35,309	38,707	32,845	2,164	2,330	2,323
Geraldton	27,943	31,522	38,591	1,501	1,523	1,521
Kalgoorlie	71,590	88,978	100,752	1,618	1,864	2,080
Karratha	136,497	145,893	140,492	5,275	5,283	4,386
Kununurra	34,081	34,972	39,769	1,698	1,716	1,981
Learmonth	10,532	10,461	13,357	816	749	702
Newman	28,439	30,968	30,809	1,366	1,427	1,650
Paraburdoo	27,213	25,469	26,954	1,380	1,413	1,516
Perth—						
Internal (c)	1,264,444	1,432,115	1,471,116	16,647	18,596	18,724
International	r566,056	r649,199	714,111	3,280	3,307	3,338
Port Hedland—						
Internal	93,980	82,901	87,397	4,797	4,607	3,774
International	4,161	r5,115	5,899	104	102	106

(a) Total of embarkations and disembarkations. (b) Total of arrivals and departures. (c) Interstate and intrastate.

## SHIPPING

Western Australia's sea-borne trade is conducted through the Port of Fremantle and a number of outports. Of these, Geraldton, Bunbury, Albany and Esperance are situated in the more highly developed south-western and southern parts of the State. The less closely settled areas of the north-west and the north are served by ports and other landing points at Useless Loop (Shark Bay), Carnarvon, Cape Cuvier, Exmouth, Barrow Island, Dampier, Port Walcott (Cape Lambert), Port Hedland, Broome, Derby, Yampi and Wyndham.

Table 19.16 shows the number of arrivals into and departures from various ports by vessels coming

direct from or going direct to overseas ports for the period 1985-86 to 1987-88. The figures exclude particulars of naval vessels; yachts and other craft used for pleasure; foreign fishing vessels that neither load nor discharge cargo; geophysical and oceanographic research vessels; oil-drilling rigs and vessels servicing them; and vessels of 200 registered net tonnes and under.

The importance of mineral developments in the north-west of the State is evident from the numbers of ship calls in the ports of Dampier, Port Hedland and Port Walcott. They are surpassed only by the Port of Fremantle, the principal port of Western Australia.

TABLE 19.16 – OVERSEAS SHIP CALLS (a) AT MAJOR PORTS  
Reference: Catalogue No. 9211.0

Port	Arrivals			Departures		
	1985-86	1986-87	1987-88	1985-86	1986-87	1987-88
Fremantle	988	1,069	1,025	1,977	1,057	1,004
Other ports—						
Bunbury	184	174	n.a.	188	172	n.a.
Cape Cuvier	7	-	n.a.	7	-	n.a.
Dampier	462	451	n.a.	463	442	n.a.
Geraldton	160	131	n.a.	164	137	n.a.
Port Hedland	449	403	405	434	408	395
Port Walcott	96	91	n.a.	100	91	n.a.
Yampi Sound	25	38	n.a.	26	37	n.a.
Other	229	223	1,184	226	227	1,168
<i>Total</i>	<i>1,612</i>	<i>1,511</i>	<i>-</i>	<i>1,608</i>	<i>1,514</i>	<i>-</i>
<b>All ports</b>	<b>2,600</b>	<b>2,580</b>	<b>2,614</b>	<b>2,585</b>	<b>2,571</b>	<b>2,567</b>

(a) Number of port visits made by ships engaged in overseas voyages.

Cargo statistics are recorded in both revenue tonnes and gross weight tonnes. A revenue tonne is the basis on which freight is charged and may be measured by mass (tonnes) or volume (cubic metres). Gross weight is the total weight of cargo excluding the weight of containers, irrespective of the basis on which freight is charged.

Apart from general cargo, overseas consignments discharged were principally petroleum and petroleum products, rock phosphate, caustic soda, iron, steel and sulphur. Outward cargoes from Fremantle consisted largely of alumina, cereal grains, wool, refined petroleum and sheep. Cargo loaded at Esperance and Albany comprised mainly

cereal grains. At Bunbury, the principal cargoes loaded were alumina, mineral sands and woodchips. Cereal grains and mineral sands were the main items loaded at Geraldton. Principal cargoes loaded in the northern part of the State were iron ore from Dampier, Port Hedland, Port Walcott and Yampi. Salt was loaded at Carnarvon, Dampier and Port Hedland.

The Western Australian Coastal Shipping Commission was established in 1965 to carry on the services formerly maintained by the State Shipping Service. The Commission's ships operate along the north-west and northern coasts, calling regularly at ports between Fremantle and Darwin

TABLE 19.17 – OVERSEAS CARGO LOADED AND DISCHARGED AT MAJOR PORTS 1986-87  
Reference: Catalogue No. 9211.0

Port	Loaded		Discharged	
	Revenue tonnes (a)	Gross weight tonnes (a)	Revenue tonnes (a)	Gross weight tonnes
Fremantle	7,196,820	7,097,325	3,636,548	3,287,417
Other ports—				
Bunbury	3,848,225	3,825,392	499,542	497,237
Dampier	32,099,254	32,099,254	258,377	244,592
Geraldton	1,703,320	1,703,319	75,084	75,084
Port Hedland	32,299,330	32,299,330	133,472	128,734
Port Walcott	11,314,652	11,314,413	19,583	19,583
Yampi Sound	2,358,160	2,358,160	300	300
Other	2,610,725	2,610,700	226,091	226,091
<i>Total</i>	<i>86,233,666</i>	<i>86,210,568</i>	<i>1,212,449</i>	<i>1,191,621</i>
<b>All ports</b>	<b>93,430,486</b>	<b>93,307,893</b>	<b>4,848,997</b>	<b>4,479,038</b>

(Northern Territory). Besides general cargo, the freight discharged at north-west and northern ports consists mainly of refined petroleum products, bulk cement and other building and construction materials, refrigerated cargo, vehicles and drilling equipment. Cargoes carried south to Fremantle are mainly primary products (such as meat, grains and prawns) and vehicles.

The Commission also maintains a regular link between Fremantle and Bunbury and the Eastern States.

In 1986, the Commission extended its operations to include Papua New Guinea; and in 1988, after a break of fifty years, the shipping service with South East Asia recommenced.

### Administration of ports

The State Government, through the Marine and Harbours Department, controls the ports at Broome, Carnarvon, Derby, Port Walcott (Cape Lambert) and Wyndham. The ports at Albany, Bunbury, Esperance, Fremantle, Geraldton and Port Hedland are controlled by separately constituted authorities established by Act of Parliament. Private operators control the ports (or landing points) at Barrow Island, Cape Cuvier, Dampier, Exmouth, Useless Loop and Yampi.

### Description of principal ports

A brief description of the principal ports, at 30 June 1988, is given below. References to previous articles on ports appears in the Appendix.

**Albany.** The port of Albany (35°S latitude) is the most southerly port in Western Australia and comprises the waters of Princess Royal Harbour and King George Sound. The effect of tidal movements is negligible and as there is little trouble from fog or storm it is an all-weather port. It embraces an area of 11,800 hectares having an abundance of natural deep water and affording excellent protection to shipping and shore works.

Access to Princess Royal Harbour from King George Sound is by means of a channel of 12.2 metres minimum depth and 145 metres wide.

**Bunbury.** The port of Bunbury (33°S latitude) is situated in Koombana Bay, 104 nautical miles south of Fremantle, and comprises an inner and outer harbour. It is an all-weather port with a tidal rise and fall of 0.8 metres influenced by weather conditions.

Access to the inner harbour is by means of a dredged channel approximately 24 kilometres in length, 12.2 metres in depth and 121 metres wide.

**Esperance.** The port of Esperance (33°S latitude) is situated in Esperance Bay on the south coast of Western Australia.

The port has two land-backed berths of concrete and steel construction. The approach channel to the berths is 244 metres wide and is dredged to a depth of 11.0 metres. The deepest permissible loading draft is 10 metres.

**Fremantle.** The port of Fremantle (32°S latitude) is the principal port of Western Australia. It is an all-weather port, virtually tideless and little troubled by storm or fog. The port provides modern facilities for the handling of ships, passengers and cargo and is connected to the road and rail systems of Western Australia and Australia generally. It has an area of 87,600 hectares and comprises an Inner Harbour and an Outer Harbour.

The Inner Harbour, which is constructed within the mouth of the Swan River, is approached through a short entrance channel dredged to a depth of 11 metres at low water. It encloses 81 hectares of water dredged throughout to 11 metres at low water and is the centre of the general cargo trade of the port.

The Outer Harbour is protected from the west by islands and reefs. It embraces three main anchorages of depths of up to 19 metres. Gage Roads, the most northerly of these anchorages, serves as an approach to the Inner Harbour. Owen Anchorage is centrally situated between Success and Parmelia Banks. The largest and most protected of the anchorages, Cockburn Sound, lies to the south and serves the Kwinana industrial area.

**Geraldton.** The port of Geraldton (28°S latitude) is situated in Champion Bay on the west coast, 215 nautical miles in a north-westerly direction from Fremantle. The outer harbour, which is 10 metres deep, provides a good holding anchorage. The inner harbour, enclosed by a breakwater, affords ample protection for shipping and shore works. The depth of the inner harbour is 9.1 metres, but the rock base of the entrance channel restricts the loaded draught of vessels to 8.7 metres. With the use of tides, vessels may load to 9.1 metres at mean sea level (0.8 metre tide), or to 9.3 metres at mean higher high water (1.1 metre tide).

**Port Hedland.** Port Hedland (20°S latitude) is situated on the north-west coast of Western Australia, 957 nautical miles from Fremantle. Access to the harbour is by means of a dredged channel approximately 20 kilometres in length with a further 25 kilometres delineated by

beacons. The channel has a minimum depth of 14.1 metres, and minimum width of 183 metres. Subject to the height of tide, the channel is navigable by vessels of up to 250,000 tonnes deadweight, and 325 metres in length with a maximum draft of 18.35 metres.

## Communications

### TELECOMMUNICATIONS

#### Internal services

Telecommunications services throughout Australia are controlled by the Australian Telecommunications Commission (Telecom). Telephone services available include teleconferencing as well as the standard exchange and public telephone services. Other services available include radio paging, videotex, teletex, telex, cellular mobile telephone services and a range of services such as digital data services, ISDN and Virtual Private Networks, tailored for corporate customers.

**TABLE 19.18 - TELECOM OPERATIONS IN WESTERN AUSTRALIA**  
(Source: Telecom)

	1986-87	1987-88	1988-89
Telephone services (a)—			
Metropolitan (b)	448,038	469,984	520,300
Country	157,172	165,802	156,500
<b>Total</b>	<b>605,210</b>	<b>635,786</b>	<b>676,800</b>
Telex services (a)	4,686	3,339	2,012
Telex internal calls ('000) (c)	3,979	2,946	138
Data services (a)—			
Datel services	7,415	6,892	6,426
Digital data services	4,291	5,786	6,345

(a) At 30 June. (b) Within a 32 kilometre radius of the General Post Office, Perth. (c) Includes Post Office official traffic.

To improve the capacity and security of the service in Western Australia, some new developments have been undertaken including the installation of an optical fibre cable between Perth and Adelaide. Route preparation work is being planned for the provision of a second optical fibre cable, with a target completion date of April 1992.

The Royal Flying Doctor Service of Australia, through its extensive radio network, provides general telegram and radio-telephone facilities in addition to medical aid and advice in remote areas.

#### External services

The Overseas Telecommunications Commission (OTC) is responsible for telecommunication services between Australia and other countries.

Australia, represented by the Commission, is a member of the management body of the International Telecommunications Satellite Consortium which, in 1964, established a global communications satellite system. The Commission operates five standard earth stations (Carnarvon and Perth in Western Australia, Ceduna in South Australia, Healesville in Victoria and Moree in New South Wales) which communicate via satellite with stations in other countries.

In addition to transmission via satellite, OTC also uses submarine cables and high frequency radio for its services.

The Commission operates a coastal radio service which provides essential maritime communications covering distress signals, air-sea rescue and naval traffic. OTC also provides communications with ships at sea. Coastal radio stations in Western Australia are located at Perth, Broome, Carnarvon, Esperance and Geraldton.

In association with Telecom, OTC provides telephone, electronic mail, television and many other telecommunications services to other countries.

Radio communication station operators in Australia are licensed by the Department of Transport and Communications. These stations can be run by either organisations or private individuals and can be licensed to operate from fixed or mobile points.

### Internal satellite communications services

Australia's National Satellite System is owned and operated by AUSSAT Pty Ltd, a company established in 1981 to provide internal satellite communications for Australia and neighbouring regions.

AUSSAT's first two satellites were launched from Cape Canaveral in the United States of America on the Space Shuttles Discovery and Atlantis in August and November 1985. They began commercial operations on 1 January 1986. A third satellite was launched in September 1987 from Kourou, French Guyana, on the European Space Agency's Ariane rocket.

The major access points to the satellite system are though the company's eight major City Earth Stations located in each capital city. In Western Australia, the station is located at Lockridge, eleven kilometres north-east of Perth. Two stations—Belrose in Sydney and Lockridge—are responsible for monitoring and controlling the status of the orbiting satellites (Tracking, Telemetry, Command and Monitoring Stations). The Lockridge facility is equipped with a tracking and telemetry dish, two communications antennas for sending and receiving telecommunications and broadcasting signals and a microwave tower for land-based signal sending and receiving.

Each satellite has two national beams in the 'uplink' direction (ground to satellite) that can receive signals from anywhere in Australia and from offshore regions. In the 'downlink' direction, each has two national beams and four spot beams covering:

Western Australia (the Western Australian beam)

Queensland (the North-East beam)

South Australia, Northern Territory (the Central Australian beam)

New South Wales, Victoria, Tasmania, Lord Howe and Norfolk Islands (the South-East beam).

In addition, the third satellite has a beam which covers the south-west Pacific region including New Zealand.

AUSSAT's domestic satellite communications system complements existing land-based communications systems. It provides Telecom

services to remote areas and improved communications for mining and exploration companies; provides emergency service organisations with more reliable communications than land-based systems; enables government departments, financial institutions and businesses generally to use AUSSAT for voice, video and data transmission; provides improved communications links between air traffic control centres and aircraft; enables television and radio services to reach more remote areas through the Australian Broadcasting Service Homestead and Community Broadcast Satellite Service (HACBSS) and a Remote Commercial Television Service; and provides a more cost-effective and flexible means for establishing interactive distance education.

### Radio and television services

Radio broadcasting stations have operated in Western Australia since 1924 when station 6WF (Westralian Farmers) opened in Perth.

Full scale transmission from a television station in Western Australia began in 1959 with the commercial station TVW 7 (Channel 7).

The Australian Broadcasting Tribunal (ABT) is responsible for the licensing of all commercial radio and television stations, with the national broadcasting and television services being under the control of the Australian Broadcasting Corporation (ABC). The ABT operates within a framework of complex provisions designed to ensure diversity of ownership and control of commercial broadcasting services, including cross media interests.

A Remote Commercial Television Service began operating in Western Australia in October 1986. Remote licences were introduced by the ABT to provide a service to currently underserved regions via AUSSAT satellites and to ensure that remote area residents receive at least one commercial television service.

In June 1987, the ABC introduced a Second Regional Radio Network to provide people in rural areas with access to at least two services. Program material is provided for HACBSS listeners and country areas fed by satellite transmission.

The ABC simulcasts major orchestral concerts, ballets and operas using ABC TV and ABC-FM radio.

The Special Broadcasting Service was extended to Perth in March 1986. Programs originate in Sydney and are relayed to transmitters in each State via AUSSAT satellite.

**POSTAL SERVICES**

Postal services throughout Australia are controlled by the Australian Postal Commission (Australia Post). Postal services made available by Australia Post include courier, electronic mail services and standard mail services.

**TABLE 19.19 – AUSTRALIA POST OPERATIONS  
WESTERN AUSTRALIA**  
(Source : Australia Post)

	1986-87	1987-88	1988-89
Post offices at 30 June (a)	400	400	397
Postal articles handled (b) ('000)—			
Posted for delivery within Australia	252,084	266,774	281,757
Posted for delivery overseas	13,039	14,626	15,274
Received from overseas	12,988	13,402	14,117
<b>Total</b>	<b>265,123</b>	<b>294,802</b>	<b>311,148</b>

(a) Official and non-official. (b) Includes standard letters, non-standard and registered articles and parcels.

**REFERENCES**

**ABS Publications**

*Motor Vehicle Registrations, Western Australia* (9304.5)

*Road Traffic Accidents Involving Casualties, Reported to the Police Department, Western Australia* (9406.5)

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Telecom, *Annual Report*

Transperth, *Annual Report*

Western Australian Police Department, *Annual Report*

Westrail, *Annual Report*

## Chapter 20

### FOREIGN AND INTERSTATE TRADE

Foreign trade statistics are compiled from information contained in documents prepared by importers and exporters or their agents in accordance with the Customs Act. Particulars of Western Australia's foreign trade, as presented in this Chapter, are derived from data supplied by the Australian Bureau of Statistics (ABS), Canberra.

Statistics of Western Australia's trade with other Australian States are compiled by the Western Australian Office of the ABS from information contained in documents collected under authority of the *Census and Statistics Act 1905* from importers, exporters and other persons concerned with the distribution of goods.

#### The Customs Tariff

The first Commonwealth Customs Tariff was introduced on 8 October 1901, from which date uniform duties came into effect throughout Australia. The Australian Customs Tariff was developed in conformity with the policy of protecting economic and efficient Australian industries and of granting preferential treatment to imports from certain countries. Duties are imposed on some goods, generally of a luxury nature, for revenue purposes. Customs collections are a major source of revenue, but in its protective character the tariff has an important influence on the Australian economy.

The Australian Customs Tariff in use until December 1987 was introduced on 1 July 1965. The nomenclature used in the Tariff is that of the Convention on Nomenclature for the Classification of Goods in Customs Tariffs, an international agreement signed at Brussels on 15 December 1950. The system of naming established by the Convention is known as the 'Customs

Co-operation Council Nomenclature' (previously the Brussels Tariff Nomenclature).

For periods up to and including December 1987 import and export statistics were presented according to the codes and descriptions of the Australian Import Commodity Classification (A.I.C.C.) and the Australian Export Commodity Classification (A.E.C.C.) respectively. These classifications were based on the *United Nations Standard International Trade Classification, Revision 2*, (SITC Rev 2), with some modifications to take account of Australia's trade.

#### The Harmonised Commodity Description and Coding System

From 1 January 1988 import and export data have been reported solely according to the Harmonized Tariff and the Australian Harmonized Export Commodity Classification respectively.

These new classifications, which update those used formerly reflect technological development



and changes in international trade. They provide international uniformity in classifying and coding goods, and simplify the task of collecting, analysing and comparing foreign trade statistics. The A.H.I.C.C. and A.H.E.C.C. contain some 8,200 and 6,300 items respectively.

To coincide with the introduction of the Harmonized System, the third revision of SITC (i.e. SITC Rev 3) was introduced.

SITC Rev 3 incorporates significant changes to the numbering system and overall structure to align it more closely with the Harmonized System. The changes between the second and the third revisions of SITC, and the adoption by the ABS of the complete international version of the classification, have resulted in a break in the statistical series published by the ABS.

Interstate imports and exports are classified according to Interstate Trade Commodity Classifications which are based on the A.H.I.C.C. and the A.H.E.C.C. The basic items of the Australian classifications are compressed or expanded according to their significance in Western Australia's trade to form interstate trade commodity categories.

Lack of comparability between the A.I.C.C. and the A.H.I.C.C. and the A.E.C.C. and the A.H.E.C.C., has prevented the production of twelve months of data for 1987-88 on the basis of one commodity classification. Overseas trade statistics for 1987-88 have therefore not been published in this edition of the *Western Australian Year Book*.

### Valuation of Items of Trade

**Foreign Trade.** All values in foreign trade statistics are determined on a 'free on board (f.o.b.) port of shipment' basis. This means that all charges (in particular the cost of freight and insurance) incurred after the goods have been exported from the port of shipment are excluded. Only transport and service charges incurred, or usually incurred, prior to export are included in the determination of trade values.

*Re-exports* are defined as goods, materials or articles which are exported either in the same condition as they were in when imported, or after minor repair or operations which leave them unchanged. These minor operations include blending, packaging, bottling, cleaning, sorting, husking or shelling.

TABLE 20.1 - VALUE OF IMPORTS INTO AND EXPORTS FROM WESTERN AUSTRALIA CLASSIFIED ACCORDING TO ORIGIN OR DESTINATION: 1988-1989 (\$'000)

Origin or destination	Imports	Exports
Interstate (a)	6,430,737	1,777,058
Overseas—		
Argentina	7,802	65,402
Bahrain	3,708	102,261
Bangladesh	911	17,550
Belgium-Luxembourg	30,465	113,821
Brazil	23,174	14,621
Canada	144,850	155,685
China		
excluding Taiwan Province	61,727	366,355
Taiwan Province only	94,091	228,663
Christmas Island	-	1,416
Denmark	11,018	812
Egypt	166	237,303
Fiji	40	6,234
Finland	29,427	48,536
France	72,360	202,211
Germany, Democratic Republic of	5,158	7,336
Germany, Federal Republic of	171,376	262,157
Hong Kong	33,619	186,239
India	15,101	25,241
Indonesia	48,107	272,712
Iran	616	98,685
Italy	86,260	208,224
Japan	753,739	2,261,287
Jordan	2,938	306
Korea, Republic of	61,228	362,477
Kuwait	27	13,349
Malaysia	79,328	81,450
Nauru	18,793	1
Netherlands	106,966	168,429
New Zealand	65,336	26,563
Norway	10,825	390
Pakistan	3,116	56,410
Papua New Guinea	475	17,038
Philippines	6,122	18,178
Poland	960	27,467
Qatar	30,019	10,205
Saudi Arabia	78,877	35,712
Singapore	142,204	407,488
South Africa	11,217	51,863
Spain	16,269	56,913
Sri Lanka	4,000	3,272
Sweden	36,891	8,129
Switzerland	22,779	217,853
Thailand	27,175	29,413
Union of Soviet Socialist Republics	14,454	316,695
United Arab Emirates	261,679	102,615
United Kingdom	339,295	191,244
United States of America	510,432	1,403,225
Yemen, People's Democratic Republic of	-	6,547
Yugoslavia	4,487	24,997
Zimbabwe	245	734
Other countries, country unknown and re-exports	118,312	268,992
Ships' stores	-	72,465
Total overseas	3,581,772	8,856,643
<b>Total</b>	<b>10,012,509</b>	<b>10,633,701</b>

(a) Excludes interstate value of horses. Also excludes value of interstate ships' stores.

TABLE 20.2 – VALUE OF FOREIGN EXPORTS OF SELECTED COMMODITIES  
MAIN COUNTRIES OF DESTINATION : 1988-89  
(\$'000)

<i>Commodity and destination</i>	<i>Value</i>	<i>Commodity and destination</i>	<i>Value</i>
Iron ore (a)—		Rock lobsters, whole and tails, fresh or frozen—	
<b>Total exports</b>	<b>1,718,621</b>	Japan	90,272
Wheat, (incl. spelt) and meslin, unmilled—		United States of America	48,515
Egypt	235,417	Taiwan	27,739
China	176,870	<b>Total exports</b>	<b>172,779</b>
Indonesia	143,782	Salt—	
Japan	134,382	Japan	75,246
Iran	99,030	Korea, Republic of	17,043
Iraq	95,240	Taiwan	16,674
Pakistan	40,017	<b>Total exports</b>	<b>118,154</b>
Korea, Republic of	32,036	Live sheep—	
Malaysia	22,788	Saudi Arabia	21,351
Thailand	7,374	Kuwait	9,847
Singapore	6,880	Qatar	9,007
<b>Total exports</b>	<b>1,009,103</b>	United Arab Emirates	7,620
Wool, greasy—(incl. fleece washed wool)		Oman	3,863
Union of Soviet Socialist Republics	293,732	<b>Total exports</b>	<b>62,256</b>
Japan	168,691	Meat of bovine animals, fresh, chilled or frozen—	
France	107,232	United States of America	39,685
Italy	86,121	Taiwan	10,935
Germany, Federal Republic of	65,331	<b>Total exports</b>	<b>74,722</b>
Poland	24,938	Feeding stuff for animals (b)—	
United States of America	24,804	Japan	32,313
Korea, Republic of	21,439	Netherlands, Kingdom of the	26,127
Taiwan	18,465	Korea, Republic of	25,778
Czechoslovakia	17,358	<b>Total exports</b>	<b>117,008</b>
United Kingdom	15,203	Pigments, paints, varnishes and related materials—	
Yugoslavia	13,403	Japan	14,259
China	12,501	Korea, Republic of	12,242
<b>Total exports</b>	<b>963,586</b>	Taiwan	6,868
Gold bullion—		New Zealand	6,636
Singapore	272,170	Hong Kong	6,146
Hong Kong	90,396	<b>Total exports</b>	<b>78,812</b>
Korea, Republic of	29,754	Mutton and lamb, fesh, chilled or frozen—	
<b>Total exports</b>	<b>414,025</b>	Japan	11,143
Petroleum and petroleum products—		Saudi Arabia	3,074
United States of America	74,401	<b>Total exports</b>	<b>38,006</b>
Singapore	42,948	Hides and skins—	
Japan	28,724	Italy	11,626
Polynesia (French)	13,888	France	8,435
<b>Total exports</b>	<b>257,603</b>	<b>Total exports</b>	<b>32,009</b>
Barley, unmilled—			
Japan	20,271		
Brazil	14,369		
Portugal	8,066		
Chile	7,142		
<b>Total exports</b>	<b>66,719</b>		
Wool, degreased—			
Japan	89,882		
Italy	30,956		
United States of America	21,825		
Thailand	16,304		
<b>Total exports</b>	<b>200,124</b>		

(a) Source: Western Australian Department of Mines No country details available. (b) Excludes unmilled cereals.

TABLE 20.3 – VALUE OF FOREIGN TRADE WITH SELECTED COUNTRIES BY SELECTED DIVISIONS: 1988-89  
(\$'000)

Division	Description	Imports				Exports			
		Japan	United States of America	United Kingdom	All countries	Japan	United States of America	United Kingdom	All countries
01	Meat and meat preparations	-	-	-	411	16,396	41,191	3,062	124,385
03	Fish, (not marine mammals) crustaceans, molluscs and aquatic invertebrates, and preparations thereof	1,689	1,538	1,824	42,612	122,782	48,791	535	218,722
04	Cereals and cereal preparations	168	35	504	5,587	178,839	380	68	1,126,782
05	Vegetables and fruit	71	2,950	361	19,105	106	-	691	35,180
08	Feeding stuff for animals (excluding unmilled cereals)	-	4,196	5	8,558	32,313	-	-	117,008
11	Beverages	48	1,356	3,056	20,714	147	63	457	1,268
24	Cork and wood	-	4,295	26	21,222	33	352	4,496	5,503
26	Textile fibres and their wastes (not manufactured into yarn or fabric)	1,542	74	828	19,199	258,572	46,759	22,914	1,167,486
27	Crude fertilisers (excl. those of Divisions 56) and crude minerals (excl. coal, petroleum and precious stones)	95	5,950	149	62,427	89,473	14,443	1,787	180,839
28	Metalliferous ores and metal scrap (a)	23	1,649	177	4,218	539,077	45,691	58,905	1,176,036
29	Crude animal and vegetable materials, n.e.s.	862	477	56	9,282	5,130	999	369	24,309
33	Petroleum, petroleum products and related materials	22	10,212	123	490,659	28,724	74,401	-	257,603
51	Organic chemicals (a)	5,293	8,549	9,158	47,616	432	-	-	813
52	Inorganic chemicals (a)	7,308	26,923	14,251	102,270	5,029	-	-	29,666
56	Fertilisers (excl. crude)	127	21,577	57	63,437	-	-	-	710
58	Plastics in non-primary forms (a)	1,870	6,833	1,907	21,448	-	-	169	687
59	Chemical materials and products, n.e.c.	1,251	7,158	13,842	44,549	202	486	-	1,974
62	Rubber manufactures, n.e.s.	51,840	8,207	2,429	100,105	3	39	-	810
64	Paper, paperboard and articles of paper pulp, of paper or of paperboard (a)	6,961	3,096	2,939	69,219	4	11	33	5,598
65	Textile yarn, fabrics, made-up articles n.e.s. and related products (a)	4,433	2,089	3,513	58,630	7	10	2	678
66	Non-metallic mineral manufactures, n.e.s. (a)	6,831	3,337	6,414	91,367	5,840	8,228	425	51,154
67	Iron and steel	38,369	4,071	6,851	81,587	-	3	10	944
68	Non-ferrous metals (a)	51,662	1,202	1,252	68,856	1,980	5,204	645	8,628
69	Manufactures of metal, n.e.s. (a)	5,826	19,284	4,975	77,666	4	1,200	39	15,487
71	Power generating machinery and equipment	25,444	29,566	8,658	96,997	2	372	2,150	3,703
72	Machinery specialised for particular industries (a)	68,302	89,683	12,254	275,913	433	1,180	284	9,621
73	Metal working machinery	2,045	1,128	2,115	13,308	-	-	77	1,031
74	General industrial machinery and equipment, n.e.s. and machine parts, n.e.s. (a)	26,172	45,451	13,811	163,761	7,103	1,810	290	31,148
75	Office machines and automatic data processing equipment	3,236	11,143	1,436	42,396	49	633	277	3,440
76	Telecommunications and sound recording and reproducing apparatus and equipment	17,677	3,305	1,073	32,474	536	52	46	1,836
77	Electrical machinery, apparatus, appliances, parts (incl. non-elec. counterparts of electrical domestic equip)	19,991	15,581	9,280	77,640	331	295	125	6,094
78	Road vehicles (including air cushion vehicles)	310,232	62,591	18,153	457,810	160	138	78	2,129
79	Transport equipment (excl. road vehicles)	6,782	10,442	119,466	192,688	966	14,783	528	73,164
87	Professional, scientific and controlling instruments and apparatus, n.e.s.	6,862	23,234	6,980	53,170	487	574	419	4,102
88	Photographic apparatus, equipment and supplies and optical goods, n.e.s. watches and clocks (a)	4,065	2,405	950	12,909	2	31	11	261
	<b>Total (a)</b>	<b>753,739</b>	<b>510,431</b>	<b>339,286</b>	<b>3,581,772</b>	<b>2,261,287</b>	<b>1,403,225</b>	<b>191,244</b>	<b>8,856,643</b>

(a) Excludes commodities subject to a confidential restriction. These are included in totals. (b) Includes details not available for publication and divisions not shown separately.

TABLE 20.4 – VALUE OF INTERSTATE IMPORTS AND EXPORTS (a) -- SELECTED DIVISIONS  
(\$'000)

Division	Description	Imports			Exports		
		1986-87	1987-88	1988-89	1986-87	1987-88	1988-89
00	Live animals,	5,985	6,294	6,158	7,688	7,588	11,590
01	Meat and meat preparations	44,455	46,472	53,450	12,010	15,404	14,489
02	Dairy products and birds' eggs	54,454	53,348	66,206	n.p.	n.p.	n.p.
03	Fish, crustaceans and molluscs, and preparations thereof	13,180	12,793	16,023	51,841	32,796	35,745
04	Cereals and cereal preparations	66,001	84,041	87,798	3,465	5,056	7,118
05	Vegetables and fruit	105,334	123,378	163,860	8,775	9,507	15,667
06	Sugar, sugar preparations and honey	45,623	42,714	56,360	n.p.	n.p.	n.p.
07	Coffee, tea, cocoa, spices and manufactures thereof	80,431	82,889	93,941	n.p.	n.p.	n.p.
08	Feeding stuff for animals (not including unmilled cereals)	31,939	35,192	42,602	n.p.	n.p.	n.p.
11	Beverages	104,919	122,182	140,156	n.p.	n.p.	n.p.
12	Tobacco and tobacco manufactures	152,853	157,572	150,070	-	-	-
24	Cork and wood	5,897	8,973	n.p.	n.p.	n.p.	n.p.
28	Metalliferous ores and metal scrap	-	n.p.	n.p.	225,802	258,013	292,153
51	Organic chemicals	14,692	17,047	17,173	n.p.	n.p.	143
52	Inorganic chemicals	29,281	35,274	41,157	n.p.	n.p.	n.p.
53	Dyeing, tanning and colouring materials	35,917	35,699	44,255	n.p.	n.p.	n.p.
54	Medicinal and pharmaceutical products	110,516	128,177	153,198	n.p.	n.p.	n.p.
55	Essential oils and perfume materials; toilet, polishing and cleansing preparations	127,908	137,603	176,796	157	162	206
58	Artificial resins and plastic materials, and cellulose esters and ethers	86,798	98,535	72,237	7,006	10,016	9,661
62	Rubber manufactures, n.e.s.	43,672	55,445	80,162	5,152	5,601	4,142
63	Cork and wood manufactures (excluding furniture)	14,893	19,382	19,036	n.p.	n.p.	n.p.
64	Paper, paperboard, and articles of paper pulp, of paper or of paperboard	156,023	185,459	211,469	21,716	26,506	30,500
65	Textile yarn, fabrics, made-up articles n.e.s. and related products	150,993	150,584	175,477	22,284	40,123	41,918
66	Non-metallic mineral manufactures, n.e.s.	63,327	63,913	77,334	18,969	19,150	21,837
67	Iron and steel	290,827	331,642	426,893	25,647	20,745	18,689
68	Non-ferrous metals	67,287	84,089	125,937	15,794	16,623	n.p.
71	Power generating machinery and equipment	44,723	58,968	62,509	9,366	10,602	11,477
72	Machinery specialised for particular industries	158,580	208,670	298,196	41,803	52,259	59,627
73	Metalworking machinery	11,087	12,181	14,121	6,553	5,037	8,240
74	General industrial machinery and equipment, n.e.s. and machine parts n.e.s.	211,250	226,874	283,285	45,074	49,013	72,395
75	Office machines and automatic data processing equipment	131,467	151,551	180,732	6,306	6,391	11,861
76	Telecommunications and sound recording and reproducing apparatus and equipment	161,140	150,275	152,802	9,231	8,532	7,021
77	Electrical machinery, apparatus and appliances, n.e.s. and electrical parts thereof	274,110	281,925	312,697	8,036	9,615	11,918
78	Road vehicles (including air cushion vehicles)	579,322	757,475	1,075,165	17,107	22,032	29,962
81	Sanitary, plumbing, heating and lighting fixtures and fittings, n.e.s.	25,090	22,310	24,300	1,927	n.p.	n.p.
82	Furniture and parts thereof	28,529	27,143	34,411	40,628	50,478	46,398
84	Articles of apparel and clothing accessories	253,345	247,280	302,224	43,499	45,130	53,868
85	Footwear	70,471	69,980	82,704	2,681	3,811	4,074
87	Professional, scientific and controlling instruments and apparatus, n.e.s.	98,752	83,446	93,056	3,334	4,467	9,909
88	Photographic apparatus, equipment and supplies and optical goods, n.e.s., watches and clocks	51,072	55,187	62,513	2,014	2,766	3,319
<b>Total (a) (b)</b>		<b>5,067,868</b>	<b>5,404,518</b>	<b>6,430,737</b>	<b>1,804,153</b>	<b>1,808,478</b>	<b>1,777,058</b>

(a) Excludes the value of horses. Also excludes the value of interstate ships' stores. (b) Includes details not available for publication and divisions not shown separately.

**Interstate Trade.** Statistics of goods imported from other Australian States are recorded in terms of landed cost. The basis of valuation for goods exported to other Australian States is f.o.b., or its equivalent, at the point of final shipment.

### Direction of Trade

The term *Country of origin*, as used in recording the statistics of foreign trade, means the country of production; *Country of destination* means the country to which goods were consigned at the time of export. In compiling statistics of Western Australia's interstate imports and exports, goods are classified according to the State or Territory from which or to which they were consigned.

### HISTORY OF WESTERN AUSTRALIAN TRADE<sup>1</sup>

Natural resources and agricultural products have been the basis of Western Australia's prosperity and economic growth. During the early colonial period, wool, whale-oil and sandalwood products—not difficult for a small, sparsely-settled population to exploit—provided the bulk of export earnings which, in turn, paid for imported secondary goods and some foodstuffs. During the later colonial period, primitive port, road and railway facilities enabled exploitation of the rich jarrah and karri forests, although horses, copper and pearl-shell contributed erratically to export earnings. Wool remained a staple export throughout the period because the land was suitable for grazing, and steady improvement in quality assured continued demand by over-seas buyers. Furthermore, farmers did not require large amounts of capital to establish themselves.

Although this pattern of trade has hardly changed since first settlement, discovery of gold in large quantities in the Yilgarn during the 1890s had a dramatic impact on the State's economy. Immigration of diggers (and later their families) was mainly responsible for the State's population increasing four-fold during the 1890s from a base population of 48,502 in 1890. By 1900, gold dominated the value of export earnings—\$11.1 million of a total \$13.7 million. These earnings funded imports of mine machinery, which, in turn, led to the discovery of more gold. Government revenue also increased, enabling the establishment of many public works. For example, railways were

laid to mine sites, and during the early years of the twentieth century a network of lines was laid from trunk lines in the South-West to facilitate the establishment and development of the wheat industry. By 1910, wheat had challenged gold as the major export earner.

Revenue from gold discovery and exploitation also enabled the construction of such important and imaginative schemes as the inner harbour at Fremantle, Mundaring Weir and a water pipeline to the goldfields. An interesting and important development in trade direction during this period was the entry of India and Ceylon as buyers of gold, although Britain and continental countries remained the major buyers of wool, timber and other 'traditional' exports.

Although the value of wool and wheat exports declined dramatically during the depression of the 1930s, exports of gold increased in response to a rise in the world prices of that mineral, which was fortunate for Australia in general and Western Australia in particular. Indeed, for much of its history, Western Australia has been both a major contributor to the country's export earnings as well as a major buyer of manufactured goods from the Eastern States.

During the Second World War, the Federal Government established the Wheat Board to ensure, among other things, that wheat producers received stable prices. In addition, the State's wool clip was acquired by the British Government. British demand for food, clothing and textiles was high mainly because the war had caused major disruption to British agricultural production.

The composition and direction of trade established during the nineteenth century continued throughout the 1950s. Wheat and wool remained the major exports and Britain and Europe the major customers. During the 1960s, however, the discovery and exploitation of large iron ore deposits in the Pilbara led to long-term contracts with overseas buyers and changed dramatically both the composition and direction of Western Australia's trade. Again, this development occurred during economic downturn and uncertainty concerning markets for agricultural products. Britain had joined the European Economic Community and was no longer the State's major market. Her role was taken over by

<sup>1</sup> Reproduced with updates by courtesy of Professor R.T. Appleyard, University of Western Australia and Department of Lands and Surveys Western Australia, from *Western Australia an atlas of human endeavour*, 2nd ed.

Japan, a major buyer of wool and the almost exclusive buyer of iron ore. By 1976, iron ore worth \$722 million was exported from Western Australia, compared with the combined total of \$605 million for wool and wheat.

Although the value of imports and exports more than trebled between 1978-9 and 1988-9, direction and composition of trade did not alter significantly. While Asia, especially Japan, remains the main destination of our exports, there has been an increase in the share taken by the United States and the European Economic Community. The value of imports relative to exports decreased from 41.2 to 40.4 per cent, and as our main requirements are for industrial goods, Japan, the United States and the United Kingdom remain the main sources of supply

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## Chapter 21

### EMPLOYMENT AND INDUSTRIAL CONDITIONS

Information in this chapter, relating to employment, earnings and employment conditions, is sourced from a number of ABS collections. This chapter also includes information on the Commonwealth Employment Service, Federal and State industrial authorities, employer and employee organisations, apprenticeships and industrial training, and workers' compensation.

#### THE LABOUR FORCE

The labour force is defined as those persons aged 15 and over who, during a specified week were either employed or unemployed. This represents the total supply of labour available to the labour market for that week.

TABLE 21.1 – LABOUR FORCE STATUS, NOVEMBER  
(\*000 persons)  
Reference: Catalogue No. 6203.0

<i>Labour force status</i>	<i>1984</i>	<i>1989</i>
MALES		
Employed	376.3	449.5
Unemployed	30.6	24.0
Not in labour force	118.9	145.7
<b>Total</b>	<b>525.8</b>	<b>619.3</b>
FEMALES		
Employed	227.0	308.5
Unemployed	21.4	16.7
Not in labour force	276.8	291.7
<b>Total</b>	<b>525.2</b>	<b>616.9</b>

Estimates of the labour force are obtained from the Population Survey. This is an Australia-wide survey conducted monthly by means of personal interviews of a sample of private and non-private

dwelling (hotels, motels, caravan parks etc). This sample represents 0.6 per cent of the total population and includes approximately 31,000 private households. The survey provides particulars of the demographic and labour force characteristics of the population.

Detailed estimates of employed wage and salary earners are collected from employers through the Survey of Employment and Earnings. This is a quarterly survey of approximately 21,200 employers Australia-wide, in both the private and public sector. The survey provides detailed information on employment by industry and sector.

Two of the most important labour force indicators are:

(a) The participation rate, which represents the proportion of persons in a particular age group who are in the labour force; and

(b) Employment status, which shows the number of persons who are employed (full-time or part-time), unemployed (looking for full-time or part-time work), and not in the labour force.

These indicators provide the basis for monitoring changes in the size and composition of labour supply, particularly in terms of age, sex and marital status.

Between November 1984 and November 1989, the proportion of females participating in the labour force has increased in all age groups, while the proportion of participating males has decreased in all age groups except the 15-19 and 55-64 year age groups.

**TABLE 21.2 - LABOUR FORCE PARTICIPATION RATES, NOVEMBER**  
(Per cent)  
*Reference: Catalogue No. 6203.0*

Age group	1984	1989
<b>MALES</b>		
15 - 19	59.1	62.9
20 - 24	90.6	86.4
25 - 34	95.7	93.8
35 - 44	94.9	93.4
45 - 54	91.0	89.8
55 - 64	61.8	62.8
65 +	8.4	6.6
<b>Total</b>	<b>77.4</b>	<b>76.5</b>
<b>FEMALES</b>		
15 - 19	62.3	66.0
20 - 24	70.6	71.2
25 - 34	54.4	62.2
35 - 44	62.2	69.6
45 - 54	52.4	61.7
55 - 64	19.3	24.2
65 +	*1.7	*1.9
<b>Total</b>	<b>47.3</b>	<b>52.7</b>

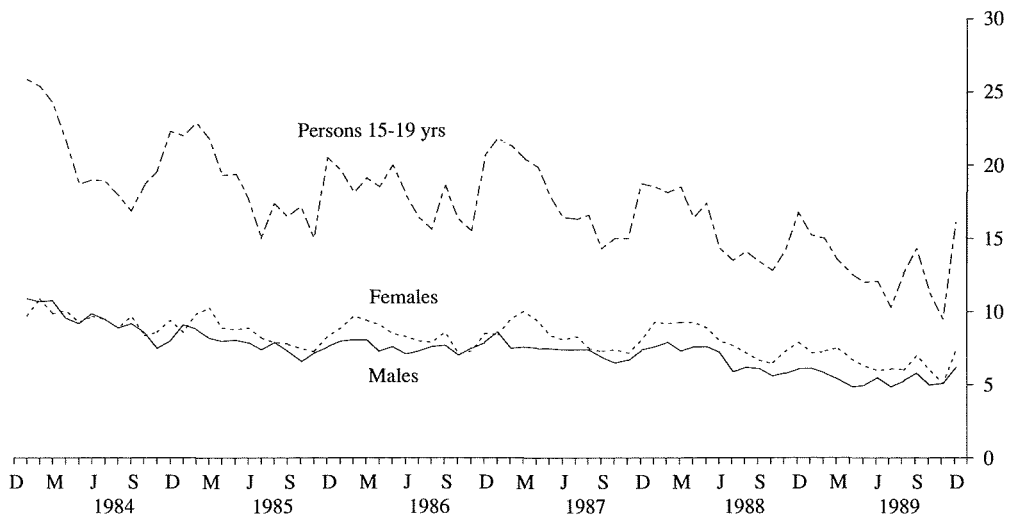
\* Subject to sampling variability too high for most practical uses.

Total employment between November 1984 and November 1989 increased by 154,718 persons from 603,300 to 758,018 and the numbers of unemployed decreased from 52,057 persons to 40,705, representing a decrease in the unemployment rate from 7.9 per cent to 5.1 per cent.

Employment of married females increased from 138,755 in November 1984 to 191,326 in November 1989, representing a proportional increase of 37.9 per cent. The number of unemployed married females decreased from 8,125 to 6,656, a decrease of 2.2 per cent in the unemployment rate over the same period.

The composition of the employed labour force remained relatively constant when comparing November 1984 and November 1989. The number of employers changed from 35,179 (5.8 per cent) to 38,908 (5.1 per cent); self-employed persons from 70,620 (11.7 per cent) to 85,626 (11.3 per cent) and wage and salary earners (including unpaid helpers) from 497,500 (82.5 per cent) to 633,485 (83.6 per cent).

**DIAGRAM 21.1**  
**UNEMPLOYMENT RATES: WESTERN AUSTRALIA**  
(The unemployed in each group as a percentage of the civilian labour force in the same group)





In the five years between November 1984 and November 1989 the pattern of employment between industries varied only slightly. At least 50 per cent of employed persons worked in one of the three major industries: Wholesale and retail trade, Community services or Manufacturing. Other industries which employed in excess of five per cent of the labour force were: Agriculture, forestry, fishing and hunting; Construction; Finance, property and business services; and Recreation, personal and other services.

**TABLE 21.3 - LABOUR FORCE - EMPLOYMENT STATUS, NOVEMBER**  
(\*000 persons)

Reference: Catalogue No. 6203.0

Employment status	1984		1989	
	Married females	Persons	Married females	Persons
Employer	9.2	35.2	11.7	38.9
Self-employed	19.0	70.6	21.6	85.6
Wage or salary earner	110.1	495.8	155.8	629.1
Helper, unpaid	*0.5	*1.6	*2.2	4.4
Unemployed	8.1	52.1	6.6	40.7
Not in labour force	178.0	395.7	178.3	437.4
<b>Total</b>	<b>324.9</b>	<b>1,051.0</b>	<b>376.2</b>	<b>1,236.2</b>

\* Subject to sampling variability too high for most practical uses.

**TABLE 21.4 - EMPLOYED PERSONS BY INDUSTRY NOVEMBER**  
(\*000 persons)

Reference: Catalogue No. 6203.0

Industry division	1984	1989
Agriculture, forestry, fishing and hunting	42.4	47.4
Mining	24.6	28.9
Manufacturing	75.8	88.3
Electricity, gas and water	11.3	9.4
Construction	43.8	62.4
Wholesale and retail trade	121.9	168.4
Transport and storage	34.9	34.6
Communication	11.8	10.7
Finance, property and business services	58.4	83.1
Public administration and defence	25.2	28.9
Community services	110.9	132.8
Recreation, personal and other services	42.2	63.1
<b>Total all industries</b>	<b>603.3</b>	<b>758.0</b>

In this period teenage unemployment rates were between 4 per cent and 12 per cent higher than unemployment rates for all males and all females. Teenage unemployment peaked at 22.3 per cent in December 1984. Unemployment rates for all males

and all females for the same period were 8.0 per cent and 9.4 per cent respectively. Teenage unemployment was at its lowest in November 1989 at a rate of 9.5 per cent.

Female unemployment peaked at 10.3 per cent in March 1985 and was at its lowest in November 1989 at 5.1 per cent. Male unemployment was at its lowest in April and July 1989 with a rate of 4.9 per cent and at its highest in January 1985 with a rate of 9.1 per cent.

## LABOUR COSTS

Details of major labour costs, i.e. earnings, payroll tax, superannuation, workers' compensation and fringe benefits tax, are collected through an annual survey of approximately 460 employers in the public and private sectors.

**TABLE 21.5 - MAJOR LABOUR COSTS**

Type of cost	1986-87		1987-88	
	\$m	%	\$m	%
<b>PRIVATE SECTOR</b>				
Earnings—				
Gross wages and salaries	6,471	88.8	7,077	88.4
Severance, termination etc.	135	1.8	161	2.0
Other—				
Payroll tax	238	3.3	258	3.2
Workers' compensation	190	2.6	203	2.5
Superannuation	201	2.8	235	2.9
Fringe benefits tax (a)	49	0.7	70	0.9
<b>Total other</b>	<b>678</b>	<b>9.3</b>	<b>765</b>	<b>9.6</b>
<b>Total</b>	<b>7,284</b>	<b>100.0</b>	<b>8,003</b>	<b>100.0</b>
<b>PUBLIC SECTOR</b>				
Earnings—				
Gross wages and salaries	3,314	89.4	3,614	87.9
Severance, termination etc.	56	1.5	78	1.9
Other—				
Payroll tax	56	1.5	61	1.5
Workers' compensation	74	2.0	80	1.9
Superannuation	199	5.4	266	6.5
Fringe benefits tax	7	0.2	11	0.3
<b>Total other</b>	<b>335</b>	<b>9.0</b>	<b>418</b>	<b>10.2</b>
<b>Total labour costs</b>	<b>3,705</b>	<b>100.0</b>	<b>4,110</b>	<b>100.0</b>

(a) Fringe benefits tax was introduced on 1 July 1986.

The composition of major labour costs remained relatively constant in both the public and private sector, between 1986-87 and 1987-88. The cost of gross wages and salaries per employee increased by 7.0 per cent in both sectors, going from \$18,706 to \$20,013 in the private sector, and from \$19,564 to \$20,933 in the public sector. In the private sector payroll tax increased by 6.0 per cent, workers' compensation by 4.4 per cent and

superannuation by 14.3 per cent, while in the public sector payroll tax increased by 6.5 per cent, workers' compensation by 4.9 per cent and superannuation by 22.6 per cent. It is important to note that owing to differences in the way that superannuation statistics are compiled for the two sectors, no direct comparisons can be made between public and private superannuation costs.

**TABLE 21.6 – MAJOR LABOUR COSTS PER EMPLOYEE**

Type of cost	1986-87		1988-88	
	\$	%	\$	%
<b>PRIVATE SECTOR</b>				
Gross wages and salaries	18,706	88.8	20,013	88.4
Severance, termination etc.	390	1.8	455	2.0
Other—				
Payroll tax	687	3.3	728	3.2
Workers' compensation	549	2.6	573	2.5
Superannuation	582	2.8	665	2.9
Fringe benefits tax (a)	142	0.7	199	0.9
<i>Total other</i>	<i>1,959</i>	<i>9.3</i>	<i>2,165</i>	<i>9.6</i>
<b>Total</b>	<b>21,056</b>	<b>100.0</b>	<b>22,633</b>	<b>100.0</b>
<b>PUBLIC SECTOR</b>				
Gross wages and salaries	21,486	89.5	23,004	87.9
Severance, termination etc.	361	1.5	495	1.9
Other—				
Payroll tax	360	1.5	387	1.5
Workers' compensation	477	2.0	509	1.9
Superannuation	1,289	5.4	1,695	6.5
Fringe benefits tax (a)	43	0.2	71	0.3
<i>Total other</i>	<i>2,169</i>	<i>9.0</i>	<i>2,661</i>	<i>10.2</i>
<b>Total</b>	<b>24,017</b>	<b>100.0</b>	<b>26,160</b>	<b>100.0</b>

(a) Fringe benefits tax was introduced on 1 July 1986.

### COMMONWEALTH EMPLOYMENT SERVICE

The main functions of the Commonwealth Employment Service (CES) are:

to assist people seeking employment

to assist employers to fill vacancies

to provide intensive and specialised assistance to disadvantaged groups including young people, the disabled, Aborigines, sole supporting parents, the long term unemployed and migrants from non-english speaking backgrounds.

The CES has trained and qualified staff to assist jobseekers experiencing difficulty in obtaining or maintaining employment. These include employment councillors and occupational psychologists.

The CES administers a number of labour market programs which provide access to training opportunities for jobseekers whose skills need updating or upgrading and those who have been structurally displaced. It also assists industries by providing training in those areas where skills are in demand and through 'refresher' courses.

The Relocation Assistance Scheme assists eligible jobseekers who are unlikely to secure continuing employment in their present locality to move to continuing employment in other parts of Australia.

Special assistance programs providing subsidised employment ranging from apprenticeships to formalised training are available for Aboriginal people.

Jobstart, an Integrated Wage Subsidy Program for all persons aged 15 years and over provides for on-the-job subsidised work experience to assist trainees to acquire new skills or update their current skills. Financial assistance is provided to disadvantaged jobseekers aged 15 years and over, enabling them to participate in flexible training arrangements leading to identified employment opportunities in the labour market.

The Australian Traineeship Program is a training program for all 16-18 year olds. In some cases 15 and 19 year olds may also be included. Under this program a traineeship is very similar to a one-year apprenticeship where the young person is paid while training both with an employer and at an educational institution. During this period trainees acquire a wide range of skills which lead to a qualification recognised by employers.

Skillshare, a community-based program, enables long term unemployed, particularly those unemployed for one year or more, and other disadvantaged unemployed to obtain and retain employment or to proceed to further education or training. This is achieved through the provision of a range of structured skills training, open access services and enterprise activities, by groups in the community with demonstrated capacity to deliver such service.

There is a Commonwealth Rebate for Apprentice Full Time Training applicable to all apprentices who began their training after 14 January 1977, to encourage employers to train apprentices.

## INDUSTRIAL AUTHORITIES

### Federal authorities

**Federal Court of Australia.** The Federal Court of Australia comprises an Industrial Division and a General Division. The Industrial Division deals with all proceedings under the *Conciliation and Arbitration Act 1904* and related legislation. A single Judge and the Industrial Relations Commission may refer a question of law for the opinion of the Court. Appeal from a judgement of a Full Court may, in certain circumstances, be made to the High Court of Australia.

**Industrial Relations Commission.** The Commission has jurisdiction to prevent and to settle industrial disputes extending beyond the limits of any one State. The work of the Commission is normally done by individual members; however, certain matters must be determined by a Full Bench of the Commission consisting of at least three members, of which two must be presidential members. A Full Bench of the Commission also deals with appeals and references from single members of the Commission.

### Western Australian authorities

The Western Australian Industrial Relations Commission can inquire into any industrial matter and make an award, order or declaration relating to such a matter. The Commission may also make inquiries where industrial action has occurred or is likely to occur.

TABLE 21.7 - INDUSTRIAL AWARDS, EMPLOYEE AND EMPLOYER ORGANISATIONS AND MEMBERS REGISTERED (a) : AT 30 JUNE

	1983	1988
Awards in force	488	610
Employee organisations (a)—		
Number	66	70
Membership	176,065	186,608
Employer organisations (a)—		
Number	14	15
Membership	2,138	2,825

(a) Before 1 March 1985 the term 'union' was used in lieu of 'organisation.'

The Commission in Court Session may make General Orders, hear matters referred by the Commission, and hear appeals from decisions of Boards of Reference.

The Full Bench of the Commission may hear matters on questions of law and appeals from decisions of the Commission and Industrial Magistrates.

An appeal lies to the Western Australian Industrial Appeal Court from decisions of the President of the Western Australian Industrial Relations Commission, the Full Bench or the Commission in Court Session but only on the ground that the decision is erroneous in law or in excess of jurisdiction.

## EMPLOYER ORGANISATIONS

Both the Confederation of Western Australian Industry (Incorporated) and the Australian Mines and Metals Association (Incorporated) represent employers in all aspects of the negotiation of industrial awards and agreements, in the settlement of industrial disputes, including arbitration, and in direct relationships with employee organisations. Both are members of the Confederation of Australian Industry through which they have overseas affiliation with the International Organisation of Employers.

In addition to its role in industrial affairs, the Confederation also represents employers in the Occupational Health, Safety and Welfare Commission and the Workers Compensation and Rehabilitation Commission.

The Confederation of Western Australian Industry (Incorporated) has approximately 6,000 company members and 102 affiliated trade, industry and professional associations.

The Australian Mines and Metals Association (Incorporated) is an association of mining and hydrocarbon companies.

## EMPLOYEE ORGANISATIONS

Employee organisations in Western Australia cover all forms of occupations—from the unskilled to the professional worker. Most union organisations are national in character with State branches registered with both the Federal and State industrial authorities.

The major organisation in Western Australia is the Trades and Labour Council (TLC). This organisation covers most of the wage and salary earners employed in the private and government sectors of industry and commerce.

The TLC is the State branch of the Australian Council of Trade Unions (ACTU) and at 31 December 1988 it was affiliated with seventy three State resident unions having a membership of approximately 200,000.

The TLC frequently acts on behalf of employees, before the Western Australian industrial authorities, in matters such as wages, hours, holidays and long service leave.

### APPRENTICESHIP AND INDUSTRIAL TRAINING

At 30 June 1989 the total number of apprentices registered in a variety of trades in this State was 13,824.

The Industrial Training Advisory Council is the principal advisory body to the Government on matters relating to industrial training. The Council comprises representatives of the Department of Employment and Training, the Confederation of Western Australian Industry (Incorporated), the Trades and Labour Council of Western Australia, the Office of Technical and Further Education and the Department of Employment, Education and Training. The Council is responsible for the overall coordination of industrial training arrangements in Western Australia.

TABLE 21.8 - APPRENTICESHIP - NEW REGISTRATIONS AND NUMBER OF EFFECTIVE REGISTRATIONS TO SELECTED TRADES

Trade	Effective registrations at 30 June		Registrations effected during 1987-88
	1983	1988	
Building	1,522	1,352	389
Electrical	1,528	1,264	373
Food	984	1,119	362
Metal	3,421	3,617	1,008
Printing	227	204	63
Vehicle building	505	525	154
Other	1,902	2,522	775
<b>Total</b>	<b>12,089</b>	<b>10,603</b>	<b>3,125</b>

An industrial training advisory board for each trade or group of trades, prescribed as an apprenticeship trade or an industrial training trade, is appointed to assist the Council. It also deals with apprenticeship matters relevant to the trade it is appointed to review.

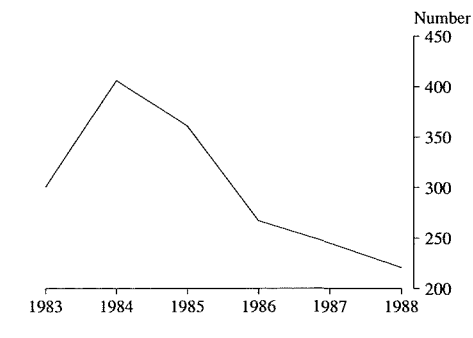
An apprenticeship term of indenture may be for three, three-and-a-half, four or five years depending upon the chosen trade and the apprentice's academic achievements. Satisfactory completion of an approved pre-apprenticeship course conducted by the Office of Technical and Further Education may entitle an apprentice to a shortened term of indenture of three years.

### INDUSTRIAL DISPUTES

These statistics relate only to disputes which involved stoppages of ten working days or more at the establishment where the stoppages occurred. Those disputes involving less than ten working days are excluded. Effects on other establishments, such as standdowns because of lack of materials, disruption of transport services, power cuts, etc. are not included.

Reports of stoppages of work are obtained primarily from the Department of Industrial Relations and from trade journals, publications and newspapers. The statistics of individual disputes are compiled from data obtained from the employers and trade unions concerned. Particulars of some stoppages may have been estimated and the statistics therefore should be regarded as giving only a broad measure of the extent of industrial disputes.

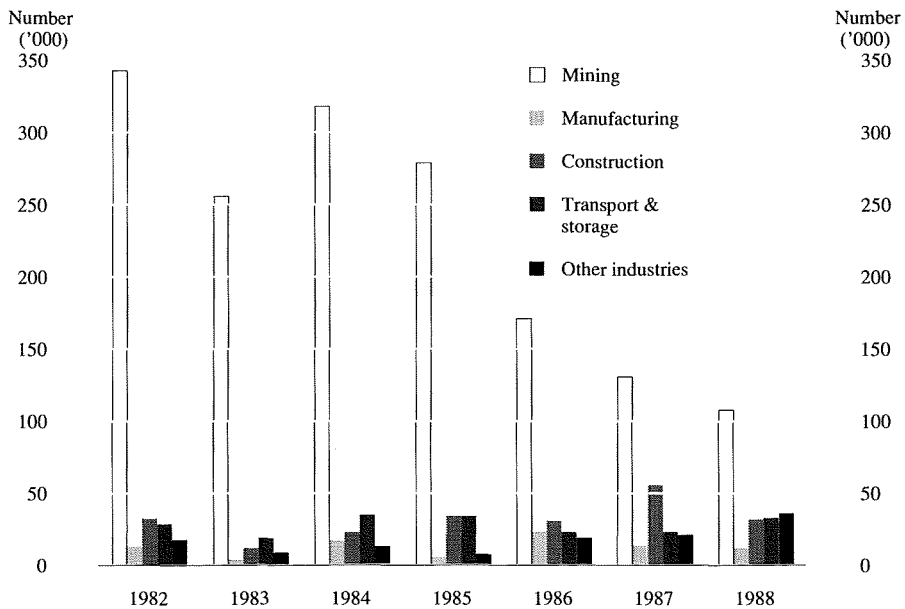
DIAGRAM 21.2  
INDUSTRIAL DISPUTES



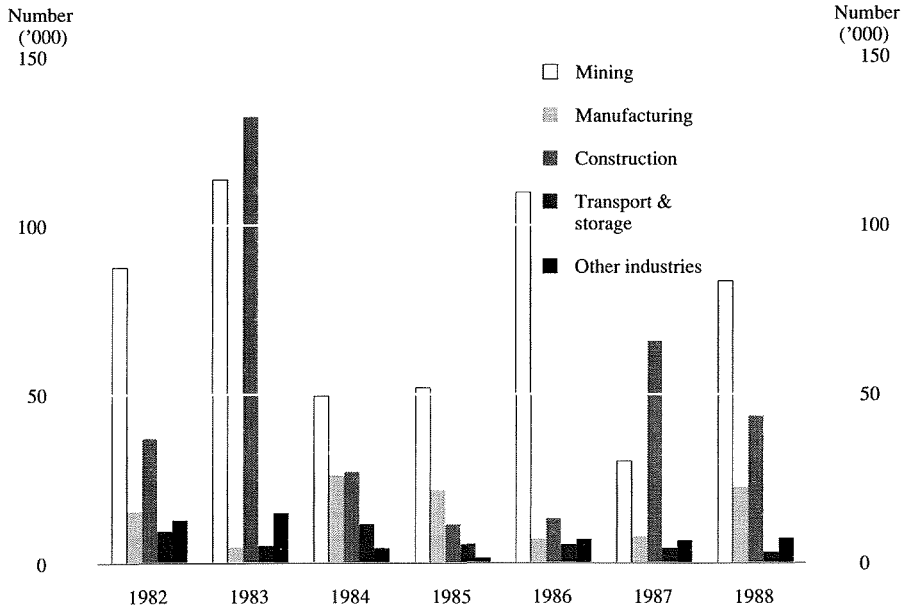
**TABLE 21.9 – INDUSTRIAL DISPUTES BY INDUSTRY DIVISION**  
(’000)

Industry	1983	1984	1985	1986	1987	1988
<b>NUMBER OF DISPUTES</b>						
Mining	256	318	279	171	131	108
Manufacturing	04	17	06	23	14	12
Construction	12	23	34	31	56	32
Transport & storage	19	35	34	23	23	33
Other industries	09	13	08	19	21	36
<b>WORKING DAYS LOST</b>						
Mining	113.5	049.9	052.0	109.8	030.3	083.5
Manufacturing	04.8	25.9	21.7	07.3	07.9	22.5
Construction	132.2	027.2	011.7	013.3	065.8	043.7
Transport & storage	05.3	11.7	05.8	05.6	04.6	03.4
Other industries	14.9	04.6	01.6	07.1	06.8	07.5
<b>WORKERS INVOLVED</b>						
Mining	28.9	35.6	32.6	28.6	16.6	29.4
Manufacturing	00.7	06.6	02.1	04.9	03.3	11.4
Construction	08.7	12.3	06.0	04.8	10.2	10.0
Transport & storage	02.8	11.0	05.8	04.2	06.7	04.7
Other industries	1.4	3.6	2.2	8.1	6.3	5.4

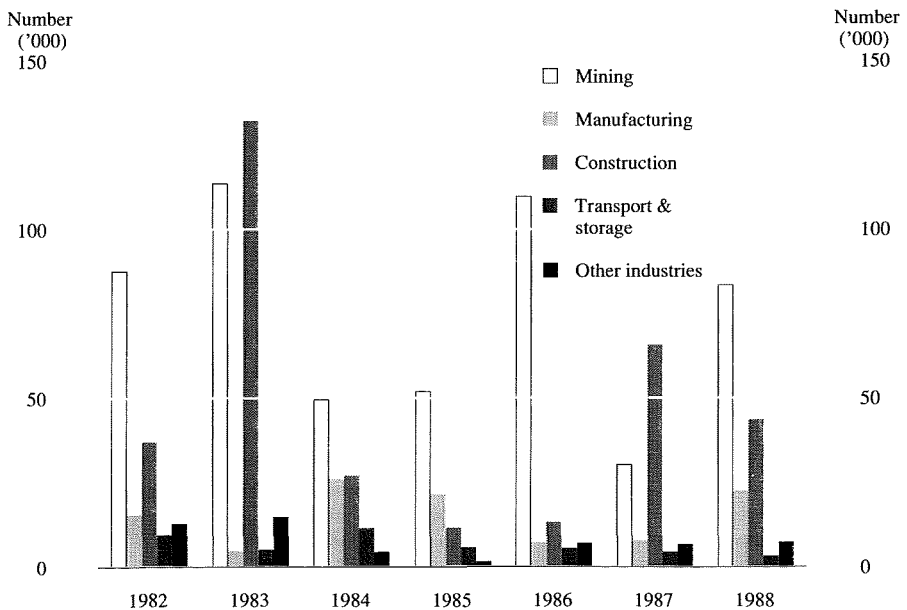
**DIAGRAM 21.3**  
**INDUSTRIAL DISPUTES BY INDUSTRY**



**DIAGRAM 21.4**  
**WORKING DAYS LOST BY INDUSTRY**  
(\*000)



**DIAGRAM 21.5**  
**WORKERS INVOLVED BY INDUSTRY**



All disputes in progress during the year are included in the annual figures, whether the dispute commenced in that year or was in progress at the beginning of the year. Consequently, details of the number of disputes and workers involved in disputes which commenced in any year, and were still in progress during the following year, are included in the figures for both years.

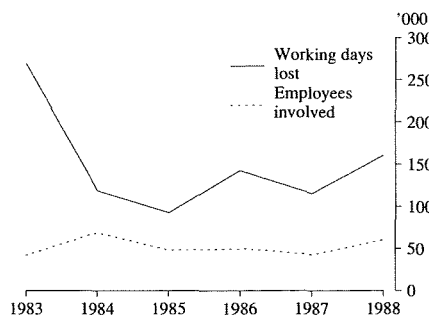
TABLE 21.10 – INDUSTRIAL DISPUTES (a)

	1984	1989
Number of disputes	300	221
Number of workers involved ('000)—		
Directly	39.0	60.1
Indirectly (b)	3.3	0.8
<b>Total</b>	<b>42.3</b>	<b>60.9</b>
Number of working days lost ('000)	270.6	160.6

(a) Excludes disputes involving cessation of work of less than 10 working days. (b) Persons put out of work at the establishments where the stoppages occurred, but not themselves parties to the dispute.

During the period November 1984 to November 1989 the number of working days lost peaked in 1988 at approximately 160,600 although there were fewer disputes in that year. The number of working days lost peaked in the Mining industry during 1986 (109,800), in 1984 for Manufacturing (25,900), 1987 for Construction (65,800), 1984 for Transport and Storage (11,400) and 1988 for other industries (7,700).

DIAGRAM 21.6  
INDUSTRIAL DISPUTES: NUMBERS OF EMPLOYEES INVOLVED AND WORKING DAYS LOST



## WAGES AND EARNINGS

### Determination of rates of pay

The awards and determinations of the various Federal and State tribunals prescribe minimum rates of pay, standard hours of work and other

conditions of employment for particular occupations. Most awards also prescribe a minimum wage for adults, i.e. the minimum amount which must be paid to an adult employee, regardless of occupation, for working the standard weekly hours of work. The concept of equal pay for the sexes is applicable in most Federal and State awards. In recent years the wage-fixing principles of the Industrial Relations Commission have generally been followed by State tribunals.

### Award rates of pay

The indexes shown in the following tables relate to full-time adult wage and salary earners whose rates of pay are normally varied in accordance with awards or determinations made by Federal or State authorities or collective agreements registered with them. The indexes are designed to measure trends in rates payable under awards.

In December 1987 the Award Rates of Pay indexes were rebased with June 1985 as the new base. Separate indexes for wage earners and wage and salary earners were compiled for the new series, owing to difficulties in distinguishing wage and salary earners in the award documentation and in the survey from which employment numbers were obtained.

TABLE 21.11 – INDEXES OF WEEKLY AWARD RATES OF PAY: NOVEMBER  
(Base: Weighted average minimum weekly award rate, June 1985 = 100.0)

Industry	Wage and salary earners	
	1986	1989
Mining	106.1	121.9
Manufacturing	106.3	125.4
Electricity, gas and water	106.2	120.4
Construction	106.1	124.4
Wholesale trade	106.5	125.6
Retail trade	106.3	125.8
Transport and storage	106.2	123.7
Communication	106.2	124.4
Finance, property and business services	106.2	123.0
Public administration and defence (a)	106.3	123.5
Community services	106.3	122.1
Recreation, personal and other services	106.1	123.1
<b>All industries (b)</b>	<b>106.2</b>	<b>123.5</b>

(a) Excludes employees in the defence forces. (b) Excludes employees in the defence forces, agriculture, services to agriculture and employees in private households employing staff.

In the three years between November 1986 and November 1989, award rates for adult wage and salary earners increased on average over all industries by 17.3 per cent. For particular

industries the increases ranged from a maximum of 19.5 per cent in the Retail industry to a minimum of 14.2 per cent in the Electricity, gas and water industry.

### Average weekly earnings

Statistics of average weekly earnings are produced quarterly, and are based on employment and earnings information obtained from a sample survey of employers. They relate to earnings of employees for a single pay period ending on or before a specific date near the middle of the quarter.

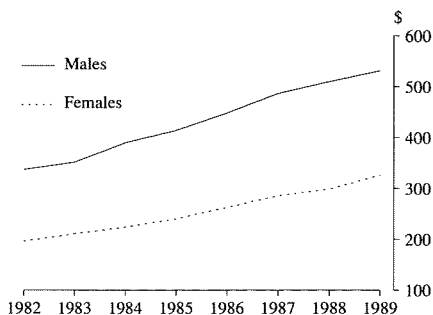
*Earnings* are gross earnings in a pay period, before taxation and any other deductions such as superannuation, board and lodging, etc. have been made. Earnings comprise ordinary time earnings, overtime earnings, shift allowances, plus other allowances, payments, commissions, etc.

**TABLE 21.12 – AVERAGE WEEKLY EARNINGS OF EMPLOYEES, AUGUST**  
(\$)

Reference: Catalogue No. 6302.0

Particulars	Percentage change		
	1984	1989	
Males	390.00	531.70	36.3
Females	224.40	327.20	45.8
Persons	318.60	436.50	37.0

**DIAGRAM 21.7**  
AVERAGE WEEKLY EARNINGS FOR ALL EMPLOYEES: AUGUST



## HOURS OF WORK AND LEAVE PROVISIONS

### Standard hours of work

In the fixation of weekly wage rates most industrial tribunals prescribe the number of hours constituting a full week's work for the wages specified.

Since January 1948, practically all employees in Australia have had a standard working week of forty hours or less. However, the number of hours constituting a full week's work (excluding overtime) differs between industries.

The average weekly hours worked by employees over all industries in November 1989 was 36.4 hours per week. For particular industries the average per employee ranged from a minimum of 31.4 hours per week in the Recreation, personal and other services industry to a maximum of 46.3 hours per week in the Agriculture and services to agriculture industry.

**TABLE 21.13 – EMPLOYED PERSONS AVERAGE WEEKLY HOURS WORKED (a) BY INDUSTRY**  
NOVEMBER 1989

Reference: Catalogue No. 6304.0

Industry	Females			Total Persons
	Males	Married		
Agriculture, forestry, fishing and hunting—	50.8	30.1	29.9	45.5
Agriculture and services to agriculture	51.5	31.5	31.0	46.3
Forestry and logging, fishing and hunting	43.6	13.5	16.4	37.8
Mining	45.4	36.0	38.8	44.4
Manufacturing—	41.8	30.4	32.2	39.4
Food, beverages and tobacco	41.8	33.3	31.9	38.9
Metal products	42.2	27.9	31.6	40.1
Other manufacturing	41.6	30.3	32.5	39.3
Electricity, gas and water	36.0	35.9	32.1	35.6
Construction	41.9	16.1	19.2	38.7
Wholesale and retail trade—	41.3	27.4	26.0	34.1
Wholesale trade	42.6	26.1	29.3	38.8
Retail trade	40.4	27.8	25.2	32.2
Transport and storage	42.3	28.1	28.9	39.2
Communication	35.0	28.4	30.3	33.4
Finance, property and business services	41.7	28.5	31.9	37.1
Public administration and defence	39.6	29.7	31.1	36.3
Community services	40.4	27.3	28.5	32.9
Recreation, personal and other services	39.3	26.6	25.7	31.4
<b>All industries</b>	<b>42.0</b>	<b>27.6</b>	<b>28.3</b>	<b>36.4</b>

(a) The estimates refer to actual hours worked, not hours paid for.



### Annual leave and long service leave.

As from 1 January 1973, employees of the Commonwealth Government and the State Government were granted four weeks paid annual leave, together with an annual leave loading of 17.5 per cent of their weekly salary, up to a specified maximum amount. Subsequently, these entitlements were extended to most awards and agreements so that most employees now receive at least four weeks paid annual leave and an annual leave loading payment.

The *Long Service Leave Act 1958* (State) confers entitlement to long service leave with pay on employees for whom such leave is not otherwise provided. Entitlement accrues only in relation to continuous service with one employer, but continuity of service is not affected by the transfer of a business from one employer to another. Leave of thirteen weeks on ordinary pay is granted for the first fifteen years of service. For each subsequent ten years the entitlement is eight and two-thirds weeks, with pro rata conditions applying in the case of termination of employment for any reason other than serious misconduct.

The *Long Service Leave Act Amendment Act 1973*, which came into operation on 1 March 1974, provides that the 'standard' period of thirteen weeks leave after fifteen years service may be varied as the result of an agreement between the Confederation of Western Australian Industry (Incorporated) and the Trades and Labour Council of Western Australia or by a determination of the Western Australian Industrial Relations Commission in Court Session.

### WORKERS' COMPENSATION AND ASSISTANCE

The *Workers' Compensation and Assistance Act 1981-1987* provides compensation for personal injury arising out of or in the course of employment, for death resulting from such injury, and for disease or the recurrence of a pre-existing disease where employment was a contributing factor. The provisions of the Act do not extend to employees of the Commonwealth Government for whom compensation is provided by the *Commonwealth Employees Rehabilitation and Compensation Act 1988*.

The workers' compensation system is a no fault system and compensates employees for loss of earning capacity and health care expenses.

Workers' compensation in this State is based on a multi-insurer system where all employers, other than self-insurers, are required to effect insurance with an approved insurer for the full amount of their liability to pay compensation under the Act to all workers employed by them. A workers' compensation policy should cover all employees, including those paid by wages, salary, commission, piece rates or payment in kind.

The Workers' Compensation Board, constituted under the Act, has exclusive jurisdiction to examine, hear and determine all matters and questions arising out of claims for compensation under the Act and all questions as to the right or amount of indemnity. The Board's determinations are final and conclusive except that a party to any proceedings before the Board who is dissatisfied with a determination may appeal to the Full Court of the Supreme Court. Additionally, when a question of law arises in any proceedings before the Board, the Board may refer the question for the decision of the Full Court of the Supreme Court.

The Workers' Compensation and Rehabilitation Commission participates in research into the causes, incidence and methods of prevention of accidents, injuries and diseases for which compensation may be payable. It encourages the prevention or minimisation of accidents, injuries and diseases and coordinates rehabilitative, occupational or vocational training or remedial treatment for workers suffering injuries or disease. It also has the important function of formulating recommendations and preparing estimates to Parliament on costs of rehabilitation and insurance matters under the Act.

The payments, allowances and benefits under the Act are calculated by reference to a 'prescribed amount' which is partially indexed annually on 1 July by the weighted average minimum award rate for adult males under Western Australian State Awards. At 1 July 1989 the prescribed amount was \$80,783.

The total liability of the employer weekly and lump sum payments is limited to \$80,783 except where the Board determines that a disability to a worker has resulted in his permanent total or permanent partial incapacity for work. In this event the board may award up to \$50,000 more if it considers the workers' social and financial circumstances justify it.

Additional monies are payable up to a maximum of 20 per cent of the prescribed amount, i.e. \$16,156 for expenses incurred for first aid and ambulance services, medicines, medical or surgical attendance, hospital treatment and the like. The board may award up to \$50,000 more where such expenses have been incurred and if it considers the workers' social and financial circumstances justify it.

In the event of the death of the worker, payable funeral expenses are compensable up to a maximum of \$1,100.

Where death results from the disability and the worker leaves any adult dependents who are wholly dependent on the worker's earnings, a sum equal to 85 per cent of his residual entitlement is payable. However, payments to a wholly dependant mother or spouse are subject to a guaranteed minimum sum. A child's allowance of \$24.30 is payable weekly up to the age of sixteen years (or twenty-one years in the case of a full-time student) for any wholly dependent child.

Provisions also exist for partial dependants to receive compensation in proportion to the loss of necessary financial support suffered by such dependants.

### INDUSTRIAL ACCIDENTS

The statistics shown in Table 21.14 represent all industrial accidents occurring during the year ended 30 June 1988 involving time lost from work of one day or more, and are presented according to broad industry groups. For the year ended 30 June, reports of finalised cases are received progressively from insurers up to the end of September after which time reports are provided for unfinalised cases.

The figures do not represent all industrial accidents which actually occurred in Western Australia during the year because:

- (i) in the case of non-fatal accidents, they include only those which resulted in absence from work for one day or more;
- (ii) only accidents coming within scope of the *Workers' Compensation and Assistance Act 1981* are included in the statistics, which therefore exclude industrial accidents resulting

in the death of or injury to, self-employed persons and persons employed by the Commonwealth Government;

(iii) the statistics include only accidents occurring at the work site or accidents occurring in the course of a worker's normal duties, and therefore do not include 'journey' cases or 'recess' cases (i.e. accidents which occur when travelling between place of residence and workplace, and cases which occur during work breaks). During the year ended 30 June 1988, there were 1,575 claims for 'journey' cases and 63 claims for 'recess' cases;

(iv) industrial disease cases are not included.

TABLE 21.14 - TOTAL ACCIDENTS - INDUSTRY DIVISION, TIME LOST AND COST OF CLAIMS 1987-88

Industry	Number of		Total cost of claims (a)
	Accidents	Weeks lost(a)(b)	
			\$'000
Agriculture, forestry, fishing and hunting	1,343	6,551	4,852
Mining	2,718	12,884	11,986
Manufacturing	8,026	26,738	23,127
Electricity, gas and water	891	5,902	5,625
Construction	3,422	14,956	14,391
Wholesale and retail trade	4,212	13,193	11,236
Transport and storage	1,801	8,544	7,026
Finance, property and business services	1,115	4,362	3,690
Public administration and defence	1,503	7,830	6,096
Community services	4,556	28,958	23,118
Recreation, personal and other services	1,356	6,898	5,362
<b>Total</b>	<b>30,943</b>	<b>136,815</b>	<b>116,509</b>

(a) Includes estimates for cases not finalised by October 1988. (b) Claims relating to fatal accidents do not have time lost.

In addition to the employment data appearing in this Chapter, references to the number of persons engaged in particular activities are to be found elsewhere in the Year Book. Chapter 10, for example, shows numbers engaged in teaching and Chapter 8 contains details of hospital staff. Chapter 14 provides information on employment

in mining, and Chapter 16 includes tables relating wholly, or in part, to employment in factories. Chapter 17 gives numbers employed in retail establishments.

#### REFERENCES

ABS publications

*A Guide to Labour Statistics* (6102.0)

*Average Earnings and Hours of Employees, Australia* (6304.0)

*Average Weekly Earnings, States and Australia* (6302.0)

*Award Rates of Pay Indexes, Australia* (6312.0)

*Distribution and Composition of Earnings and Hours of Employees* (6102.0)

*Employed Wage and Salary Earners, Australia* (6248.0)

*Labour Statistics* (6101.0)

*The Labour Force, Australia* (6202.0 and 6203.0)

## Chapter 22

# PRICE INDEXES, PRICES AND HOUSEHOLD EXPENDITURE

### PRICE INDEXES

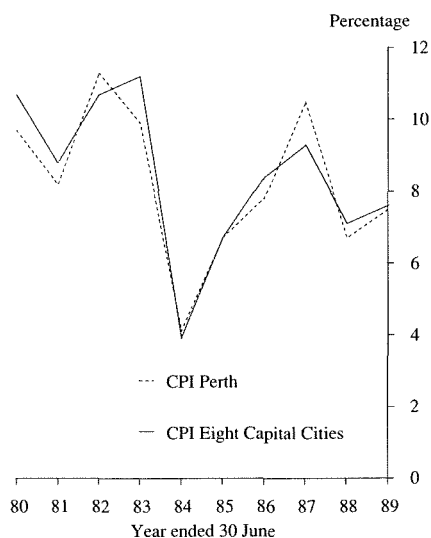
Information concerning the development of price indexes in Australia is given in *Year Book Australia* (Catalogue No. 1301.0) and *Labour Report* No. 58, 1973 (Reference No. 6.7).

#### The Consumer Price Index

The Consumer Price Index (CPI) measures quarterly price changes of a 'basket' of goods and services which account for a high proportion of expenditure by metropolitan employee households. This 'basket' covers a wide range of goods and services, arranged in eight groups: Food; Clothing; Housing; Household equipment and operation; Transportation; Tobacco and alcohol; Health and personal care; and Recreation and education. The eight groups in turn are divided into thirty-five sub-groups and 107 expenditure classes. Indexes at the sub-group level and for selected expenditure classes are available on request. The CPI was published for the first time in August 1960 and was compiled retrospectively to the September quarter 1948.

**CPI population group.** Because the spending patterns of various groups in the population differ somewhat, the pattern of one group, fairly homogeneous in its spending habits, is chosen for calculating the CPI. This population group is, in concept, *metropolitan employee households*. For this purpose, *employee households* are those households which obtain at least three-quarters of their total income from wages and salaries excluding the top ten per cent (in terms of income) of such households. *Metropolitan* means the six State capital cities, Canberra and Darwin.

DIAGRAM 2.1  
CONSUMER PRICE INDEX  
Percentage change



**Weighting pattern.** Each of the 107 expenditure classes in the current CPI has a fixed weight (i.e. the measure of its relative importance) which reflects the expenditure pattern of the CPI population group as derived from Household Expenditure Surveys and other data collected by the ABS. More detailed information on weighting is published in *The Australian Consumer Price Index: Concepts, Sources and Methods* (Catalogue No. 6461.0)

TABLE 22.1 - CONSUMER PRICE INDEX : PERTH  
(Base year 1980-81 = 100 unless otherwise noted)  
Reference: Catalogue No 6401.0

	Food	Clothing	Housing (a)	Household equipment and operation	Trans- portation	Tobacco and alcohol	Health and personal care	Recreation and education (b)	All groups
1986-87	157.1	154.4	154.7	159.0	172.3	188.1	156.0	135.7	161.8
1987-88	166.3	165.8	163.6	170.3	184.5	203.0	175.1	146.4	173.3
1988-89	181.2	177.4	(a)184.7	181.4	191.4	212.9	190.8	155.4	186.1
1986-87									
December	156.8	153.8	153.3	157.7	172.5	185.5	152.9	133.9	160.7
March	158.3	156.1	156.5	160.4	175.6	190.9	158.4	137.7	163.8
June	159.6	160.6	159.4	163.2	178.0	194.7	164.8	140.0	166.6
1987-88									
September	161.2	160.7	161.2	166.2	180.8	198.0	168.5	143.1	169.1
December	163.6	165.3	163.5	169.3	183.7	201.3	171.0	144.1	171.8
March	168.3	165.4	163.5	171.2	185.7	204.5	179.2	148.6	174.6
June	172.0	171.9	166.0	174.6	187.9	208.0	181.8	150.0	177.7
1988-89									
September	176.6	172.2	175.2	177.1	188.1	210.8	186.3	152.3	181.3
December	178.7	177.6	188.2	180.3	188.4	210.5	187.1	155.2	185.1
March	183.8	177.0	(a)182.1	182.9	192.0	213.0	193.9	157.4	187.0
June	185.7	182.7	(a)193.4	185.2	196.9	217.3	195.7	156.6	191.0
1989-90									
September	188.4	181.5	(a)206.6	188.6	200.4	222.2	199.2	158.8	195.5
December	190.6	186.4	215.1	189.5	203.1	229.1	204.1	162.8	199.5

(a) These series have been affected by the adoption of a new approach to the treatment of mortgage interest charges. For more detail refer to Information paper *The Australian Consumer Price Index: Treatment of Mortgage Interest Charges* (Catalogue No 6442.0). (b) New group index replacing former 'Recreation' group. Base: March quarter 1982 = 100.

**Periodic reviews.** The CPI is reviewed at approximately five-yearly intervals to take account of changes in household spending patterns. Following each review, the new series with its changed composition and weighting pattern is linked to the previous series to form one continuous series.

The eleventh (current) series of the CPI began with the release of the March quarter 1987 CPI and incorporates the following changes: expenditure on the purchase of dwellings was replaced by expenditure on mortgage interest charges; interest charges for consumer credit used for household purposes other than dwelling purchase were included; expenditure on optical services, veterinary services and watches and clocks was included; and the range of fresh fruit and vegetables included in the index was expanded.

A further change to the CPI was introduced in the March quarter 1989 when the ABS replaced the simple revaluation method of calculating mortgage interest charges with the conceptually superior and more sophisticated debt profile method.

**Price collection.** Since the CPI is designed to measure the impact of changing prices on metropolitan employee households, information about prices is collected in the kinds of retail outlets or other establishments where households normally purchase goods or services. This involves collecting prices from many sources, including supermarkets, electrical appliance retailers, doctors, dentists, car dealers and repairers, service stations, hotels, real estate agents and financial institutions. For Perth, about 13,000 separate quotations are collected each quarter.

Prices are generally collected quarterly. However, for some important items prices are collected more frequently (e.g. petrol, alcohol, bread, fresh fish, fresh meat, fruit and vegetables) and a small number annually (e.g. seasonal clothing, local government rates and charges).

The prices used in the CPI are those that any member of the public would have to pay on the pricing day to purchase the specified good or service. Any sales tax or excise which the consumer must pay when purchasing specific items is included in the CPI price. Sale prices, discount prices and 'specials' are accepted for the

CPI so long as the items concerned are of normal quality (e.g. not damaged or shop soiled) and are offered for sale in reasonable quantities. To ensure that the price movements reflect the experience of the bulk of the metropolitan population, the brands and varieties of the items which are priced are generally those which sell in the greatest volume.

**Analysis of CPI changes.** Movements in the CPI from one period to another can be expressed either as changes in index points or as percentage changes. The following example illustrates the method of calculating index points changes and percentage changes between any two periods:

*All Groups CPI: Perth*

Index numbers:	
September quarter 1989:	195.5
less: June quarter 1989:	191.0
Change in index points:	+4.5
Percentage change =	$\frac{+4.5 \times 100}{191.0} = 2.4\%$

**House price indexes**

House price indexes are compiled for use in calculating the mortgage interest charges component of the CPI. Separate indexes are constructed for established houses and project homes and these are published quarterly for each of the capital cities (including Perth) in *House Price Indexes: Eight Capital Cities* (Catalogue No. 6416.0)

**INDEX OF RELATIVE RETAIL PRICES**

An annual survey of retail prices for food in selected cities and towns in Western Australia is carried out during May each year. The information from the survey is then used to compile index numbers of the relative levels of food prices in those cities and towns using a common set of weights derived from the weighting pattern of the CPI Food Group. The resulting index numbers are expressed on the base Perth = 100 and are available from the ABS on request.

**AVERAGE RETAIL PRICES FOR SELECTED COMMODITIES**

'Average prices' of a limited range of commodities are recorded in the Blue Books of Western Australia from the early colonial years and in the Western Australian Year Book (Old Series) from 1886. Retail prices of food and groceries and average rentals of houses for years

extending back to 1901 have been collected by the Australian Statistician but it was not until 1911 that a systematic collection of retail price statistics for compiling retail price indexes was begun. Since 1962 average retail prices for a range of selected (mainly food) items have been published quarterly in *Average Retail Prices of Selected Items* (Catalogue No. 6403.0)

**TABLE 22.2 – AVERAGE RETAIL PRICES OF SELECTED ITEMS : PERTH (cents)**

*Reference: Catalogue No.6403.0*

Item	Unit	December quarter		
		1987	1988	1989
<b>Dairy produce—</b>				
Milk, carton, supermarket sales	1 litre	83	87	90
Milk, powdered, full cream	1 kg can	522	529	631
Cheese, processed, sliced, wrapped	500g	252	279	330
Butter	500g	154	167	182
<b>Cereal products—</b>				
Bread, white loaf, sliced, supermarket sales	680g	115	120	136
Biscuits, dry	250g	101	110	117
Breakfast cereal, corn based	500g	210	219	250
Flour, self-raising	2 kg	162	176	199
Rice, medium grain	1 kg	97	102	107
<b>Meat and seafoods—</b>				
<b>Beef</b>				
Rib, without bone	1 kg	510	575	552
Rump steak	1 kg	818	906	1,014
T-bone steak, with fillet	1 kg	764	857	928
Chuck steak	1 kg	533	592	624
Silverside, corned	1 kg	532	595	637
Sausages	1 kg	270	336	366
<b>Lamb</b>				
Leg	1 kg	494	551	554
Loin chops	1 kg	570	661	686
Forequarter chops	1 kg	453	512	499
<b>Pork</b>				
Leg	1 kg	514	560	630
Loin chops	1 kg	597	649	744
Chicken, frozen	1 kg	311	323	346
Bacon, middle rashers	250g pkt	216	252	294
Beef, corned	340g can	210	228	241
Salmon, pink	210g can	243	316	284
<b>Fresh fruit and vegetables—</b>				
Oranges	1 kg	134	150	143
Bananas	1 kg	129	184	193
Potatoes	1 kg	84	124	122
Tomatoes	1 kg	273	234	298
Carrots	1 kg	76	109	108
Onions	1 kg	100	159	109
<b>Processed fruit and vegetables—</b>				
Peaches	825g can	154	170	177
Pineapple, sliced	450g can	80	80	85
Peas, frozen	500g pkt	92	110	136
<b>Confectionery—</b>				
Chocolate, milk, block (a)	250 g	166	187	205

**TABLE 22.2 – AVERAGE RETAIL PRICES OF  
SELECTED ITEMS : PERTH — continued**  
(cents)

Reference: Catalogue No.6403.0

Item	Unit	December quarter		
		1987	1988	1989
<b>Other food—</b>				
Eggs(b)	53g 1 dozen	168	181	193
Sugar, white	2 kg	163	178	234
Jam, strawberry	500g jar	171	182	193
Tea	250g	141	144	152
Coffee, instant	150g jar	464	475	465
Tomato sauce	600 ml	133	147	160
Margarine, poly-unsaturated	500 g	128	130	151
Baked beans, in tomato sauce	440 g	73	80	83
Baby food	125g can	36	37	40
<b>Household supplies and services—</b>				
Laundry detergent	1 kg	359	371	415
Dishwashing detergent	1 litre	354	380	392
Facial tissues	pkt of 224	165	183	195
Toilet paper (c)	4 x 300 sheet rolls	283	304	330
Pet food	415g	80	88	90
<b>Private motoring—</b>				
Petrol, super grade	1 litre	57.8	53.6	62.0
<b>Alcoholic beverages—</b>				
Beer, full strength, unchilled	12 x 750 ml bottles	1,869	1,866	1,928
Draught beer, full strength, public bar	285 ml glass	140	139	158
Scotch, nip, public bar	30 ml	192	197	232
<b>Personal care products—</b>				
Toilet soap	2 x 125g	129	139	146
Toothpaste	140g	189	214	212

(a) Prior to 1989 prices relate to 200 gram blocks. (b) Prior to 1988 prices relate to 55 gram egg standard. (c) Prior to 1988 prices relate to 6 x 500 sheet rolls.

## WHOLESALE PRICES OF MATERIALS USED IN BUILDING

There are two separate price index series for materials used in building.

**The Price Index of Materials used in House Building** measures changes in prices of selected materials used in the construction of houses. For this index the weights reflect the usage of materials in detached single dwelling units constructed in the Perth Statistical Division.

**TABLE 22.3 – PRICE INDEX OF  
MATERIALS USED IN HOUSE  
BUILDING – ALL GROUPS : PERTH**  
(Base year 1985-86 = 100)

Reference: Catalogue No. 6408.0

Year	Index number
1986-87	106.7
1987-88	114.2
1988-89	128.1

**The Price Index of Materials used in Building Other than House Building.** This index measures monthly changes in prices of selected materials used in the construction of buildings other than houses. The weights used in this index are based on the usage of materials in the construction of buildings commenced in the six State capital cities in the three years ended June

**TABLE 22.4 – PRICE INDEX OF MATERIALS USED IN  
BUILDING OTHER  
THAN HOUSE BUILDING : PERTH**  
(Base year 1979-80 = 100)

Reference: Catalogue No. 6407.0

Materials	Index number		
	1986-87	1987-88	1988-89
<b>Selected major building materials—</b>			
Structural timber	187.9	189.8	220.2
Clay bricks	170.5	188.5	205.6
Ready mixed concrete	165.4	182.5	200.4
Precast concrete products	170.8	182.6	199.9
Galvanised steel decking, cladding, etc.	173.7	185.2	207.9
Structural steel	203.1	221.0	255.8
Reinforcing steel bar, fabric and mesh	168.2	183.8	199.4
Aluminium windows	195.4	216.8	231.7
Steel windows, doors, louvres, etc.	186.4	202.2	214.1
Builders' hardware	196.4	208.7	222.6
Sand, aggregate and filling	184.5	200.0	223.4
Carpet	195.0	213.3	223.9
Paint	169.4	190.9	214.6
Non-ferrous pipes	144.3	189.1	213.4
<b>Special combinations of building materials—</b>			
All electrical materials	201.6	238.1	270.0
All mechanical services	197.3	214.3	230.9
All plumbing materials	175.0	191.0	211.6
<b>All groups</b>	<b>183.9</b>	<b>201.5</b>	<b>221.8</b>

1977. The same weighting pattern is used for each of the six capital cities.

For both of these indexes, prices are collected at the mid-point of each month from representative suppliers. In general the point of pricing is delivered on site, but in some cases it may be necessary to accept other pricing points, e.g. supplied and fixed.

### OTHER PRICE INDEXES

In addition to the indexes already described, the ABS compiles price indexes related to the prices of selected import and export commodities, copper materials, materials used in manufacturing industries and articles produced by manufacturing industries. The Import Price Index is released on a

quarterly basis while the other indexes are released monthly. These indexes are published on a national basis only. For further reference to these indexes see *Year Book Australia* (Catalogue No. 1301.0) and other references listed at the end of this Chapter.

### HOUSEHOLD EXPENDITURE SURVEYS

During 1974-75 and 1975-76, the ABS conducted two surveys in order to obtain information about the expenditure patterns of private households. The 1974-75 survey was confined to a sample of households in the six State capital cities and Canberra, while the coverage of the 1975-76 survey was extended to include other urban and rural regions. Apart from limited attempts in 1910-11 and 1913 to assess the spending patterns

TABLE 22.5 - HOUSEHOLD EXPENDITURE, WESTERN AUSTRALIA : 1984 AND 1988 (a)

Reference : Catalogue No. 6528.0

Particulars	1984	1988 (a)	Increase
			%
AVERAGE WEEKLY HOUSEHOLD EXPENDITURE (\$)			
Commodity or service—			
Current housing costs (selected dwelling) (b)	41.50	78.22	88.5
Fuel and power	10.37	14.21	37.0
Food and non-alcoholic beverages	69.18	98.14	41.9
Alcoholic beverages	13.24	19.09	44.2
Tobacco	6.27	7.29	16.2
Clothing and footwear	20.72	32.20	55.4
Household furnishings and equipment	28.54	40.50	41.9
Household services and operation	15.74	26.42	67.9
Medical care and health expenses	12.72	20.78	63.4
Transport	62.47	76.21	22.0
Recreation	46.50	55.28	18.9
Personal care	6.24	12.26	96.5
Miscellaneous commodities and services	26.52	57.62	117.3
<b>Total commodity or service expenditure</b>	<b>360.01</b>	<b>538.22</b>	<b>49.5</b>
Selected other payments—			
Income tax	81.82	129.99	58.9
Mortgage payment— principal (selected dwelling)	7.09	11.42	61.1
Other capital housing costs	21.44	25.55	19.2
Superannuation and life insurance	11.47	16.96	47.9
HOUSEHOLD CHARACTERISTICS			
Average weekly household income (\$) (c)	452.87	655.40	44.7
Proportion of total income being (per cent)—			
Wages and salaries	71.7	70.1	-2.2
Own business	8.9	12.8	43.8
Government pensions and benefits	11.0	9.6	-12.7
Other	8.4	7.5	-10.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>..</b>
Average age of reference person (years)	45	44	..
Average number of persons per household—			
Under 18 years	0.87	1.01	16.1
18 to 64 years	1.71	1.75	2.3
65 years and over	0.24	0.21	-12.5
<b>Total</b>	<b>2.82</b>	<b>2.97</b>	<b>5.3</b>



**TABLE 22.5 HOUSEHOLD EXPENDITURE, WESTERN AUSTRALIA : 1984 AND 1988 (a) — continued**  
*Reference : Catalogue No. 6528.0*

<i>Particulars</i>	<i>1984</i>	<i>1988 (a)</i>	<i>Increase</i>
			%
HOUSEHOLD CHARACTERISTICS (continued)			
Proportion of households with nature of housing occupancy being (per cent)—			
Owned outright	33.0	36.3	10.0
Being bought	35.3	34.8	-1.4
Renting— government	6.9	9.1	31.9
Renting— private	20.1	15.7	-21.9
Occupied rent-free	4.7	4.0	-14.9
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>..</b>
Average number of earners in household	1.2	1.4	16.7
Proportion of households with family composition of the household being (per cent)—			
Married couple			
Only	26.0	21.4	-17.7
With dependent children only	28.9	29.2	1.0
Other (d)	13.6	14.1	3.7
Single parent one family household only	4.3	8.4	95.3
Single person household	18.8	14.4	-23.4
Other (e)	8.5	12.5	47.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>..</b>
Number of households in sample	1,084	388	..
<b>Estimated total number of households in population ('000)</b>	<b>450.9</b>	<b>492.1</b>	<b>9.1</b>

(a) Data relates to the six months July 1988 to December 1988. Caution should be exercised when comparing the data to full year estimates from previous surveys as factors such as inflation, differing sample error and seasonal factors may influence the comparison. (b) Includes the interest component only of any housing loan repayments. Excluded are outright purchase, or deposit on, dwellings or land, and other payments of a capital nature. (c) Household income is the sum of the gross weekly income of all household members. (d) Includes married couple family households where a combination of dependent and non-dependent children are present. (e) Includes married couple and single parent families living in multiple family households.

of Australian households, these surveys were the first official collections of household expenditure statistics conducted in this country.

Further household expenditure surveys were conducted by the ABS in 1984 and for the financial year 1988-89. Coverage of these surveys, as in 1975-76, included households in urban and rural areas, except remote and sparsely settled areas. Table 22.5 shows household expenditure for Western Australia based on the 1984 Household Expenditure Survey compared with preliminary data from the 1988-89 survey based on data collected for the six months July to December 1988.

Data obtained from the Household Expenditure Surveys are used for a number of purposes including:

to provide data for updating the weighting pattern of the Consumer Price Index;

to provide a basis for analyses of the expenditure patterns of disadvantaged groups

(e.g. pensioners, one parent families and the unemployed);

development of government policy and planning in respect of specific components of expenditure (e.g. housing, health, transport).

## REFERENCES

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*Australian Consumer Price Index (6401.0)*

*The Australian Consumer Price Index: Concepts Sources and Methods (6461.0)*

*A Guide to the Consumer Price Index: Eleventh Series (6440.0)*

*Information Paper: The Australian Consumer Price Index Treatment of Mortgage Interest Charges (6442.0)*

*Information Paper Review of the Consumer Price Index: (6450.0)*

*Export Price Index (6405.0)*

*Import Price Index (6414.0)*

*Price Index of Materials Used in House Building (6408.0)*

*Price Index of Materials Used in Building Other than House Building (6407.0)*

*Price Indexes of Articles Produced by Manufacturing Industry (6412.0)*

*Price Indexes of Copper Materials (6410.0)*

*Price Indexes of Materials Used in Coal Mining (6415.0)*

*Price Indexes of Materials Used in Manufacturing Industries (6412.0)*

*Information Paper: 1988-89 Household Expenditure Survey, Australia (6527.0)*

*Household Expenditure Survey, Australia: Preliminary Results, July to December 1988 (6528.0)*

## Chapter 23

### PUBLIC FINANCE

This chapter deals mainly with the financial activities of State and local government authorities in Western Australia. Particular emphasis has been given to Commonwealth-State financial relations, including details of Commonwealth cash benefits to persons in Western Australia.

In 1988-89 total current and capital outlays of State authorities was \$6,410m – 15 per cent above that of the previous year—with grants of \$2,570m received from the Commonwealth, a decrease of 0.5 per cent over the previous year.

Total payments for goods, services and land by local authorities were \$563.0m in 1987-88, an increase of 9.5 per cent. Government grants of \$155.3m were received, a decrease of 3.4 per cent over the previous year.

#### COMMONWEALTH-STATE FINANCIAL RELATIONS

For a historical description of Commonwealth-State financial relations, refer to Chapter 24 of the *Western Australian Year Book*, No. 24—1986.

#### Management of Commonwealth-State funding

The major institutions assisting in the management of Commonwealth funding to States and Northern Territory governments are: the Premiers' Conference; the Commonwealth Grants Commission; and the Australian Loan Council.

**Premiers' Conference.** The annual Premiers' Conference determines the total amount of general revenue assistance and the shares of each State and the Northern Territory. Although these payments are at the Commonwealth's discretion, they are subject to negotiation between the Commonwealth and States at the Conference.

**Commonwealth Grants Commission.** The Commonwealth Grants Commission was established in 1933 to recommend on applications made by States, under section 96 of the Constitution, for special financial assistance grants. Since 1982, as a result of arrangements

agreed at Premiers' Conferences, no State has sought such a grant.

Since 1978, under the *States (Personal Income Tax Sharing) Act 1976*, a special division of the Commission has also been responsible for recommending the per capita relativities to be used for the allocation of general revenue grants among the States.

**Australian Loan Council.** The Loan Council was established under the Financial Agreement Act of 1928 with responsibility for determining the annual borrowing programs of the Commonwealth and State Governments, and the terms and conditions of loans to finance these programs. In 1936, the Gentlemen's Agreement extended the Loan Council's authority to include approval of semi-government and local authorities' borrowings.

By the early 1980s the Loan Council had begun to exercise increasingly less influence under the Gentlemen's Agreement over total authority borrowings. Greater use of non-conventional financing techniques, such as finance leasing and similar forms of borrowing, were being employed, which were outside the scope of the Agreement. These developments culminated in the

Gentlemen's Agreement being suspended at the June 1984 Loan Council meeting, and the Global Approach was adopted on a trial basis in 1984-85. The objective of the Global Approach was to broaden the scope of Loan Council oversight of authority borrowings by bringing within voluntarily agreed limits all forms of borrowings by Commonwealth, State and Local Authorities.

### Commonwealth financial assistance

Commonwealth Government payments to the States and Northern Territory Governments may be classified under two major headings: general purpose payments and specific purpose payments, which may be further classified into those provided for recurrent outlays and those provided for capital outlays. Payments are made in the form of grants (non-repayable) or loans (repayable).

General purpose payments provide general budgetary assistance and the States and Northern Territory are free to determine the spending of these monies according to their own budgetary priorities. Specific purpose payments, however, are generally a means of meeting the objectives and priorities of Commonwealth Budget programs. They are, therefore, provided subject to certain conditions, for example, the Commonwealth specifying the purpose for which the funds may be spent; the States being required to contribute some specified amount of their own funds to the program to qualify for the assistance.

**TABLE 23.1 - COMMONWEALTH GENERAL AND SPECIFIC PURPOSE PAYMENTS FOR WESTERN AUSTRALIA AND AUSTRALIA: 1986-87(a)**  
(\$ million)

(Source: Commonwealth Budget Paper No. 4.)

Payments	Western Australia	Australia
General purpose payments—		
Revenue	1,460.2	12,542.9
Capital	45.8	621.0
<b>Total</b>	<b>1,506.0</b>	<b>13,164.0</b>
Specific purpose payments—		
Revenue	788.6	8,509.7
Capital	296.5	2,711.7
<b>Total</b>	<b>1,085.1</b>	<b>11,221.4</b>
<b>Total payments</b>	<b>2,591.1</b>	<b>24,385.3</b>
General and specific purpose payments classified according to—		
Grants	2,568.2	24,060.8
Advances (loans)	22.9	324.5

(a) Excludes direct Commonwealth payments to local authorities.

**General purpose revenue payments.** General purpose revenue is paid in the form of grants. The arrangements for determining the level and distribution of these grants among the States and Northern Territory, for 1988-89 were agreed to at the May 1988 Premiers' Conference. The main features of the arrangements are: the implementation of new hospital funding arrangements which resulted in the termination of the identified health grants and removal of the exemption from payroll tax for government business enterprises.

The following table shows the main components of the general purpose revenue assistance for Western Australia and Australia for the three years 1986-87 to 1988-89.

**TABLE 23.2 - GENERAL PURPOSE REVENUE ASSISTANCE (a)**  
(\$ million)

(Source: Commonwealth Budget Paper No. 4)

Year	Western Australia	Australia
<b>FINANCIAL ASSISTANCE GRANTS</b>		
1986-87	1,263.8	11,517.8
1987-88	1,393.3	12,446.1
1988-89	1,452.0	12,821.9
<b>IDENTIFIED HEALTH GRANTS (b)</b>		
1986-87	198.6	1,651.3
1987-88	219.5	1,782.7
1988-89	-	-
<b>SPECIAL REVENUE ASSISTANCE</b>		
1986-87	2.5	46.9
1987-88	6.5	33.8
1988-89	8.3	150.8
<b>TOTAL GENERAL REVENUE ASSISTANCE</b>		
1984-85	1,224.6	10,978.9
1985-86	1,299.3	11,919.9
1986-87	1,464.9	13,227.1
1987-88	1,619.3	14,248.2
1988-89	1,460.3	12,972.7

(a) Excludes direct Commonwealth payments to local authorities. (b) Identified health grants were absorbed into the specific purpose payment in 'Hospital Funding Grants' in 1988-89.

**General purpose capital payments.** For 1988-89, the Loan Council approved a borrowing program of General Purpose Capital Funds for the States and Northern Territory of \$680m, of which \$340m comprised borrowings and \$340m capital grants. Western Australia's share amounted to \$45.8m, comprising \$22.9m in capital grants and \$22.9m in borrowings. Western Australia opted, under Loan Council provisions, to allocate the \$22.9m loan to

public housing, thereby attaining a concessional interest rate.

**Specific purpose payments.** Specific purpose recurrent payments to Western Australia for 1988-89 amounted to \$580.3m. The major payments were for: schools \$144.5m; colleges of advanced education \$107.2m; universities \$102.7m; and hospital funding grants \$273.9m. Specific purpose capital payments to Western Australia in 1988-89 amounted to \$296.5m; with the largest amounts allocated to the Australian

Centennial Road Development \$66.2m, Australian Land Transport Program \$53.1m; the Australian Bicentennial Roads Development \$40.7m; and public housing \$48.5m.

**Grants and advances.** General and specific purpose payments are made in the form of grants or advances (loans). Tables 23.3 and 23.4 show grants and advances classified according to the Government Purpose Classification.

TABLE 23.3 - COMMONWEALTH GOVERNMENT GRANTS TO WESTERN AUSTRALIA BY GOVERNMENT PURPOSE CLASSIFICATION (\$ million)

Item	1984-85	1985-86	1986-87p
CURRENT GRANTS			
General public services, defence, public order and safety	7.3	8.6	7.6
Education—			
Primary and secondary	103.6	113.9	122.4
Tertiary education—			
University education	85.2	93.9	96.8
Other higher education	85.3	95.1	100.2
Technical and further education	15.8	16.1	16.6
Pre-school education	4.9	2.4	-
Other education	2.9	3.0	2.9
Health—			
Hospitals and other institutional services and benefits	87.9	89.1	93.0
Clinic and other non-institutional services and benefits	1.3	1.5	4.1
Public health	8.5	9.8	9.0
Social security and welfare—			
Welfare services —			
Family and child welfare	1.3	1.3	1.3
Aged and handicapped welfare	3.0	3.7	10.4
Welfare services n.e.c.	3.6	5.8	5.4
Social security and welfare n.e.c.	2.0	2.1	4.2
Housing and community amenities—			
Housing	0.6	0.6	0.6
Community development	0.8	1.2	1.3
Community amenities	-	-	0.2
Recreation and culture	4.3	1.8	6.0
Fuel and energy	0.9	0.7	0.7
Agriculture, forestry, fishing and hunting—			
Agricultural land management	3.1	3.3	6.9
Other agriculture	-0.6	7.4	11.8
Transport and communications	-	-	0.1
Other economic affairs	32.0	23.2	19.1
Other purposes—			
General purpose inter-government transactions	1,275.7	1,354.1	1,521.3
Natural disaster relief	-	0.1	-
<b>Total current grants</b>	<b>1,730.6</b>	<b>1,838.6</b>	<b>2,041.8</b>
CAPITAL GRANTS			
Education—			
Primary and secondary	22.1	22.2	17.5
Tertiary education—			
University education	5.4	6.7	11.4
Other higher education	3.6	5.4	13.5
Technical and further education	15.7	16.1	14.4
Other education	0.1	0.1	0.1

TABLE 23.3 – COMMONWEALTH GOVERNMENT GRANTS TO WESTERN AUSTRALIA BY GOVERNMENT PURPOSE CLASSIFICATION — *continued*  
(\$ million)

<i>Item</i>	<i>1984-85</i>	<i>1985-86</i>	<i>1986-87p</i>
CAPITAL GRANTS (continued)			
Health—			
Hospitals and other institutional services and benefits	-	4.3	4.3
Clinic and other non-institutional services and benefits	0.1	0.3	0.5
Public health	0.1	-	-
Social security and welfare—			
Welfare services—			
Family and child welfare	2.7	2.0	2.5
Aged and handicapped welfare	0.9	0.4	1.3
Housing and community amenities—			
Housing	57.7	60.2	63.4
Community development	3.8	4.0	7.0
Community amenities	6.8	0.4	0.6
Recreation and culture	1.0	18.8	3.2
Agriculture, forestry, fishing and hunting—			
Agricultural water resources management	3.0	2.5	1.2
Other agriculture	6.1	-	-
Transport and communications—			
Road transport	154.0	158.1	154.3
Other transport and communications	-	9.8	-
Other purposes—			
General purpose inter-government transactions	48.3	51.6	39.7
Natural disaster relief	-	0.3	-
<b>Total capital grants</b>	<b>331.4</b>	<b>367.5</b>	<b>334.9</b>

TABLE 23.4 – COMMONWEALTH GOVERNMENT ADVANCES TO WESTERN AUSTRALIA CLASSIFIED BY GOVERNMENT PURPOSE CLASSIFICATION  
(\$ million)

<i>Item</i>	<i>1984-85</i>	<i>1985-86</i>	<i>1986-87p</i>
Net advances (a)—			
Defence	-0.1	-	-
Housing and community amenities—			
Housing	92.5	88.5	66.4
Community development	-11.0	-7.0	-4.0
Water supply	-0.8	-0.1	-0.8
Sanitation and protection of the environment	-0.2	-0.2	-0.2
Recreation and culture	-	-0.2	-0.2
Agriculture, forestry, fishing and hunting—			
Agricultural water resources management	-0.2	-0.2	-
Agricultural support schemes	1.8	-0.8	-2.3
Forestry, fishing and hunting	-0.1	-0.2	-0.2
Transport and communications	-3.1	-3.3	-3.4
Other purposes—			
General purpose inter-government transactions	-23.6	-18.3	-18.3
Natural disaster relief	-6.6	-6.5	-7.0
<b>Total net advances</b>	<b>48.6</b>	<b>51.8</b>	<b>30.1</b>

(a) Gross advances less repayments.

### COMMONWEALTH CASH BENEFITS TO PERSONS IN WESTERN AUSTRALIA

Commonwealth cash benefits to persons are paid from the National Welfare Fund which was established in 1943 by the National Welfare Fund Act. The main components of cash benefits are hospital, medical, pharmaceutical, sickness and unemployment benefits; family allowance; and sole parent, widows, age, invalid and repatriation

pensions. Other cash benefits include scholarships and payments to trainee teachers.

As Table 23.5 shows cash benefits to or for persons in Western Australia for the period 1985-86 to 1987-88 increased from \$1,891.4m to \$2,264.1m over the period. In 1987-88, social security and welfare amounted to \$1,762.2m or 77.8 per cent of the total cash benefits, followed by health with \$416.0m or 18.4 per cent.

**TABLE 23.5 – COMMONWEALTH GOVERNMENT CASH BENEFITS TO OR FOR PERSONS IN WESTERN AUSTRALIA CLASSIFIED BY GOVERNMENT PURPOSE CLASSIFICATION (a)**  
(\$ million)

<i>Item</i>	<i>1985-86</i>	<i>1986-87</i>	<i>1987-88</i>
<b>Education—</b>			
Primary and secondary education	19.1	22.2	27.9
Tertiary education—			
University education	13.4	13.6	15.9
Other higher education	14.1	14.3	17.6
Technical and further education	6.6	6.7	7.5
Other tertiary education	5.8	6.8	6.6
Other education (including pre-school)	0.5	0.4	0.5
<i>Total education</i>	<i>59.5</i>	<i>64.0</i>	<i>76.0</i>
<b>Health—</b>			
Hospital and institutional services and benefits—			
Nursing home benefits	60.0	63.5	90.5
Hospital benefits re-insurance	0.6	0.7	0.9
Clinical and non-institutional services and benefits—			
Medical benefits	194.1	228.9	249.9
Other	2.8	3.0	3.6
Public health benefits	4.0	3.2	-
Pharmaceutical benefits	53.9	55.9	71.1
<i>Total health</i>	<i>315.4</i>	<i>355.2</i>	<i>416.0</i>
<b>Social security and welfare—</b>			
Benefits to ex-servicemen and their dependents	211.7	228.0	260.8
Invalid and other permanent disabled benefits			
Invalid pensions	155.5	177.0	205.5
Other	11.7	11.7	11.1
Old age pensions	450.2	478.3	537.7
Widows, deserted wives, divorcees and orphans benefits	72.9	76.1	81.3
Unemployed benefits	294.2	328.3	295.9
Sickness benefits	23.3	28.8	36.6
Sole parent benefits	134.0	146.9	162.0
Family and child benefits n.e.c.	147.5	135.8	152.1
Other social security and welfare benefits	15.5	16.1	19.2
<i>Total social security and welfare,</i>	<i>1,516.5</i>	<i>1,627.0</i>	<i>1,762.2</i>
Other purposes	-	14.5	9.9
<b>Total all cash benefits</b>	<b>1,891.4</b>	<b>2,060.7</b>	<b>2,264.1</b>

### STATE GOVERNMENT FINANCE

The data in Tables 23.6 to 23.10 relate to the financial activities of the Government of Western Australia, statutory authorities, boards, commissions and corporations, and incorporated bodies (other than financial enterprises) in which the State Government or its agencies have a controlling interest.

The revised series is designed to provide, for the public sector, statistics which complement the accounts for individual sectors provided in the Australian National Accounts. These statistics are intended to consolidate the transactions of the various public authorities and present them so that their economic impact may be assessed; to show the purposes that are being served by government expenditures; and to show the roles of the various

levels of government in the undertaking and financing of these expenditures.

Basic principles which have been followed in developing the data for the economic accounts for the public sector are that all public authorities should be included; all funds under the control of those authorities should be analysed; and transfers between funds, accounts and authorities should be eliminated to present tables on a consolidated basis.

In this section of the Year Book the public sector has been taken to comprise general government bodies (excluding local government authorities) and public trading enterprises. Public financial enterprises have been omitted from the consolidated accounts presented here, largely on the ground that combining the income and outlay and capital financing transactions of publicly-owned trading and savings banks, government insurance offices and other public financial institutions with the equivalent transactions of public trading enterprises and general government seems to provide a less meaningful account of public sector activity.

**General government bodies** are government departments, offices, agencies and authorities engaged in providing services free of charge or at prices significantly below their cost of production.

**Public trading enterprises** are government undertakings which aim at covering the bulk of their expenses by revenue from sales of goods and services.

Over recent years a range of new and revised classifications has been developed for use in the compilation and presentation of government finance statistics. For details of the new classifications refer to the *Classification Manual of Government Finance Statistics* (Catalogue No. 1217.0). Two of the main classifications shown in that publication are the Economic Transactions Framework and the Government Purpose Classification.

The Economic Transactions Framework, in broad terms, is designed to categorise transactions between public authorities and the private sector, and between public authorities where sub-sectors of the public sector have been identified, in a way which facilitates a study of the impact of government transactions on the economy.

The Government Purpose Classification scheme is the medium by which outlays with similar objectives are brought together to reveal more fully the broad purposes of public sector spending, and to provide a framework for developing means of assessment of the effectiveness of outlays in achieving government policies. With the classification of outlays by economic type, the purpose classification also facilitates the assessment of the economic impact of identified programs of expenditure.

Table 23.6 shows that the main components of the receipts of Western Australian State authorities are taxation, grants from the Commonwealth Government, and financing transactions. Further details of taxation collections by State authorities and local government authorities are given later in this Chapter.

**TABLE 23.6 – STATE AUTHORITIES – RECEIPTS AND FINANCING TRANSACTIONS CLASSIFIED BY ECONOMIC TRANSACTIONS FRAMEWORK**  
(\$ million)

<i>Item</i>	<i>1985-86r</i>	<i>1986-87</i>	<i>1987-88p</i>
Revenue and grants received—			
Taxes, fees, fines	932.0	1,160.8	1,430.5
Net operating surpluses of public trading enterprises	400.7	518.3	563.4
Property income—			
Income from public financial enterprises	26.9	24.8	30.5
Interest received	168.4	189.4	219.2
Other property income	217.1	203.6	227.9
Other revenue	58.9	67.3	82.3
Grants received from the Commonwealth—			
Current grants	1,841.9	2,045.2	2,215.6
Capital grants	361.6	334.9	369.6
<i>Total revenue and grants received</i>	<i>4,007.4</i>	<i>4,548.5</i>	<i>5,139.0</i>



TABLE 23.6 – STATE AUTHORITIES—RECEIPTS AND FINANCING TRANSACTIONS  
CLASSIFIED BY ECONOMIC TRANSACTIONS FRAMEWORK — *continued*  
(\$ million)

Item	1985-86r	1986-87	1987-88p
Financing transactions—			
Advances received	48.1	24.7	-9.0
Net borrowing—			
General government	128.9	307.0	555.9
Public trading enterprises	470.5	371.9	345.9
Deposits received (net)—			
Increase in cash balance of private trust funds	-41.0	3.8	121.8
Decrease in investments	1.7	9.3	-263.1
Decrease in currency and deposits	-61.8	-123.5	-332.5
Increase in provisions—			
For depreciation	109.3	128.8	170.4
Other	72.5	55.9	26.1
Other funds available (net) including errors and omissions	-77.2	-85.5	-164.8
<i>Total financing transactions</i>	<i>651.0</i>	<i>691.3</i>	<i>450.7</i>
<b>Total funds available</b>	<b>4,658.4</b>	<b>5,239.8</b>	<b>5,589.7</b>

Figures for some items published in the public authority finance series may differ from issue to issue as a consequence of reclassification of items and other improvements made in the course of developing the most appropriate presentation of the financial transactions of public authorities.

**Financing transactions** are the means by which governments finance their deficits or invest their surpluses, which include transactions in securities of all types, borrowing, trade credit of public trading enterprises, and changes in bank balances. Financing transactions represent the difference between total revenue and grants received and total outlays.

Table 23.7 shows current and capital outlays by Western Australian State authorities classified by Economic Transaction Framework. The principal components, for current outlays, are general government final consumption expenditure and current transfer payments; and for capital outlays, capital expenditure on goods, capital transfer payments, and net advances.

*General government final consumption expenditure* refers to expenditure by general government bodies which does not result in the creation of fixed tangible assets or in the acquisition of land, buildings or secondhand goods. It comprises expenditure on wages, salaries

and supplements, and on goods and services other than fixed assets or stock. Fees, etc. charged by general government bodies for goods sold and services rendered are offset against purchases. Net expenditure overseas by general government bodies and purchases from public enterprises are included. All expenditure on defence is classified as general government final consumption expenditure.

*Current transfer payments* include such items as interest payments on public loans, personal benefit payments (e.g. age pensions), subsidies paid by general government to public and private enterprises, and grants for non-capital purposes, to local authorities and private non-profit organisations (e.g. charitable organisations).

*Capital expenditure* refers to expenditure on new fixed assets whether for additions or replacements, including wages and salaries paid in connection with capital works. The acquisition and disposal of secondhand fixed assets, land and intangible assets and changes in the balance of stock accounts are included. Expenditure on new fixed assets for defence purposes is excluded.

*Capital transfer payments* consist mainly of grants to local governments, to public and private enterprises and persons for the purpose of acquiring capital assets.

TABLE 23.7 – STATE AUTHORITIES – OUTLAYS  
CLASSIFIED BY ECONOMIC TRANSACTIONS FRAMEWORK  
(\$ million)

<i>Item</i>	<i>1985-86r</i>	<i>1986-87</i>	<i>1987-88p</i>
Current outlays—			
General government final consumption expenditure	388.8	2,608.5	2,910.6
Transfers payments—			
Interest paid—			
On Commonwealth advances	210.6	215.0	219.1
Other	460.2	593.5	683.7
Subsidies paid—			
To public trading enterprises	180.4	180.2	170.5
Other enterprises	22.7	32.0	97.0
Personal benefit payments	33.9	47.3	44.3
Grants—			
To non-profit institutions	159.3	172.4	207.6
To local government authorities	76.3	75.9	77.1
Other current transfer payments	-	2.4	3.2
<i>Total current transfer payments</i>	<i>1,143.4</i>	<i>1,316.2</i>	<i>1,502.5</i>
<b>Total current outlays</b>	<b>3,532.2</b>	<b>3,925.3</b>	<b>4,413.1</b>
Capital outlays—			
Gross fixed capital expenditure—			
On new fixed assets	1,030.7	1,101.5	1,071.7
On secondhand fixed assets (net)	-39.2	36.0	-40.8
Increase in stocks	25.4	44.2	39.6
Expenditure on land and intangible assets (net)	-32.9	-31.0	-41.0
<i>Total capital expenditure</i>	<i>984.0</i>	<i>1,150.7</i>	<i>1,029.5</i>
Transfer payments—			
Grants—			
To private sector and public financial enterprises	6.4	12.6	18.2
To local government authorities	57.7	62.0	68.8
<i>Total capital transfer payments</i>	<i>64.1</i>	<i>74.6</i>	<i>87.0</i>
Net advances paid—			
To public financial enterprises	-11.6	17.5	23.9
To private sector	89.6	64.8	32.8
To local government authorities	-	5.0	3.3
<i>Total net advances paid</i>	<i>78.0</i>	<i>87.3</i>	<i>60.0</i>
<b>Total capital outlays</b>	<b>1,126.1</b>	<b>1,312.6</b>	<b>1,176.6</b>
<b>TOTAL OUTLAYS</b>	<b>4,658.3</b>	<b>5,239.8</b>	<b>5,589.7</b>

*Net advances.* Advances are the creation of financial assets with the aim of funding particular enterprises, households or government activities. Repayments are offset against gross advances to give net advances. These advances are included in outlays, rather than financing transactions (refer to the definition on page 279) in order to bring together all the methods governments use to achieve expenditure policies. For example, advances are made to fund State housing projects.

#### LOCAL GOVERNMENT FINANCE

The financial powers of local government authorities in Western Australia are derived

principally from the *Local Government Act 1960*, the main provisions of which are outlined in Chapter 5—Government.

#### Receipts and Payments

Table 23.8 summarises the receipts and payments (including loan transactions) of local government authorities for the financial years 1985-86 to 1987-88. Amounts have been shown on a gross basis wherever practicable.

TABLE 23.8 – SUMMARY OF LOCAL GOVERNMENT RECEIPTS AND PAYMENTS  
(\$ million)

Item	1985-86	1986-87	1987-88
<b>Receipts—</b>			
Rates (including penalties and ex gratia receipts)	208.5	230.6	255.9
Fees and fines	6.8	8.2	12.7
Household garbage charges	23.8	27.5	33.3
Government grants—			
General purpose grants	51.4	55.6	60.3
Specific purpose grants	94.8	105.1	94.9
Reimbursements received—			
Roads and bridges (a)	10.1	12.2	12.1
Other reimbursements	15.1	17.0	17.7
Other revenue (b)	118.8	134.8	146.2
<b>Total receipts</b>	<b>529.3</b>	<b>591.0</b>	<b>633.1</b>
Loans raised during the year	41.4	32.4	27.8
<b>Payments—</b>			
Payments for goods, services and land—			
General public services	56.2	59.9	69.8
Public order and safety	6.2	7.1	8.2
Education	0.3	0.5	0.7
Health	10.3	11.5	13.6
Welfare	11.9	16.3	14.3
Housing and community amenities—			
Household and other garbage	40.0	40.6	50.4
Community and regional development	10.8	24.4	-
Other housing and community amenities	24.5	24.1	61.0
Recreation and culture—			
Public halls, civic centres	10.6	12.1	8.9
Recreation and sport	85.7	82.3	95.7
Libraries and other culture	19.4	21.4	24.0
Economic services—			
Transport—			
Construction, maintenance of roads and bridges	130.7	144.2	138.8
Road plant purchases	18.6	19.2	22.9
Other transport	15.7	18.7	20.3
Other economic services	6.2	7.8	9.3
Other payments for goods, services and land	24.6	24.2	25.1
<b>Total payments for goods, services and land</b>	<b>471.8</b>	<b>514.3</b>	<b>563.0</b>
Comprising—			
Recurrent payments	278.7	297.9	331.3
Capital payments	193.1	216.5	231.7
Other payments from revenue—Debt charges (c)	76.8	81.3	88.8

(a) Mainly reimbursements from the Main Roads Department for work performed on its behalf and from private developers for sub-divisional roads. (b) Includes debt charges in respect of loans raised on behalf of State Government authorities (c) Repayment of all loans.

## Loan Transactions

Under the provisions of local government legislation, local government authorities are constituted as corporate bodies and are authorised to raise loans for works and undertakings and for the liquidation of existing loan debts. The conditions imposed by the *Local Government Act 1960* in relation to loan raising, the levying of loan rates, the expenditure of loan monies and the repayment of loans are summarised in the section

*The Local Government System* in Chapter 5 under the heading *Financial Provisions*.

Loans are raised mainly from banks, insurance companies and superannuation funds. The State Government exercises a measure of supervision over the loan transactions of local government authorities and, where a loan is repayable in full at maturity, maintains the necessary sinking fund at the Treasury.

**TABLE 23.9 – LOCAL AUTHORITIES: DEBT  
AT 30 JUNE  
(\$ million)**

<i>Item</i>	1986	1987	1988
Advances from public authorities	0.2	0.2	8.5
Loans	324.0	317.5	294.2
Other indebtedness	-	-	-
<b>Debt outstanding</b>	<b>324.3</b>	<b>317.8</b>	<b>302.7</b>

Table 23.9 shows the aggregate debt outstanding at 30 June of each year from 1986 to 1988 for all local authorities constituted under the Local Government Act. Figures are on a gross borrowing

basis as they include all transactions associated with borrowing by one level of government on behalf of another, and borrowing between levels of government.

### STATE GOVERNMENT AND LOCAL AUTHORITY TAXATION

The principal sources of State Government and local authority taxes, fees and fines in 1987-88 were: employers' payroll taxes 22.1 per cent, municipal rates 16.2 per cent, stamp duties 13.7 per cent and petroleum products franchise taxes 7.0 per cent. The following table shows, for the three years 1985-86 to 1987-88, taxes, fees and fines collected by State Government and local authorities.

**TABLE 23.10 – STATE AND LOCAL AUTHORITIES:  
TAXES, FEES AND FINES BY TYPE  
(\$ million)**

<i>Item</i>	1985-86	1986-87	1987-88
Taxes, fees and fines—			
Employers' payroll taxes	246.8	310.5	360.3
Taxes on property—			
Taxes on immovable property—			
Land taxes	51.7	58.6	63.0
Municipal rates	206.3	228.3	251.0
Metropolitan improvement rates	7.8	8.8	10.2
Taxes on immovable property n.e.c.	0.4	0.4	0.4
Estate inheritance and gift duty	-	-	-
Taxes on financial and capital transactions—			
Stamp duties	145.2	192.8	338.2
Financial institutions' taxes	27.0	26.4	31.6
Taxes on provision of goods and services—			
Excises (levies on statutory corporations)	28.7	31.0	42.7
Taxes on gambling—			
Taxes on government lotteries	20.5	25.9	36.7
Casino taxes	4.6	10.8	11.4
Race betting taxes	28.2	28.1	32.2
Taxes on gambling n.e.c.	0.9	0.9	0.5
Taxes on insurance—			
Insurance companies' contributions to fire brigades	23.6	25.8	26.8
Third party insurance taxes	4.5	4.6	4.6
Taxes on insurance n.e.c.	25.8	29.6	32.6
Taxes on use of goods and performance of activities—			
Motor vehicle taxes—			
Vehicle registration fees and taxes	84.3	93.2	100.8
Stamp duty on vehicle registration	48.9	50.1	60.1
Drivers' licences	13.9	14.7	18.0
Road transport and maintenance taxes	2.6	2.6	3.1
Franchise taxes—			
Petroleum products franchise taxes	46.0	98.2	91.0
Tobacco franchise taxes	57.0	61.9	65.1
Liquor franchise taxes	28.6	43.1	51.9
Fees and fines—			
Fees from regulatory services	20.7	35.3	37.1
Fines	21.0	24.9	27.2
<b>Total taxes, fees and fines</b>	<b>1,145.0</b>	<b>1,406.5</b>	<b>1,696.5</b>

**REFERENCES****ABS publications**

*Classification Manual of Government Finance Statistics* (1217.0)

*Local Government, Western Australia* (1303.5)

*Government Financial Estimates, Australia* (5501.0)

*Commonwealth Government Finance* (5502.0)

*State and Local Government Finance, Australia* (5504.0)

*Taxation Revenue, Australia* (5506.0)

*Expenditure on Education, Australia* (5510.0)

## Chapter 24

### PRIVATE FINANCE

**The operations of the financial sector in Western Australia are controlled by both Commonwealth and Western Australian legislation.**

The principal Australian legislation comprises the *Banking Act 1959*, *Reserve Bank Act 1959*, *Commonwealth Banks Act 1959*, *Life Insurance Act 1945* and the *Insurance Act 1973*. More detailed descriptions of the background and purpose of these Acts may be found in the *Year Book Australia*, No.71—1988 from page 812 (Catalogue No. 1300.0).

In addition, the Financial Corporations Act was introduced in 1974 as a result of the increasing significance of the non-bank financial institutions in the early 1970s. The Government's aim in introducing this legislation was to regulate the activities of these non-bank institutions in order to achieve economic stability, maintenance of full employment, the efficient allocation of productive resources and to ensure adequate levels of finance for housing.

Recent Australian Governments, however, have sought to decrease the degree of regulation previously imposed on the financial sector and on banking activity in particular. As a result, controls on most bank interest and foreign exchange have been relaxed and new private banks (including overseas banks) have been permitted to commence operations.

State legislation exists to regulate the activities and monitor the solvency of particular types of financial institutions, which operate on a cooperative basis and lend predominantly to members or consumers. In general, these institutions are permanent building societies, cooperative housing societies and credit unions. In some States, including Western Australia, there is also legislation for State Government bodies to operate as banks or insurance offices.

#### CURRENCY

Australia has a decimal system of currency, the unit being the dollar which is divided into 100 cents. Australian notes are issued in the denominations of 5, 10, 20, 50 and 100 dollars and coins in the denominations of 1, 2, 5, 10, 20, 50 cents, and 1 and 2 dollars. The 2 dollar note was replaced by a 2 dollar coin in 1988.

#### BANKING

The banking system in Western Australia includes the Commonwealth banking institutions, The Rural and Industries Bank of Western Australia and the private trading and savings banks, summary details of which are given below.

### Trading Banks

Commercial banking is conducted by trading banks and in Western Australia twenty such banks had outstanding advances at 30 June 1989.

**TABLE 24.1 – TRADING BANKS – MONTHLY AVERAGES OF DEPOSITORS' BALANCES AND BANK ADVANCES (a) : JUNE (\$'000)**

	1987	1988	1989
Depositors balances—			
Fixed	3,914,955	4,356,472	4,700,821
Current—			
Bearing interest	396,194	485,366	505,576
Not bearing interest	1,053,673	1,268,761	1,335,014
Other	-	-	62,846
<b>Total</b>	<b>5,364,822</b>	<b>6,110,598</b>	<b>6,604,257</b>
Debits to customers' accounts	5,146,615	6,167,823	5,382,392

(a) Averages based on amounts at close of business each Wednesday.

**TABLE 24.2 – TRADING BANKS AT JUNE 1989  
Average of weekly balances for June 1989 (\$'000)**

Name	Deposits repayable in Australia	Loans, advances and bills discounted
Australian and New Zealand Banking Group Ltd	748,000	729,000
Bank of America Australia Ltd	1,000	-
Bank of New Zealand	155,000	150,000
Bank of Singapore (Australia) Ltd	-	46,000
Bankers Trust Australia Ltd	5,000	3,000
Banque Nationale de Paris	34,000	29,000
Barclays Bank Australia Ltd	-	42,000
Chase A.M.P. Bank Ltd	28,000	69,000
Citibank Ltd	-	2,000
Commonwealth Bank of Australia	606,000	941,000
Hong Kong Bank of Australia	52,000	127,000
I.B.J. Australia Bank Ltd	11,000	41,000
Lloyds Bank N.Z.A. Ltd	1,000	-
National Australia Bank Ltd	927,000	1,076,000
National Mutual Royal Bank Ltd	78,000	24,000
Nat West Australia Bank Ltd	43,000	188,000
Primary Industry Bank of Australia	1,000	95,000
Standard Chartered Bank Australia Ltd	10,000	65,000
The Rural and Industries Bank of Western Australia (General Banking Division)	3,269,000	2,022,000
Westpac Banking Corporation	1,490,000	1,352,000
<b>Total</b>	<b>7,459,000</b>	<b>7,001,000</b>

### Savings Banks

At 30 June 1989 nine savings banks were operating in Western Australia. Table 24.3 shows the value of depositors' balances at the end of June 1989.

**TABLE 24.3 – SAVINGS BANKS AT 30 JUNE 1989 (\$'000)**

Name	Depositors balances
Australia and New Zealand Savings Bank Limited	394,000
Bank of New Zealand Savings Bank Limited	1,000
Challenge Bank Limited	1,538,000
Citibank Savings Limited	45,000
Commonwealth Savings Bank of Australia	1,391,000
National Australia Savings Bank Limited	474,000
National Mutual Royal Savings Bank Limited	1,000
The Rural and Industries Bank of Western Australia (Savings Division)	1,168,000
Westpac Banking Corporation Savings Bank Limited	832,000
<b>Total</b>	<b>5,844,000</b>

### State Bank

The Rural and Industries Bank of Western Australia is owned by the Western Australian government. The bank has an office in Sydney, which handles wholesale business, branches in London and the Cayman Islands, and a representative office in Tokyo. It is also authorised to deal in foreign exchange under the Banking (foreign exchange) Regulations and to operate a full foreign exchange dealing room in Perth.

### Other Banks (excluding merchant banks)

Other banks operating in Western Australia comprise the Commonwealth Development Bank of Australia, which provides finance for the purpose of primary production, and for the establishment or development of small business undertakings where finance is not otherwise available on reasonable and suitable terms and conditions; the Australian Resources Development Bank Limited, which assists Australian enterprises to participate in the development of Australia's natural resources; and the Primary Industry Bank of Australia Limited, which provides loans to primary producers for longer terms than are otherwise generally available but which is restricted to refinancing loans made by banks and other financial institutions.

## BUILDING SOCIETIES

Building societies in Western Australia are registered under the provisions of the *Building Societies Act 1976*, primarily for the purpose of raising funds to assist members by granting loans, secured on mortgage, to build or acquire homes.

As shown by Table 24.4 permanent building societies obtain the majority of their funds from the public, while terminating societies derive funds primarily from government and banks. The Commonwealth Government contributes to these funds under the *Housing Assistance Act 1984*.

TABLE 24.4 - BUILDING SOCIETIES

	1985-86	1986-87	1987-88
<b>PERMANENT SOCIETIES</b>			
Number of societies	8	8	7
	\$'000	\$'000	\$'000
<b>Liabilities—</b>			
Withdrawable shares	1,534,979	1,685,300	1,097,445
Borrowings (a)	1,058,426	1,104,696	518,082
Other	109,383	123,563	91,783
<b>Total liabilities</b>	<b>2,702,788</b>	<b>2,913,559</b>	<b>1,707,310</b>
<b>Assets—</b>			
Amount owing on loans	1,977,938	2,056,374	1,222,144
Placements and deposits	162,470	115,467	65,784
Other	562,380	741,718	419,382
<b>Total assets</b>	<b>2,702,788</b>	<b>2,913,559</b>	<b>1,707,310</b>
Expenditure	364,896	430,701	330,796
Income	376,585	444,956	350,288
<b>TERMINATING SOCIETIES</b>			
Number of societies	203	210	174
	\$'000	\$'000	\$'000
<b>Liabilities—</b>			
Loans—			
Banks	41,195	42,423	49,202
Government	147,993	158,819	157,950
Other	28,466	29,541	31,772
Other	4,376	4,588	5,526
<b>Total liabilities</b>	<b>222,031</b>	<b>235,370</b>	<b>244,450</b>
<b>Assets—</b>			
Amount owing on loans	190,233	200,183	208,420
Other	31,797	35,188	36,029
<b>Total assets</b>	<b>222,031</b>	<b>235,370</b>	<b>244,450</b>
Expenditure	19,931	22,800	22,529
Income	20,627	23,446	23,707

(a) Previously known as deposits.

## CREDIT UNIONS

Credit unions are registered in Western Australia under the *Credit Union Act 1979*. They operate on a cooperative basis by predominantly borrowing from and providing finance to their own members.

TABLE 24.5 - CREDIT UNIONS

	1985-86	1986-87	1987-88
Credit unions on register (a)	26	25	24
Number of members	201,669	217,873	186,262
	\$'000	\$'000	\$'000
<b>Income—</b>			
Interest on loans	118,449	166,427	98,644
Income from placements and other deposits (b)	9,817	8,033	4,158
Income from securities	3,791	6,918	6,850
Other income	6,183	10,346	9,157
<b>Total</b>	<b>138,241</b>	<b>191,724</b>	<b>118,808</b>
<b>Expenditure—</b>			
Interest on borrowings	98,311	145,573	73,091
Wages, salaries, etc	13,362	15,231	12,127
Other administrative expenses (c)	13,065	32,717	18,547
Other expenditure	6,841	9,559	10,786
<b>Total</b>	<b>131,581</b>	<b>203,079</b>	<b>114,549</b>
<b>Liabilities—</b>			
Members' funds—			
Share capital	1,551	1,763	5,768
Deposits	900,045	1,155,663	614,960
Other	52,909	53,304	60,848
<b>Total</b>	<b>954,505</b>	<b>1,210,731</b>	<b>681,576</b>
<b>Assets—</b>			
Loans to members	788,827	1,038,247	539,166
Other	165,677	172,483	142,411
<b>Total</b>	<b>954,505</b>	<b>1,210,731</b>	<b>681,576</b>

(a) At 30 June. (b) Includes interest on deposits with banks. (c) Includes bad debts written off and allowances for doubtful debts.

## FINANCE COMPANIES

Finance companies are defined as incorporated companies mainly engaged in providing to the general public (business as well as persons) any of the following types of credit facilities: instalment credit for retail sales; personal loans; wholesale finance; factoring; other consumer and commercial loans; finance leasing of business plant and equipment and bills of exchange transactions.



**TABLE 24.6 – FINANCE COMPANIES  
FINANCE LEASE RECEIVABLES AND LOAN  
OUTSTANDINGS AT 30 JUNE  
(\$ million)**

	1987	1988	1989
Finance lease receivables (a)	668.5	637.7	767.4
Loans outstanding—			
Individuals for housing	98.6	79.0	70.1
Individuals for other uses	624.6	561.1	686.6
Other loans and advances (b)	930.7	998.1	1,477.5

(a) Excludes leveraged lease receivables. (b) Excludes related corporations.

## OTHER FINANCIAL INSTITUTIONS

Financial institutions registered under the *Financial Corporations Act 1974* and not contained in the tables above comprise authorised money market dealers, money market corporations, general financiers, pastoral finance companies, intra-group financiers and other financial corporations. These institutions together with public unit trusts, cash management trusts, insurance companies and private and public superannuation funds also contribute to financial dealings in Western Australia. Statistical data for these institutions are generally available only on an Australian basis.

## LENDING BY FINANCIAL INSTITUTIONS

New monthly statistical series were introduced in January 1985 to show a measure of the lending activity of significant lenders in fields of personal, commercial and lease finance. These were in addition to statistics already published on secured housing finance commitments to individuals for owner occupation.

### Personal Finance Commitments

Personal finance commitments comprise those commitments made by significant lenders to individuals for their own personal (non-business) use. A lender is considered to be significant if it is a bank, a life insurance company or a corporation registered under the *Financial Corporations Act 1974* and, during 1982-83, it committed funds exceeding \$4 million to individuals for their own use.

**TABLE 24.7 – PERSONAL FINANCE COMMITMENTS  
(\$ million)**

	1986-87	1987-88	1988-89
Total fixed loan commitments during period (including Personal investment loans)	997.0	1,218.6	1,501.2
Commitments under revolving credit facilities (including credit card facilities)—			
New and increased credit limits	394.0	612.1	684.5
Cancellations and reduction of credit limits during period	180.3	303.0	444.7
Credit limits at end of period—			
Total	1,222.5	1,552.1	1,796.1
Commitments used	534.7	558.3	690.1

### Commercial Finance

Commercial finance commitments comprise those made by significant lenders to government, private and public enterprises, non-profit organisations, or individuals (for investment and business purposes). A lender is considered to be significant if it is a bank, a corporation registered under the *Financial Corporation Act 1974*, or an insurance company and if it committed funds exceeding \$40.1 million for business purposes (excluding leasing of goods) during 1982-83.

**TABLE 24.8 – COMMERCIAL FINANCE  
COMMITMENTS  
(\$ million)**

	1986-87	1987-88	1988-89
Fixed loan facilities (excluding some personal investment loans) by purpose of commitment—			
Construction finance for -			
Erection of—			
Dwellings for rental/resale	69.8	115.4	213.0
Non-residential buildings	106.2	232.7	487.4
Non-building structures	3.5	5.3	18.7
Alterations and additions	14.0	17.1	26.8
Purchase of real property—			
Dwellings for rental/resale	57.1	165.9	468.1
Non-residential buildings	175.6	280.0	481.1
Rural property	65.4	138.8	199.5
Residential block development	38.9	92.4	203.0
Other land	46.7	88.8	162.4
Wholesale finance	64.9	93.3	106.2
Purchase of plant and equipment—			
Motor vehicles	82.0	114.8	174.7
Other transport equipment	19.6	78.9	84.8
Other	85.7	131.3	199.7
Re-financing	293.8	396.4	828.6
Other (including factoring)	969.7	938.1	1,159.0
<b>Total fixed loan commitments</b>	<b>2,092.9</b>	<b>2,889.2</b>	<b>4,813.2</b>

**TABLE 24.8 – COMMERCIAL FINANCE COMMITMENTS — continued**  
(\$ million)

	1986-87	1987-88	1988-89
Commitments not drawn at end of year	381.3	445.7	582.8
Revolving credit facilities—			
Total credit limits at end of year	6,052.2	6,381.9	6,224.7
Used credit at end of year	3,305.6	4,710.9	4,387.6

### Lease Finance Commitments

Lease finance commitments comprise those made by significant lenders to trading and financial enterprises, non-profit organisations, governments, public authorities and individuals.

A lender is considered to be significant if it is a trading bank or a corporation registered under the *Financial Corporations Act 1974* and categorised as a money market corporation or a finance company or a general financier and if it committed funds exceeding \$13 million during 1982-83.

**TABLE 24.9 – LEASE FINANCE COMMITMENTS**  
(\$ million)

	1986-87	1987-88	1988-89
Value of goods under new finance lease commitments (a)—			
Motor vehicles	175.2	202.5	296.3
Other transport equipment	9.6	19.3	20.8
Construction and earthmoving equipment	49.6	50.6	45.7
Agricultural machinery and equipment	13.6	22.4	37.5
Automatic data processing equipment and office machines	76.0	54.7	75.2
Shop and office furniture, fittings and equipment	51.3	49.1	39.3
Other	44.0	87.7	140.3
<b>Total finance lease commitments</b>	<b>419.3</b>	<b>486.3</b>	<b>655.8</b>

(a) Excludes leveraged leases.

### Housing Finance for Owner Occupation

Housing finance commitments comprise secured commitments to individuals for construction or purchase of dwellings for owner occupation.

**TABLE 24.10 – HOUSING FINANCE FOR OWNER OCCUPATION**  
(\$ million)

	1986-87	1987-88	1988-89
Secured housing finance commitments to individuals—			
Construction of dwellings—			
Houses	280.7	450.9	636.0
Other dwellings	6.8	10.9	20.0
Purchase of newly erected dwellings—			
Houses	46.8	74.7	69.2
Other dwellings	8.7	21.3	20.1
Purchase of established dwellings—			
Houses	842.0	1306.0	1,522.5
Other dwellings	57.3	114.9	115.3
Alterations and additions	33.6	57.1	84.7
<b>Total commitments</b>	<b>1,275.9</b>	<b>2035.7</b>	<b>2,468.1</b>

### NEW CAPITAL EXPENDITURE

New capital expenditure is expenditure on new fixed tangible assets including major improvements, and alterations and additions. In general this is expenditure charged to fixed tangible assets accounts excluding expenditure on second hand assets unless these are imported from overseas for the first time.

Data is collected by quarterly sample survey of all private sector enterprises except those enterprises primarily engaged in the agriculture, construction and community services industries. State dissections of data have been produced since December 1978. Prior to that date data was only available at the national level. Quarterly estimates of private new capital expenditure are available in *Private New Capital Expenditure, Australia* (Catalogue No. 5626.0) and *State Estimates of Private New Capital Expenditure* (Catalogue No. 5646.0).

In original current price terms expenditure has increased by 89 per cent over the three years, the largest increase being in the Mining sector which shows a rise of 67 per cent.

**TABLE 24.11 – PRIVATE NEW CAPITAL EXPENDITURE BY SELECTED INDUSTRIES AND TYPE OF ASSET**  
(\$ million)

<i>Selected industry and type of asset</i>	1985-86	1986-87	1987-88
Finance, property and business services	498	643	432
Mining	1,326	1,949	2,211
Manufacturing	323	500	658
Other selected industries	598	538	618
New capital expenditure—			
New buildings and structures	1,310	1,576	1,418
Equipment, plant and machinery	1,434	2,055	2,501
<b>Total</b>	<b>2,744</b>	<b>3,630</b>	<b>3,919</b>

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*Reserve Bank Bulletin*

*Rural & Industries Bank of Western Australia, Annual Report*

## CHAPTER 25

### MIDLANDS STATISTICAL DIVISION PROFILE

The Midlands Statistical Division covers 110,261 square kilometres, extending from the coast north of the Perth metropolitan area, eastward for some 350 kilometres into pastoral country at the edge of the wheatbelt.

Its population of 50,171 (at June 30, 1988) live in the Divisions's 29 local government areas, which include more than 116 towns and rural localities of varying size. The towns service farms, mines or fishing fleets and, increasingly, tourists. Northam is the largest of these; Merredin and Moora are also significant centres.

The Division shows signs of having embarked on a new period of expansion, owing partly to growth in the adjoining metropolitan area, evident in steady population growth in western municipalities. Diversification and locally initiated economic activity are also having an increasing influence on the stability and growth prospects of many communities.

#### HISTORY AND HERITAGE

The Midlands Division includes sites of some of Western Australia's earliest European settlement, as well as some of its most recent. While this settlement dispossessed the division's Aboriginal inhabitants and led ultimately to the demise of their traditional society, Aboriginal people remain an important part of the Midlands community.

From the early 1830s pastoral leases and mixed farms were established in the Avon Valley and other areas north of Perth, the area subsequently having a significant role in the State's development. Well preserved public and private buildings remain as evidence of past prosperity.

A rush to the Eastern Goldfields in the late 19th Century led to development of railways, roads and a water pipeline; heralding a long period of

infrastructure development and a northward and eastward expansion of agriculture.

The western coastal parts of the Division have been opened up in the last 30 years, in part owing to the adoption of improved farming techniques for soils previously considered too sandy and infertile, but also because new coastal towns which cater for fishing, tourism and recreational activities have been established.

#### PHYSICAL FEATURES

Sedimentary limestones of the Perth Basin, form a narrow, coastal strip, otherwise most of the Division is located on the ancient, metamorphosed granitic Yilgarn Block. Basic greenstone belts, especially in the east, are host to valuable minerals and most surface rocks are heavily weathered, often lateritic.

Apart from white and grey sandy soils and limestone ridges along the coast and some relatively fertile alluvial soils along the Darling Scarp, most of the Division is covered by yellow or red duplex soils characterised by sandy topsoil and a loam subsoil. In this eastern part there are also some lighter red and yellow earths and sands. Most of the soils are naturally infertile and some are relatively saline, particularly along ancient river courses.

A long, narrow lowland made up of limestone ridges, sand dunes, sand plains and small lakes and swamps, mainly in the Gingin shire, separates the ocean from the Darling Scarp at the edge of the Yilgarn Plateau. Except for some steeper

slopes along the Scarp, less pronounced to the north, most of the land is gently undulating or flat. Laterite-capped breakaways and rock outcrops are the main features in northern and eastern parts.

The Avon River drains most of the Division, through intermittent watercourses and chains of lakes, mostly salty; the Moore River drains some of the northern area. Drinkable natural ground and surface water supplies are limited, though some large aquifers have been identified, and land clearing has contributed to increased salinity.

Most of the Division experiences a Mediterranean climate, with distinct seasonal variations, mild wet winters and hot dry summers. Rainfall decreases and temperature extremes increase with distance from the coast and to the north-east. Drought is not uncommon in inland parts where frosts are also more frequent.

With most of the Division cleared for agricultural use, only less accessible areas, parks and reserves and a small amount of State forest remain in their natural state. Features include the jarrah and marri

forests in the south-western parts, with wandoo woodlands at their edges, an extensive heathland rich in wildflowers on the north-western sandplains and the tall, attractive salmon gums which dominate to the east. National Parks in the Avon Valley and on the northern sandplains preserve fine samples of natural vegetation. Even in areas of granite outcrops, salt lakes or poor soils there are many plants attractive for their flowers and adaptations to difficult conditions. Impressive wildflower displays can be seen along roadside reserves.

In the western parts of the Division, national parks, state forests and reserves provide a haven for native species including numerous birds and some small, rare marsupials. The lakes in the Gingin and Chittering Shires are home for many water birds and the islands north of Lancelin are noted for their seals and seabird populations. Further reserves and remnant vegetation support larger marsupials and some rare and endangered species, including Mallee Fowl in the Wongan Hills and a Rock Wallaby population in the

TABLE 25.1 - TEMPERATURE AND RAINFALL

(Source: Bureau of Meteorology)

Reporting station and characteristics	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year	
<b>Merredin—</b>														
Temperature—														
Average max. °C	33.5	32.9	29.9	25.1	20.1	17.0	16.1	17.0	20.3	24.4	28.0	31.8	..	
Average min. °C	17.6	17.9	16.0	12.7	8.7	6.9	5.6	5.4	6.6	9.5	12.9	15.8	..	
Rainfall—														
Average (mm)		11	15	20	22	42	53	52	39	26	19	14	13	326
Wet days—														
Average number		2	2	3	5	8	11	12	10	7	5	3	2	70
<b>Northam—</b>														
Temperature—														
Average max. °C	34.4	33.9	30.7	25.7	21.2	18.0	17.0	17.7	20.2	24.3	28.2	32.3	..	
Average min. °C	17.4	17.6	15.5	12.5	8.6	6.6	5.6	5.7	6.6	9.3	12.7	15.5	..	
Rainfall—														
Average (mm)		8	13	19	24	57	84	84	62	36	25	12	9	433
Wet days—														
Average number		2	2	3	5	10	15	16	14	10	7	4	2	90
<b>Lancelin—</b>														
Temperature—														
Average max. °C	29.2	29.8	28.2	25.0	22.3	20.0	19.1	19.2	20.5	22.5	24.4	27.3	..	
Average min. °C	17.4	17.8	16.4	14.0	12.2	10.8	10.0	9.7	10.1	11.6	13.8	15.9	..	
Rainfall—														
Average (mm)		7	13	13	37	91	138	130	93	55	30	23	7	637
Wet days—														
Average number		2	3	4	8	13	17	18	16	13	9	6	3	112
<b>Moora—</b>														
Temperature—														
Average max. °C	33.8	33.8	30.5	25.6	21.5	18.5	17.1	17.7	20.1	24.2	27.8	31.4	..	
Average min. °C	17.6	18.1	16.0	12.9	9.4	8.0	6.3	6.5	7.4	9.5	12.6	15.0	..	
Rainfall—														
Average (mm)		10	15	19	24	61	94	89	64	38	25	12	9	460
Wet days—														
Average number		2	2	3	6	10	14	16	14	10	8	4	2	91

Quairading Shire, while farm clearing and dam building has favoured some birds and waterfowl.

Increased attention to land care and conservation is seeing remnant vegetation protected and trees planted, moves which will transform the landscape and benefit native fauna.

### POPULATION AND EMPLOYMENT

The Division's population has grown steadily in recent years, reversing a long-standing pattern. Between 1986 and 1988, fourteen municipalities experienced growth while only six did so between the 1981 and the 1986 censuses.

**TABLE 25.2 – ESTIMATED RESIDENT POPULATION  
MIDLANDS STATISTICAL DIVISION  
AT 30 JUNE**

Statistical local area (a)	1981	1986	1988
Beverley (S)	1,550	1,502	1,477
Bruce Rock (S)	1,410	1,298	1,312
Chittering (S)	1,210	1,409	1,581
Cunderdin (S)	1,630	1,484	1,457
Dalwallinu (S)	1,900	1,779	1,812
Dandaragan (S)	1,790	2,128	2,383
Dowerin (S)	1,000	961	967
Gingin (S)	1,880	2,589	2,842
Goomalling (S)	1,270	1,206	1,174
Kellerberrin (S)	1,660	1,436	1,411
Koorda (S)	790	690	678
Merredin (S)	4,530	4,177	4,150
Moora (S)	3,100	2,828	2,802
Mount Marshall (S)	920	877	857
Mukinbudin (S)	880	855	805
Narembeen (S)	1,340	1,180	1,194
Northam (S)	2,590	2,451	2,591
Northam (T)	6,940	6,887	6,928
Nungarin (S)	350	313	328
Quairading (S)	1,300	1,243	1,264
Tammin (S)	590	550	547
Toodyay (S)	1,450	1,831	2,067
Trayning (S)	620	565	552
Victoria Plains (S)	1,330	1,243	1,220
Westonia (S)	450	484	528
Wongan-Ballidu (S)	2,090	1,922	1,902
Wyalkatchem (S)	950	786	742
Yilgarn (S)	2,150	2,039	2,227
York (S)	2,130	2,258	2,373
<b>Total division</b>	<b>49,800</b>	<b>48,971</b>	<b>50,171</b>

(a) Towns are marked (T), shires are marked (S).

Reasons for this growth are varied. In areas near Perth and along the coast, increased tourism, settlement by retired people and urban commuters, and the consequent growth of services have all contributed. All agricultural areas have benefited from improved prices and seasons during recent years and in the east of the Division, mining activity, particularly for gold, has contributed to strong growth.

Many of the reasons for the previous decline are still having an impact, especially on inland municipalities. Restructuring of the agricultural industries has reduced employment and led to decreased demand for private and public services, a trend exacerbated by better transport and communications.

Employment figures reflect these trends. Between 1981 and 1986 while most categories of employment showed a loss, the workforce engaged in fishing, mining and public administration grew, the latter reflecting the regionalisation of State public sector agencies.

**TABLE 25.3 – EMPLOYMENT  
MIDLANDS STATISTICAL DIVISION  
CENSUSES 1976, 1981 AND 1986**

Industry	1976	1981	1986(a)
Agriculture	10,794	8,988	8,247
Fishing	136	235	278
Mining	392	284	405
Manufacturing	986	854	692
Electricity, gas and water	494	512	432
Construction	1,212	733	816
Wholesale and retail trade	3,164	2,976	2,823
Transport and storage	1,174	1,256	1,130
Communications	396	314	297
Finance	578	566	649
Public administration, defence	525	840	908
Community services	2,187	2,514	2,388
Entertainment and recreation	854	893	871
Other and not stated	1,533	1,913	643
<b>Total</b>	<b>22,131</b>	<b>22,554</b>	<b>19,756</b>

(a) In 1986 the Census count fell in Western Australia's school holiday period, when many households were away from their usual place of residence.

Steady growth of both population and employment in western and south-western municipalities seems likely, while those further inland remain vulnerable to changes in the fortunes of agricultural and to a lesser extent mining industries.

### AGRICULTURE

Agriculture, and in particular wheat and wool production, has traditionally dominated the Division's economy. There is an increasing trend towards diversification into different types of crops and stock.

Generally, the variety of agricultural production is greater in the western parts of the division, and it includes lupin, hay and fodder production, fat lambs and cattle, and a developing market garden sector. The eastern area produces large quantities of premium wheat.

TABLE 25.4 - NUMBER OF AGRICULTURAL ESTABLISHMENTS AND TOTAL AREA BY STATISTICAL LOCAL AREA - MIDLANDS STATISTICAL DIVISION

Statistical local area (a)	1986-87		1987-88		1988-89	
	Number of establishments	Total area	Number of establishments	Total area	Number of establishments	Total area
		'000 ha		'000 ha		'000 ha
<b>Moore—</b>						
Chittering (S)	136	66.7	146	68.8	139	68.4
Dandaragan (S)	186	390.8	180	386.6	185	410.8
Gingin (S)	141	152.7	136	145.2	140	155.2
Moora (S)	158	454.0	157	350.3	145	353.6
Victoria Plains (S)	149	254.4	146	248.4	147	254.2
<b>Total Moore Subdivision</b>	<b>770</b>	<b>1,318.6</b>	<b>765</b>	<b>1,199.3</b>	<b>756</b>	<b>1,242.2</b>
<b>Avon—</b>						
Beverley (S)	157	169.6	150	165.6	153	170.5
Cunderdin (S)	109	192.5	102	192.9	102	191.9
Dalwallinu (S)	182	546.1	176	549.1	171	552.0
Dowerin (S)	113	170.6	109	173.9	105	170.7
Goomalling (S)	114	167.3	115	169.4	113	166.9
Koorda (S)	89	218.3	85	208.0	87	213.8
Northam (T) and (S)	162	104.7	154	103.7	162	106.7
Quairading (S)	102	205.4	101	200.0	101	202.4
Tammin (S)	59	114.8	61	117.4	58	116.5
Toodyay (S)	122	92.9	116	93.5	117	93.5
Wongan-Balidu (S)	144	338.0	138	336.4	136	339.9
Wyalkatchem (S)	76	137.1	72	133.5	68	136.6
York (S)	125	140.5	124	138.3	126	139.1
<b>Total Avon Subdivision</b>	<b>1,554</b>	<b>2,597.8</b>	<b>1,503</b>	<b>2,581.7</b>	<b>1,499</b>	<b>2,600.5</b>
<b>Campion—</b>						
Bruce Rock (S)	112	262.3	111	257.7	112	257.5
Kellerberrin (S)	98	178.0	102	179.3	101	178.0
Merredin (S)	127	300.6	126	309.5	128	306.2
Mount Marshall (S)	137	643.9	131	629.5	127	634.8
Mukinbudin (S)	93	292.6	85	269.1	83	281.4
Narembeen (S)	145	380.6	143	388.9	139	374.0
Nungarin (S)	34	103.5	34	96.5	39	100.6
Trayning (S)	69	141.7	64	137.8	62	136.8
Westonia (S)	63	208.5	61	209.4	61	223.4
Yilgarn (S)	151	773.7	145	773.9	141	778.3
<b>Total Campion Subdivision</b>	<b>1,029</b>	<b>3,285.4</b>	<b>1,002</b>	<b>3,251.6</b>	<b>993</b>	<b>3,271.0</b>
<b>Total division</b>	<b>3,353</b>	<b>7,201.8</b>	<b>3,270</b>	<b>7,032.6</b>	<b>3,248</b>	<b>7,113.8</b>

(a) Towns are marked (T), shires are marked (S).

While the number of agricultural establishments is declining, particularly in the larger wheatgrowing municipalities, the total area farmed has been reduced only marginally, as properties are amalgamated and bigger machinery is used.

Sharp variations in the gross value of agriculture commodities, reflect the uncertainties of an industry relying on world markets and climatic

conditions. The high figure for 1988-89 demonstrates the impact of buoyant wool prices as well as good returns for grain production. Current agricultural prices will most likely cause this figure to reduce sharply during the next one or two years.

These fluctuations have a measurable impact on many other parts of local economies as well.

TABLE 25.5 - GROSS VALUE OF AGRICULTURAL COMMODITIES PRODUCED (a)  
MIDLANDS STATISTICAL DIVISION : 1987-88  
(\$'000)

Statistical local area (b)	Crops and pastures			Livestock slaughterings and other disposals	Livestock products			Total agriculture
	Wheat	Other	Total		Wool	Other	Total	
Avon—								
Beverley (S)	5,156	4,474	9,630	2,945	20,098	65	20,163	32,738
Cunderdin (S)	14,615	7,155	21,770	1,905	9,538	32	9,569	33,244
Dalwallinu (S)	27,116	6,109	33,225	2,671	13,996	34	14,030	49,926
Dowerin (S)	12,244	5,177	17,421	1,564	8,532	20	8,552	27,536
Goomalling (S)	11,868	5,075	16,943	1,846	9,665	21	9,686	28,475
Koorda (S)	8,545	1,546	10,091	1,153	5,463	1	5,464	16,708
Northam (S) and (T)	3,979	3,261	7,240	3,132	9,829	95	9,924	20,296
Quairading (S)	14,017	4,375	18,392	2,378	12,546	4	12,550	33,319
Tammin (S)	9,355	2,898	12,253	890	5,711	19	5,730	18,873
Toodyay (S)	2,537	2,324	4,862	1,964	8,448	8	8,456	15,281
Wongan-Ballidu (S)	26,601	10,551	37,152	2,291	12,278	15	12,293	51,736
Wyalkatchem (S)	9,369	3,353	12,723	810	4,908	8	4,916	18,449
York (S)	4,602	3,915	8,517	2,788	13,817	237	14,053	25,358
<i>Total Avon</i>	<i>150,004</i>	<i>60,213</i>	<i>2,10,219</i>	<i>26,337</i>	<i>134,829</i>	<i>559</i>	<i>135,386</i>	<i>371,939</i>
Moore—								
Chittering (S)	839	3,426	4,265	3,133	4,300	211	4,511	11,908
Dandaragan (S)	3,114	6,276	9,390	7,899	27,326	69	27,395	44,684
Gingin (S)	85	10,399	10,483	6,922	4,726	219	4,945	22,351
Moora (S)	16,097	7,478	23,575	4,661	22,837	15	22,852	51,088
Victoria Plains (S)	15,879	6,835	22,714	4,412	17,876	5	17,881	45,007
<i>Total Moore</i>	<i>36,014</i>	<i>34,414</i>	<i>70,427</i>	<i>27,027</i>	<i>77,065</i>	<i>519</i>	<i>77,584</i>	<i>175,038</i>
Campion—								
Bruce Rock (S)	19,037	5,524	24,561	2,522	13,007	34	13,041	40,124
Kellerberrin (S)	11,977	3,823	15,801	1,952	7,484	16	7,500	25,252
Merredin (S)	14,393	3,196	17,589	2,790	9,145	56	9,201	29,580
Mount Marshall (S)	15,559	2,270	17,830	2,024	9,787	22	9,810	29,663
Mukinbudin (S)	9,693	891	10,583	1,760	5,594	41	5,635	17,979
Narembeen (S)	24,496	5,572	30,068	2,655	12,987	41	13,028	45,752
Nungarin (S)	4,314	423	4,737	859	2,200	3	2,204	7,799
Trayning (S)	7,381	1,997	9,379	1,125	4,457	15	4,471	14,975
Westonia (S)	8,636	1,029	9,665	1,024	3,923	4	3,927	14,616
Yilgarn (S)	21,710	3,014	24,724	2,103	10,104	14	10,118	36,945
<i>Total Campion</i>	<i>137,196</i>	<i>27,739</i>	<i>164,937</i>	<i>18,814</i>	<i>78,688</i>	<i>246</i>	<i>78,935</i>	<i>262,685</i>
<b>Total Division</b>	<b>323,215</b>	<b>122,366</b>	<b>445,581</b>	<b>72,177</b>	<b>290,578</b>	<b>1,326</b>	<b>291,904</b>	<b>809,661</b>

(a) Excludes beekeeping. (b) Towns are marked (T), shires are marked (S).

## FISHING

Coastal towns are important as bases for the State's rock lobster fishery. A licensing system ensures that the industry is a strictly controlled, limited entry fishery and over 95 per cent of the catch is exported, mainly to the United States and Japan.

There are six fish processors in the Division and the value of both fish and rock lobster production have risen since 1985-86, both in tonnage and in dollar value. The industry is likely to remain a major contributor to State export earnings.



TABLE 25.6 – ROCK LOBSTER AND FISH CATCH BY FISHING LOCALITY  
MIDLANDS STATISTICAL DIVISION

Fishing locality	Unit	1985-86		1986-87		1987-88	
		Fish	Rock Lobster	Fish	Rock Lobster	Fish	Rock Lobster
Cape Leschenault	Tonnes	-	132	-	104	-	170
Ledge Point	"	6	251	6	272	11	478
Lancelin	"	44	505	34	528	57	711
Wedge Island	"	6	88	17	110	24	163
Green Island	"	-	86	3	72	-	143
Cervantes	"	53	474	46	527	57	807
Jurien Bay	"	98	452	38	548	85	722
<i>Total Division—</i>							
Tonnes		207	1,988	144	2,161	234	3,194
Value	\$'000	237.3	24,497.3	193.8	33,448.5	361.3	51,189.8
<b>Western Australia</b>	<b>Tonnes</b>	<b>18,276</b>	<b>7,391</b>	<b>15,893</b>	<b>7,718</b>	<b>18,989</b>	<b>10,873</b>
Midlands as percentage of Western Australia (tonnage)		1.1	26.9	0.9	28.0	1.2	29.3

## MINING

Gold production in the east of the Division, particularly in the Shire of Yilgarn has, for much of the past decade, experienced considerable expansion in a climate of favourable gold prices. Production levels in 1988-89 increased substantially and caused local population growth. Most mines in this area are relatively small employing less the fifty people.

Recent mining developments have occurred on the coastal plain, including mineral sand extraction at Cooljarloo and plans to develop a large coal field at Hill River. Exploration for hydrocarbons is also taking place.

Stone and clay are quarried in several places and a mine near Moora supplies a silicon smelter located to the south of the Division. Other mineral occurrences have been identified throughout the Division.

TABLE 25.7 – PRODUCTION OF GOLD  
MIDLANDS STATISTICAL DIVISION  
Source: Department of Mines, Western Australia

Year	Unit	1986-87	1987-88	1988-89
Production	kg	6,790.3	6,771.9	9,359.5
Value	\$m	136.0	137.9	157.1

## MANUFACTURING AND PROCESSING

Most manufacturing and processing establishments are of small or medium scale and cater for local needs such as specialised farming equipment. Exceptions include brickworks, a foundry at Wundowie which manufactures wood stoves, and major farm implement manufacturing at Merredin.

Processing operations include abattoirs, a flour mill, stockfood production and a newly commissioned rutilite plant. A paper pulp mill which uses crop stubble is being constructed near Moora.

The turnover figure for this sector is, however, small when compared with the agriculture and fishing industries. Some communities are making positive efforts to attract new value adding industries.

TABLE 25.8 – MANUFACTURING  
ESTABLISHMENTS AND TURNOVER  
MIDLAND STATISTICAL DIVISION: 1987-88

	Establishments employing	
	Fewer than 4 persons	4 or more persons
Number of establishments	32	54
Persons employed (a)	94	665
Turnover (\$m)	5.0	79.7

(a) Includes working proprietors and partners.

## BUILDING AND CONSTRUCTION

Building and construction activities have experienced a resurgence during the past two years following a period of modest decline during the middle of the decade. Impetus for this has been provided by residential demand in western parts, mine construction in the goldfields and increased farm investment. There are small building companies and skilled tradespersons throughout the Division, however much of the work is done by Perth-based contractors.

## COMMERCE

Wholesaling and retailing activities are, for the most part, small scale operations and characteristically a single business may serve a variety of functions. In larger towns there is more specialisation, with more extensive shopping centres in Northam and Merredin.

The hospitality industry is undergoing change and expansion. Country hotels remain an important social focus, but tourism and increasing local sophistication are promoting new and more diverse accommodation and restaurant provision.

The number of firms providing finance, property, and business services is increasing, as a result of population growth and investor interest in property and a greater awareness of the importance of management efficiency. An assortment of new bank buildings and new and improved small office accommodation throughout the Division are evidence of growth.

**TABLE 25.9 - WHOLESALE AND RETAIL TRADE ESTABLISHMENTS IN THE MIDLANDS STATISTICAL DIVISION JULY 1989**

Wholesale trade—	
Builders and hardware dealers	23
Machinery and equipment	101
Mineral, metal and chemical wholesalers	42
Farm property and produce dealers	58
Food, drink and tobacco wholesalers	10
<i>Total wholesales trade</i>	238
Retail trade—	
Department and general stores	6
Clothing, fabric and furniture stores	52
Household appliances and hardware stores	44
Motor vehicle dealers, petrol and tyres	183
Food stores	199
Other retailers	89
<i>Total retail trade</i>	574
<b>Total wholesale and retail trade</b>	<b>812</b>

## SERVICES AND INFRASTRUCTURE

Private and public infrastructure is generally well developed and accessible throughout the Division, especially in the longer established areas.

Electricity from the State Energy Commission (SECWA) grid reaches all parts of the Division. Water from the Goldfields and Agricultural Scheme is available in many areas and adequate local supplies are available to most communities not served by this scheme.

The national telecommunications network is universally accessible and the Australian Broadcasting Service's national television and regional radio networks reach all communities. One commercial television station (GWN) is received throughout the Division and there are two local radio stations (6AM Northam and 6MD Merredin).

Sealed roads link all towns and transport services include many private road carriers and a railway bulk freight service in agricultural areas. Road and rail links from Perth to the Eastern States and both highways to the State's North-West pass through the region. Most municipalities maintain airstrips suitable for light aircraft.

Education from government and some non-government schools to Year 10 is widely available throughout the region and to Year 12 in four towns. Northam, Moora and Merredin provide hostel accommodation for school students. Technical and Further Education (TAFE) which includes post-secondary, academic, vocational and recreational courses is also available in many communities and from centres at Northam and Kellerberrin.

Health services include a Regional Hospital at Northam which provides a range of paramedical and visiting specialist services, small hospitals in many towns and private medical practitioners in some communities.

Many community services ranging from welfare and emergency assistance to firefighting and ambulance services, rely, at least partially, on local voluntary efforts. State Government services are improving in range and efficiency with regionalisation of the public sector.

### **SMALL BUSINESS**

Small business predominates in almost every economic sector, from manufacturing and cottage crafts to transport and retailing. It has proven its adaptability and versatility in dealing with economic fluctuations, servicing the small communities and dispersed populations and adapting to new opportunities.

Local communities, with government assistance, are developing schemes to encourage and support small business growth. Low establishment and overhead costs, along with community support, provide added incentive for small business in the Division.

### **TOURISM**

Tourism and recreational visits are assuming increased importance to many communities in the Division. Visits are most often short, specific-purpose excursions (of one or two days duration) or are part of a longer journey travelling though the Division and to intra- and interstate destinations.

Attractions include: heritage buildings in scenic surroundings at places such as York, Toodyay, New Norcia and the Berkshire Valley settlement; natural landscapes in the Avon Valley; the weird limestone formations of the Pinnacles; the wildflower-rich northern sandplains and beachside holidays and windsurfing on the coast.

The variety and quality of establishments and events which attract and cater for visitors is increasing. Gliding, ballooning and excursions on camels or steamtrains bring people from the Perth metropolitan area. Major arts and cultural festivals also draw large crowds to the Avon Valley. Events such as the Avon Descent, a white water boat race, and international car rallying add to tourist appeal.

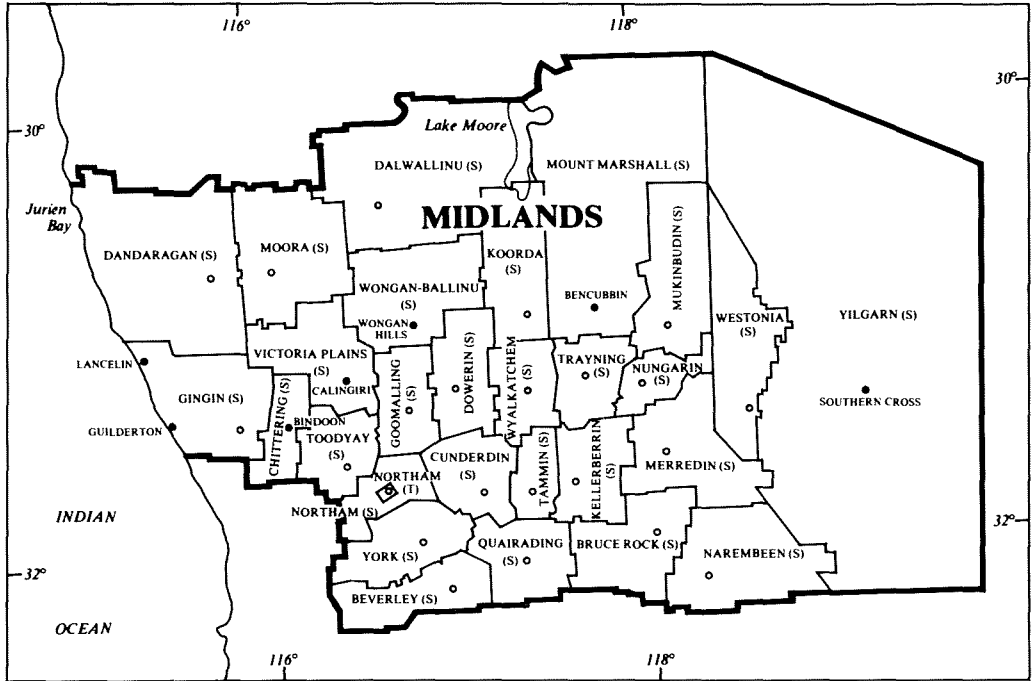
### **THE FUTURE**

Continued expansion of both the population and the economy of the Midlands Division seems assured as a result of its proximity to Perth and a strong commitment to innovative production.

Local governments are playing a leading role in community efforts to revitalise their local economies through initiatives such as townscape improvements, forming development foundations to attract investment and making agreements between municipalities for united action.

The Department of Regional Development and the North West, which has an office in Northam, is a Western Australian government agency which works with local people and all three levels of government, to promote economic and social development in the Division. It supports research to identify development opportunities and helps coordinate action to realise them.

DIAGRAM 25.1  
MIDLANDS STATISTICAL DIVISION



## Chapter 26

### STATISTICAL SUMMARY

In the following pages, a historical summary of some of the more important statistics relating to Western Australia is shown. This is intended to present a general picture of the development of the State. Naturally the range of statistics available in the early years of the colony is limited. Also it is not always possible to achieve perfect comparability over long periods of time because of changes in definitions, scope of statistical collections etc. While major breaks in series are shown minor changes are not shown and the statistics should be interpreted with this in mind. Generally, the first year shown on each page is the earliest for which any series on that page is available. Because of space constraints, data for earlier years are shown at ten year intervals only. The pages have been arranged in chapter order.

## ESTIMATED POPULATION, NATURAL INCREASE AND MIGRATION (a)

NOTE: Figures above the double lines exclude full-blood Aborigines; those below the double lines refer to total population, i.e. including Aborigines.

Year	Population at 31 December (b)			Population increase (c)				Mean population (b)		Population of Perth Statistical Division (b) (d)
				Recorded natural increase (e)	Estimated net migration (f)	Total increase (g)		Year ended		
	Males	Females	Persons			Number	Per cent (h)	30 June	December 31	
1829	769	234	1,003	n.a.	n.a.	n.a.	n.a.			
1830	877	295	1,172	n.a.	n.a.	169	16.85		n.a.	
1840	1,434	877	2,311	34	123	157	7.29			
1850	3,576	2,310	5,886	132	1,109	1,241	26.72			n.a.
1860	9,597	5,749	15,346	379	130	509	3.43	n.a.	15,092	
1870	15,511	9,624	25,135	475	7	482	1.96		24,894	
1880	16,985	12,576	29,561	551	-129	422	1.45		29,350	
1890	28,854	19,648	48,502	1,021	1,821	2,842	6.22		47,081	20
1900	110,088	69,879	179,967	3,214	6,495	9,709	5.70		175,113	73
1910	157,971	118,861	276,832	4,845	6,312	11,157	4.20	266,686	271,019	115.7
1920	176,895	154,428	331,323	4,761	-1,298	3,463	1.06	327,152	330,023	167.0
1930	232,868	198,742	431,610	5,426	-453	4,973	1.17	425,785	429,079	235.1
1940	248,734	225,342	474,076	4,598	-2,902	1,696	0.36	472,060	473,397	255.5
1950	294,758	277,891	572,649	9,170	19,295	28,465	5.23	545,134	557,878	351.7
1951	304,454	285,885	590,339	9,506	8,184	17,690	3.09	570,346	580,317	362.8
1952	316,700	296,235	612,935	10,204	12,392	22,596	3.83	589,887	600,615	378.1
1953	326,372	305,371	631,743	10,790	8,018	18,808	3.07	611,191	621,034	390.1
1954	334,342	314,365	648,707	10,564	6,400	16,964	2.69	630,705	639,963	402.2
1955	343,838	324,771	668,609	11,244	8,658	19,902	3.07	648,222	657,323	416.8
1956	350,333	330,935	681,268	11,344	1,315	12,659	1.89	666,898	674,459	427.4
1957	356,195	339,039	695,234	11,627	2,339	13,966	2.05	680,949	687,448	438.9
1958	361,441	345,755	707,196	11,177	785	11,962	1.72	693,568	699,915	449.3
1959	366,253	352,438	718,691	11,614	-119	11,495	1.63	705,869	711,737	459.5
1960	372,665	358,368	731,033	11,229	1,113	12,342	1.72	717,316	722,900	470.3
1961	384,773	370,440	755,213	11,349	2,571	13,920	1.90	729,770	737,596	482.7
1962	395,891	381,357	777,248	11,254	10,499	22,035	2.92	755,770	766,205	500.3
1963	407,024	391,871	798,895	11,314	10,068	21,647	2.79	777,413	788,457	517.8
1964	417,023	401,098	818,121	10,256	8,705	19,226	2.41	798,824	808,300	534.0
1965	427,330	410,918	838,248	9,912	9,963	20,127	2.46	817,157	826,481	550.9
1966	440,913	423,180	864,093	10,292	15,553	25,845	3.08	837,290	849,189	571.8
1967	458,438	438,550	896,988	11,244	21,651	32,895	3.81	863,539	879,815	597.7
1968	479,938	457,862	937,800	12,073	28,739	40,812	4.55	896,761	915,757	629.2
1969	500,378	476,242	976,620	13,404	25,416	38,820	4.14	935,985	955,660	659.7
1970	520,174	493,878	1,014,052	14,075	23,357	37,432	3.83	975,063	994,201	689.6
1971	547,563	522,784	1,070,347	16,433	16,352	33,033	3.26	1,013,455	1,052,785	733.0
1972	558,030	534,574	1,092,604	14,780	7,875	22,257	2.08	1,068,972	1,081,634	753.5
1973	568,500	545,482	1,113,982	12,700	8,910	21,378	1.96	1,091,845	1,101,921	773.6
1974	584,552	563,441	1,145,991	12,506	19,700	32,009	2.87	1,113,723	1,127,887	801.4
1975	594,518	572,885	1,167,403	12,411	9,410	21,412	1.87	1,142,777	1,155,499	822.1
1976	605,932	585,748	1,191,680	12,972	10,921	24,277	2.08	1,166,902	1,178,928	842.5
1977	618,210	599,006	1,217,216	12,815	11,392	25,536	2.14	1,191,588	1,204,454	861.1
1978	627,238	609,163	1,236,401	12,880	4,980	19,185	1.58	1,217,062	1,227,903	875.3
1979	636,442	620,650	1,257,092	12,499	6,847	20,691	1.67	1,237,090	1,246,800	890.6
1980	648,922	634,583	1,283,505	12,505	12,627	26,413	2.10	1,257,214	1,269,270	910.0
1981	667,381	652,840	1,320,221	13,905	20,858	36,716	2.86	1,284,014	1,301,528	937.7
1982	684,771	670,200	1,354,971	14,060	17,640	34,750	2.63	1,320,278	1,338,681	965.3
1983	697,570	683,441	1,381,011	14,718	8,126	26,040	1.92	1,354,814	1,368,546	986.8
1984	708,066	694,966	1,403,032	13,123	5,586	22,021	1.59	1,380,566	1,391,775	1,005.5
1985	724,952	711,948	1,436,900	14,272	16,304	33,868	2.41	1,404,053	1,419,004	1,032.9
1986	746,560	732,919	1,479,479	14,929	25,569	42,579	2.96	1,437,490	1,458,526	1,066.7
1987 r	767,648	752,659	1,520,307	14,452	26,376	40,828	2.76	1,479,779	1,500,057	1,099.4
1988 p	792,296	776,405	1,568,701	15,728	32,666	48,394	3.18	1,522,066	1,545,251	1,137.8

(a) Estimates for years prior to 1987 are based on final census results; those for 1987 are subject to revision. (b) Figures for 1971 and later refer to the estimated resident population. (c) Minus sign (—) denotes decrease. Figures prior to 1972 are on a State of registration basis; those for 1972 and later are on the basis of State of usual residence. (d) At 31 December. (e) Excess of births registered over deaths registered, including deaths of defence personnel, whether in Australia or overseas, between September 1939 and June 1947. (f) Interstate and overseas. (g) For the years 1972 to 1986 differences between the sum of natural increase and net migration, and total increase, are owing to distribution of intercensal discrepancy. (h) The rates represent total increase in population during the year expressed as a proportion per cent of the population at the end of the previous year.

VITAL STATISTICS

NOTE: Figures for 1965 and earlier (i.e. those above the double lines) exclude full-blood Aborigines; later figures refer to total population, i.e. including Aborigines.

Year	Marriages registered	Divorces (b)	Live births registered (c)	Deaths registered (c)(d)	Natural increase (c)(e)	Rate per 1,000 of mean population (a)				Infant mortality	
						Marriages	Births	Deaths (c)(d)	Natural increase (c)(d)	Number (c)(f)	Rate (c)(g)
1840	25		54	20	34	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1850	37		186	54	132	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1860	151		588	209	379	10.01	38.96	13.18	25.11	n.a.	n.a.
1870	153		853	378	475	6.15	34.27	15.18	19.08	100	117.23
1880	214		933	382	551	7.29	31.79	13.02	18.77	72	77.17
1890	278		1,561	540	1,021	5.90	33.16	11.47	21.69	140	89.69
1900	1,781		5,454	2,240	3,214	10.17	31.15	12.79	18.35	688	126.15
1910	2,107		7,585	2,740	4,845	7.77	27.99	10.11	17.88	593	78.18
1920	2,932		8,149	3,388	4,761	8.88	24.69	10.27	14.42	538	66.02
1930	3,205	n.a.	9,200	3,774	5,426	7.47	21.44	8.80	12.64	430	46.74
1940	5,234		9,121	4,486	4,635	11.06	19.27	9.48	9.79	403	44.18
1941	5,077		10,118	4,769	5,349	10.71	21.35	10.06	11.29	357	35.28
1942	5,441		9,901	5,076	4,825	11.42	20.77	10.65	10.12	365	36.86
1943	4,528		10,481	4,587	5,894	9.50	21.98	9.62	12.36	342	32.63
1944	4,506		10,870	4,478	6,392	9.36	22.58	9.30	13.28	354	32.57
1945	3,788		10,672	4,712	5,960	7.77	21.89	9.67	12.23	315	29.52
1946	5,171	725	12,105	4,753	7,352	10.49	24.57	9.65	14.92	376	31.06
1947	5,282	807	12,874	4,723	8,151	10.50	25.60	9.39	16.21	398	30.92
1948	5,186	696	12,931	4,685	8,246	10.08	25.13	9.10	16.02	331	25.60
1949	4,951	566	13,511	4,790	8,721	9.30	25.37	8.99	16.37	357	26.42
1950	5,434	720	14,228	5,058	9,170	9.74	25.50	9.07	16.44	386	27.13
1951	5,390	682	14,794	5,288	9,506	9.29	25.49	9.11	16.38	425	28.73
1952	5,389	585	15,413	5,209	10,204	8.97	25.66	8.67	16.99	384	24.98
1953	5,032	535	15,862	5,072	10,790	8.10	25.54	8.17	17.37	378	23.83
1954	5,204	530	15,928	5,364	10,564	8.13	24.89	8.38	16.51	359	22.54
1955	5,145	479	16,623	5,379	11,244	7.83	25.29	8.18	17.11	373	22.44
1956	5,080	544	16,916	5,572	11,344	7.53	25.08	8.26	16.82	384	22.70
1957	4,897	541	16,924	5,297	11,627	7.12	24.62	7.71	16.91	357	21.09
1958	5,038	536	16,731	5,554	11,177	7.20	23.90	7.94	15.97	360	21.52
1959	5,387	584	17,111	5,497	11,614	7.57	24.04	7.72	16.32	345	20.16
1960	5,323	540	16,926	5,697	11,229	7.36	23.41	7.88	15.53	366	21.62
1961	5,150	466	17,078	5,729	11,349	6.98	23.15	7.77	15.39	336	19.67
1962	5,466	582	17,064	5,810	11,254	7.23	22.58	7.69	14.89	380	22.27
1963	5,755	553	17,290	5,976	11,314	7.40	22.23	7.68	14.55	353	20.42
1964	6,023	542	16,685	6,429	10,256	7.55	20.93	8.06	12.86	328	19.66
1965	6,448	604	16,186	6,274	9,912	7.91	19.85	7.70	12.16	351	21.68
1966	7,002	637	17,194	6,902	10,292	8.25	20.25	8.13	12.12	343	19.95
1967	7,430	726	18,023	6,779	11,244	8.44	20.48	7.71	12.78	314	17.42
1968	8,086	812	19,541	7,468	12,073	8.83	21.34	8.16	13.18	398	20.37
1969	8,993	872	20,754	7,350	13,404	9.41	21.72	7.69	14.03	453	21.83
1970	9,227	889	21,618	7,543	14,075	9.28	21.74	7.59	14.16	459	21.23
1971	9,382	1,064	24,239	7,806	16,433	8.91	23.02	7.41	15.61	464	19.14
1972	9,120	1,243	22,177	7,441	14,736	8.43	20.50	6.88	13.62	348	15.69
1973	9,102	1,424	20,510	7,845	12,665	8.26	18.61	7.12	11.49	394	19.21
1974	9,295	1,761	20,207	7,778	12,429	8.24	17.92	6.90	11.02	327	16.18
1975	9,026	2,240	20,338	7,972	12,366	7.81	17.60	6.90	10.70	271	13.32
1976	9,517	4,818	20,670	7,740	12,930	8.07	17.53	6.57	10.97	273	13.21
1977	10,063	3,975	20,651	7,899	12,752	8.35	17.15	6.56	10.59	251	12.15
1978	9,404	3,387	20,611	7,794	12,817	7.66	16.79	6.35	10.44	230	11.16
1979	9,239	3,397	20,469	8,020	12,449	7.41	16.42	6.43	9.98	247	12.07
1980	9,594	3,073	20,607	8,166	12,441	7.56	16.24	6.43	9.80	239	11.60
1981	10,111	3,481	21,877	7,993	13,884	7.77	16.81	6.14	10.67	193	8.82
1982	10,455	3,842	22,236	8,187	14,049	7.81	16.61	6.15	10.49	204	9.17
1983	10,519	3,822	23,087	8,369	14,718	7.69	16.87	6.12	10.75	179	7.75
1984	9,920	4,069	21,625	8,503	r13,123	7.13	15.54	6.11	9.43	232	10.72
1985	10,398	4,039	23,109	8,836	r14,272	7.33	16.29	6.23	10.06	209	9.04
1986	10,379	4,001	24,236	9,307	14,929	7.12	16.62	6.38	10.24	214	8.83
1987	10,150	4,044	23,332	8,880	14,452	6.77	15.55	5.92	9.63	196	8.40
1988	10,578	3,964	25,143	9,532	15,728	6.85	16.27	6.17	10.18	214	8.51

(a) Rates for 1971 and later are based on the estimated resident population. Rates for years prior to 1982 are based on final census results. (b) Final orders - dissolution of marriages. (c) Births, deaths and natural increase figures for 1982 and earlier years are on a State of registration basis. Figures for 1983 and later are based on State of usual residence. (d) Excludes deaths of defence personnel, whether in Australia or overseas, between September 1939 and June 1947. (e) Excess of live births registered over deaths registered. (f) Deaths under 1 year of age; included in deaths registered. (g) Per 1,000 live births.

## SOCIAL SERVICE BENEFICIARIES AND REPATRIATION PENSIONS: WESTERN AUSTRALIA

Year ended 30 June	Social service benefits											
	Pensioners (a)			Family allowance (a) (b)				Un- employ- ment benefit (h)	Repatriation pensions			
	Age (c)(d)	Invalid (c)(d)	Total Age and Invalid	Under 16 years of age (e)(f)		Students (g)	Total		Disability		Service	
				Widow	Total			Number (a)(i)	Amount paid \$'000	Number (a)(j)	Amount paid \$'000	
1910	2,361	..	2,361						n.a.	n.a.	n.a.	n.a.
1920	4,791	1,788	6,579						22,311	1,087	n.a.	n.a.
1930	8,913	3,284	12,197				n.a.		28,407	1,586	n.a.	n.a.
1940	19,024	3,454	22,478	n.a.	n.a.				21,449	1,370	1,489	103
1941	19,423	3,425	22,848					n.a.	20,388	1,343	1,545	112
1942	19,156	3,557	22,713		68,533		68,533		19,757	1,337	1,561	129
1943	18,575	3,580	22,155	2,596	65,777		65,777		20,245	1,506	1,454	147
1944	18,109	3,443	21,552	2,796	66,938		66,938		22,511	1,884	1,369	144
1945	17,713	3,414	21,127	2,894	68,316		68,316		27,686	2,105	1,343	144
1946	18,797	3,538	22,335	2,870	69,325		69,325	422	37,921	2,530	1,403	173
1947	21,162	4,002	25,164	2,570	71,968		71,968	1,095	42,127	2,856	1,580	192
1948	22,210	4,387	26,597	2,719	75,186		75,186	409	44,818	3,000	1,715	290
1949	23,739	4,340	28,079	2,876	79,693		79,693	126	46,785	3,516	1,832	301
1950	24,316	4,294	28,610	2,883	133,557	n.a.	133,557	267	48,878	3,776	1,953	331
1951	24,317	4,184	28,501	2,789	172,186		172,186	60	51,027	4,545	2,022	369
1952	24,782	3,964	28,746	2,676	183,257		183,257	57	52,071	5,429	2,136	449
1953	25,679	3,996	29,675	2,686	192,991		192,991	844	52,607	5,843	2,343	556
1954	27,248	4,101	31,349	2,753	202,098		202,098	427	53,532	6,174	2,468	605
1955	28,833	4,191	33,024	2,848	212,025		212,025	157	54,117	6,877	2,692	723
1956	30,244	4,425	34,669	3,015	220,792		220,792	473	54,427	6,902	3,648	964
1957	32,192	5,039	37,231	3,243	230,922		230,922	1,940	54,987	7,169	4,306	1,095
1958	33,124	5,519	38,643	3,542	237,732		237,732	2,330	55,251	8,017	4,672	1,395
1959	34,629	5,941	40,570	3,833	245,090		245,090	2,852	56,008	7,893	5,009	1,552
1960	36,575	6,152	42,727	4,039	250,449		250,449	2,512	56,644	8,471	5,344	1,751
1961	37,656	6,945	44,601	4,348	257,037		257,037	2,154	57,123	9,310	6,101	2,102
1962	39,104	7,826	46,930	4,570	266,067		266,067	2,932	57,947	10,177	7,115	2,687
1963	40,661	8,170	48,831	4,486	270,736		270,736	2,674	57,580	10,527	7,526	2,927
1964	41,819	8,306	50,125	4,734	275,910	7,865	283,775	2,677	57,047	11,564	7,754	3,177
1965	42,706	8,615	51,321	4,926	279,642	8,844	288,486	1,679	55,920	11,447	7,780	3,320
1966	43,876	8,575	52,451	5,071	286,534	8,769	295,303	785	54,560	12,637	7,757	3,571
1967	45,741	8,307	54,048	5,228	295,628	10,697	306,325	718	52,967	11,889	7,674	3,612
1968	48,850	8,310	57,160	5,482	306,492	10,999	317,491	608	51,193	11,934	7,586	3,777
1969	50,432	8,413	58,845	5,559	318,147	11,446	329,593	524	49,526	13,061	7,298	4,071
1970	56,017	7,933	63,950	6,086	322,058	11,539	333,597	474	47,993	12,811	7,783	4,491
1971	58,224	8,155	66,379	6,392	333,848	13,737	347,585	872	46,514	13,140	7,767	4,769
1972	60,523	8,485	69,008	6,795	343,455	15,452	358,907	2,808	45,079	14,413	7,864	5,298
1973	68,701	9,518	78,219	7,948	346,769	17,821	364,590	4,960	44,093	15,462	9,599	7,394
1974	76,124	10,406	86,530	8,763	343,404	17,585	360,989	2,863	42,807	17,363	10,669	10,191
1975	79,831	10,961	90,792	9,442	349,702	18,924	368,626	9,317	41,747	21,845	11,814	15,149
1976	84,087	12,265	96,352	10,027	352,998	20,151	373,149	13,598	40,619	23,118	13,472	20,560
1977	86,470	13,263	99,733	10,691			376,346	15,706	39,459	25,587	15,338	26,933
1978	94,491	13,653	108,144	11,494			377,545	20,470	38,053	28,728	16,975	33,785
1979	96,558	15,045	111,603	12,232			371,315 (k)	29,000	36,883	28,183	18,794	38,896
1980	98,887	15,894	114,781	12,476			375,013 (k)	29,800	35,857	29,097	21,131	45,911
1981	101,042	16,352	117,394	12,526			377,113	28,638	34,920	33,411	23,704	59,328
1982	103,397	17,195	120,592	12,654	n.a.	n.a.	385,708	31,636	34,696	35,597	26,121	69,549
1983	105,784	18,598	124,382	12,830			391,885	50,992	34,726	44,394	29,346	90,417
1984	103,889	21,124	125,013	12,934			393,952 (k)	59,400	34,808	49,981	32,640	110,663
1985	102,943	23,889	126,832	12,977			396,851 (k)	57,900	34,952	58,502	34,815	127,841
1986	103,085	25,769	128,854	12,817			388,251 (k)	54,358	35,223	67,345	36,423	144,009
1987	103,339	27,886	131,225	12,647			388,360	56,441	31,760	72,596	36,532	155,389
1988	103,743	28,522	132,265	11,898			367,107	46,091	31,362	80,593	36,798	179,711
1989	104,816	29,706	134,522	6,901	352,405	14,085	366,490	35,621	30,761	84,091	36,246	184,171

(a) Number at 30 June. (b) Previously child and student endowment. Name of benefit, rates and conditions changed from 15 June 1976. (c) Prior to June 1957 excludes pensioners in benevolent homes. (d) At 30 June 1940 invalid pensioners who qualified were reclassified as age pensioners. (e) Prior to 30 June 1957 excludes endowed children in institutions. (f) Child endowment commenced 1 July 1941 for second and subsequent children. From 20 June 1950 endowment extended to include first or only children. (g) From 14 January 1964 includes students aged 16 and under 21; extended to 25 years in 1976. (h) Average number of persons on benefit at end of each week. (i) Includes pensions paid to incapacitated veterans and to dependants of incapacitated or deceased veterans. (j) Comprises pensions paid to veterans and their dependants. (k) Estimated.



NATIONAL WELFARE FUND: EXPENDITURE IN WESTERN AUSTRALIA

NOTE: The National Welfare Fund was established, with effect from 1 July 1943, in terms of the *National Welfare Fund Act 1943*. During the first two years of operation, only maternity allowances and funeral benefits were paid from the Fund. Under the provisions of the *National Welfare Fund Act 1945*, effective from 1 July 1945, expenditure on age pensions (introduced in 1909), invalid pensions (1910), widows' pensions (1942), and child endowment (1941) became a charge on the Fund. Unemployment, sickness, and special benefits came into operation on 1 July 1945. Hospital benefit was first paid in 1945-46 (for public hospitals from 1 January 1946, and private hospitals from 18 February 1946).

(\$'000)

Year ended 30 June	Social services					Health services					Total expenditure on health services (b)	Total expenditure from National Welfare Fund (c)
	Pensions		Child endowment (a)	Unemployment, sickness, and special benefits	Total expenditure on social services	Hospital and nursing home benefits	Medical benefits	Pharmaceutical benefits	Tuberculosis campaign (a)	Milk for school children		
	Age and invalid	Widows'										
1960	19,833	1,827	9,720	1,504	33,652	3,351	2,241	3,178	1,163	458	10,427	44,079
1961	21,586	2,104	11,402	1,309	37,180	3,817	2,339	3,630	1,111	448	11,386	48,812
1962	24,344	2,371	10,205	1,887	39,575	3,996	2,455	4,809	873	526	12,695	52,270
1963	25,582	2,377	10,485	2,006	41,203	4,189	2,657	5,161	885	584	13,501	54,705
1964	27,373	3,115	12,994	1,978	46,223	4,705	2,808	5,242	839	615	14,238	60,460
1965	29,413	3,463	13,406	1,401	48,450	4,987	3,716	5,294	822	637	15,486	64,635
1966	30,760	3,602	13,624	872	49,648	5,286	4,345	5,870	758	619	16,906	67,316
1967	33,794	4,011	15,498	855	55,001	5,881	4,944	6,719	600	698	18,998	74,666
1968	36,418	4,346	14,845	758	57,295	6,598	5,265	7,117	862	850	20,860	78,894
1969	39,404	4,786	15,540	795	61,729	7,401	5,600	8,702	645	797	23,340	85,828
1970	44,637	5,600	17,894	1,039	70,725	9,153	6,373	9,836	828	797	27,262	98,577
1971	48,979	6,172	16,423	1,699	75,279	10,256	9,782	11,215	800	835	33,246	109,216
1972	57,374	7,180	18,188	4,298	89,623	14,492	13,800	12,418	907	997	43,032	133,770
1973	76,188	10,064	21,407	8,372	119,622	19,062	15,958	13,258	824	1,086	50,827	171,763
1974	98,011	13,409	19,009	8,314	147,040	21,222	16,478	16,153	803	596	56,535	205,778
1975	138,812	18,459	19,085	24,944	213,981	25,758	19,437	19,830	1,023	..	68,542	284,016

(a) Comprises amounts paid to individuals in the form of allowances and to the State Government as reimbursements for expenditure incurred in the provision and maintenance of facilities. (b) Excludes some relatively minor expenditure not allocable among States. (c) See footnote (b).

NOTE: This series has been replaced by 'Commonwealth Government Cash Benefits to or for Persons in Western Australia'.

COMMONWEALTH GOVERNMENT CASH BENEFITS TO OR FOR PERSONS IN WESTERN AUSTRALIA

NOTE: This series replaced 'National Welfare Fund: Expenditure in Western Australia' (\$'000)

Year ended 30 June	Health services and benefits				Social security and welfare benefits						Total cash benefits	
	Hospital and institutional	Clinical and non-institutional and public health	Pharmaceutical	Total	Ex-service men and dependants	Age pensions	Unemployment and sickness benefits	Sole parent, family and child n.e.c.	Other	Total		Other services
1979	24,290	37,342	18,287	79,919	67,067	238,241	90,042	111,464	94,177	600,991	28,770	709,680
1980	27,771	42,135	18,717	88,623	74,995	258,650	96,078	117,148	108,903	655,774	28,631	773,028
1981	37,095	48,754	22,138	107,987	92,714	290,394	98,604	128,446	126,817	736,975	32,231	877,193
1982	46,954	58,881	28,497	134,332	105,147	334,791	125,389	156,684	146,891	868,902	36,690	1,039,924
1983	54,954	71,699	33,122	159,775	134,811	364,234	224,646	199,396	169,662	1,092,749	42,512	1,295,036
1984	42,164	114,152	35,673	191,989	160,665	400,380	294,750	234,797	192,544	1,283,136	55,175	1,530,300
1985	51,700	176,200	49,200	277,100	186,200	428,500	310,500	256,600	227,600	1,409,400	53,800	1,740,300
1986	60,600	200,900	53,900	315,400	211,700	450,200	317,500	281,500	255,600	1,516,500	59,500	1,891,400
1987	64,200	235,100	55,900	355,200	228,000	478,300	357,100	282,700	280,900	1,627,000	78,500	2,060,700
1988	91,400	353,500	71,100	416,000	260,800	537,700	332,500	314,100	317,100	1,762,200	85,900	2,264,100

## LIVESTOCK; WOOL PRODUCTION; AGRICULTURE

Year(a)	Area and production of principal grain crops (b)								
	Livestock (c)			Wool production (d)		Wheat			
						Production			Gross value
	Cattle	Sheep	Pigs	Quantity	Gross value (e)	Area	Yield per hectare	Total	
'000	'000	'000	tonnes	\$'000	'000 hectares	tonnes	'000 tonnes	\$'000	
1829	—	1	—	n.a.		n.a.	n.a.	n.a.	
1830	1	8	—	n.a.			n.a.	n.a.	
1840	2	31	2	n.a.		1	1.11	1	
1850	13	128	3	n.a.		2	n.a.	n.a.	n.a.
1860	32	260	11	298	n.a.	6	1.00	6	
1870	45	609	13	811		11	0.79	9	
1880	64	1,232	24	1,970		11	0.62	7	
1890	131	2,525	29	3,161		14	0.92	13	
1900	339	2,434	62	4,323		30	0.70	21	310
1910	825	5,159	58	13,210	2,141	236	0.68	161	2,162
1920	850	6,533	61	18,947	4,552	516	0.65	333	11,023
1930	813	9,883	101	32,451	4,829	1,601	0.91	1,456	12,201
1940	789	9,516	218	32,362	7,889	1,062	0.54	573	8,648
1950	865	10,923	79	42,071	47,237	1,171	0.89	1,048	51,339
1951	841	11,362	90	46,680	118,068	1,289	1.05	1,358	65,328
1952	852	12,188	86	52,681	64,027	1,253	0.87	1,089	58,984
1953	846	12,475	76	54,760	75,121	1,214	0.80	965	55,194
1954	830	13,087	101	58,497	82,567	1,168	0.93	1,030	55,423
1955	861	13,411	107	56,324	67,985	1,206	0.77	933	43,655
1956	897	14,128	99	67,932	69,642	1,170	1.24	1,449	68,840
1957	957	14,887	140	67,301	90,283	1,119	0.78	874	44,055
1958	997	15,724	151	68,504	75,228	1,197	0.75	901	45,912
1959	1,000	16,215	115	71,376	59,407	1,332	1.18	1,569	77,639
1960	1,030	16,412	131	72,979	75,302	1,505	1.06	1,597	82,361
1961	1,100	17,151	176	82,652	73,863	1,627	1.07	1,739	92,290
1962	1,218	18,314	174	83,159	79,283	1,773	1.01	1,788	100,023
1963	1,298	18,727	131	80,366	80,071	1,944	1.01	1,973	107,023
1964	1,299	20,165	128	95,053	116,331	1,878	0.76	1,424	74,389
1965	1,258	22,392	137	91,170	93,275	2,085	0.82	1,717	88,557
1966	1,271	24,427	144	108,116	115,183	2,489	1.12	2,780	153,050
1967	1,357	27,370	161	119,681	121,509	2,569	1.09	2,809	153,157
1968	1,427	30,161	183	131,379	116,653	2,690	1.08	2,911	170,102
1969	1,546	32,901	220	164,307	158,264	2,952	1.04	3,060	151,306
1970	1,681	33,634	250	144,527	120,819	2,747	0.66	1,815	90,961
1971	1,781	34,709	278	151,808	92,009	2,361	1.25	2,957	153,227
1972	1,975	34,405	427	170,219	135,137	2,042	1.06	2,165	115,934
1973	2,182	30,919	476	140,649	225,041	2,437	0.82	2,003	109,399
1974	2,330	32,451	344	143,147	251,712	2,978	1.41	4,211	461,049
1975	2,544	34,476	264	172,659	218,859	2,810	1.17	3,277	361,211
1976	2,654	34,771	260	174,807	242,027	3,171	1.30	4,122	427,507
1977	2,464	31,158	242	156,237	291,358	3,314	0.98	3,249	290,489
1978	2,271	29,823	237	143,127	258,034	3,609	0.82	2,945	292,901
1979	2,092	30,265	271	150,284	286,601	3,706	1.19	4,400	546,827
1980	2,065	30,431	293	147,840	348,214	4,121	0.91	3,739	571,158
1981	2,033	30,764	289	160,096	401,030	4,333	0.77	3,315	508,734
1982	1,942	30,268	263	145,126	378,540	4,593	1.05	4,803	762,706
1983	1,754	30,164	300	148,190	r395,896	4,865	1.14	5,534	982,505
1984	1,730	29,518	300	r141,359	r407,451	4,746	0.91	4,316	702,330
1985	1,673	31,574	274	r170,030	r503,963	4,652	1.41	6,580	1,134,766
1986	1,690	33,213	278	r175,859	r577,273	4,148	1.05	4,362	736,334
1987	1,660	33,463	295	188,773	716,263	4,260	1.26	5,377	836,016
1988	1,705	33,951	307	r188,527	r1,252,674	3,312	1.17	3,882	r649,969
1989	1,702	37,090	285	203,173	1,395,116	3,297	1.58	5,225	1,122,328

(a) Figures relate to varying time periods (e.g. year ended 30 June, year ended 31 December, year ended 31 March), owing to changes in the method of data collection. (b) From 1944 figures relate to the season ended 31 March. (c) From 1943 figures relate to the season ended 31 March. (d) Comprises shorn, dead and fellmongered wool and wool exported on skins. For 1947 and earlier, year ended 31 December; for the years 1949 to 1964 figures are for the year ended 31 March. From 1965 figures relate to the year ended 30 June in the following year. (e) Figures for 1949 and 1951 to 1955 exclude distributions of profits under the 1939–1945 War-time Wool Disposals Plan aggregating \$13,869,934. Separate State figures are not available for distributions made from 1956 to 1958 when payments were virtually complete.

AGRICULTURE—continued

Year (a)	Area and production of principal grain crops (b)—continued						Gross value of primary commodities produced excluding mining (c)		
	Oats		Barley		Hay (all kinds)		Area used for crops (d)	Agri-culture	Fisheries (e)
	Area	Production	Area	Production	Area	Production			
	'000 hectares	'000 tonnes	'000 hectares	'000 tonnes	'000 hectares	'000 tonnes	'000 hectares	\$'000	\$'000
1829							n.a.		
1830							n.a.		
1840	n.a.	n.a.	n.a.	n.a.	—	n.a.	1		
1850	n.a.	n.a.	n.a.	n.a.	1	n.a.	3		
1860	—	—	1	1	2	8	10		
1870	1	1	2	2	7	21	22	n.a.	n.a.
1880	—	—	2	2	8	20	26		
1890	1	1	2	2	9	25	28		
1900	2	2	1	1	42	106	81		
1910	25	14	1	1	71	182	346		
1920	78	37	4	3	108	268	730	(f)29,364	n.a.
1930	111	60	7	4	161	500	1,939	(f)38,747	544
1940	174	59	27	16	169	381	1,614	39,520	r562
1950	237	132	28	22	87	276	1,737	141,348	r1,432
1951	237	144	24	21	72	231	1,834	233,827	r1,649
1952	266	140	23	16	70	215	1,824	189,153	r2,505
1953	337	189	43	40	92	295	1,877	201,380	r3,286
1954	297	174	85	62	89	299	1,812	210,428	3,808
1955	354	174	105	64	117	310	2,041	186,361	4,383
1956	442	300	136	106	109	390	2,118	221,435	4,915
1957	425	189	139	85	98	293	2,080	216,295	5,563
1958	467	250	124	81	137	392	2,230	204,911	6,530
1959	538	410	130	123	135	462	2,434	231,149	7,818
1960	502	356	170	161	129	440	2,583	256,002	8,621
1961	538	396	219	193	115	387	2,734	266,972	8,569
1962	498	366	199	165	119	402	2,823	280,475	10,689
1963	476	367	158	137	138	460	2,965	292,615	11,219
1964	455	324	121	92	117	395	2,714	300,766	10,187
1965	466	254	123	84	123	396	2,950	296,147	15,218
1966	502	422	167	147	118	421	3,419	406,097	15,733
1967	487	401	151	152	119	424	3,463	411,084	16,525
1968	469	359	168	159	129	428	3,595	428,258	21,954
1969	442	416	224	208	138	508	3,840	461,479	23,717
1970	461	281	364	273	202	576	3,916	370,557	19,660
1971	520	520	632	769	190	673	3,831	445,390	25,127
1972	454	414	911	1,000	177	653	3,751	461,581	30,817
1973	297	212	744	640	224	664	3,855	574,665	28,158
1974	325	383	510	626	220	734	4,133	1,034,191	30,494
1975	262	250	387	329	164	508	3,758	845,169	35,130
1976	320	386	419	505	163	536	4,207	996,633	51,079
1977	372	347	452	553	169	560	4,416	959,160	69,094
1978	415	416	614	751	191	597	4,910	993,889	88,340
1979	427	491	616	778	184	586	4,993	1,343,932	96,055
1980	370	399	523	632	208	636	5,280	1,572,744	85,652
1981	382	384	535	504	240	703	5,547	1,678,031	82,764
1982	432	442	580	576	255	711	5,963	1,874,267	99,254
1983	461	534	603	717	252	754	6,379	2,196,230	126,208
1984	448	456	771	797	238	676	6,526	1,940,863	142,658
1985	351	460	965	1,431	226	747	6,723	2,602,205	165,443
1986	288	338	826	1,024	201	633	5,970	2,213,118	143,034
1987	302	414	468	601	218	681	5,930	2,554,658	r182,421
1988	373	502	461	617	243	778	5,334	r2,991,232	254,399
1989	389	618	383	552	248	873	5,082	3,718,714	n.y.a.

(a) Figures relate to varying time periods (e.g. year ended 30 June, year ended 31 December, year ended 31 March), owing to changes in the method of data collection. (b) From 1944 figures relate to the season ended 31 March. (c) Estimated value of recorded production based on wholesale prices realised at principal market. (d) Excludes pasture hay and from 1967 also excludes lucerne. (e) From 1980 excludes pearling and whaling. (f) Includes hunting.

## PRIMARY PRODUCTION—MISCELLANEOUS

Year	Gold production (a) (b)		Coal production (b)		Average values f.o.b. (c)	
	Quantity	Value	Quantity	Value	Wool (greasy) per kg (d)	Wheat per tonne (e)
	'000 grams	\$'000	'000 tonnes	\$'000	cents	\$
1860	—	—	—	—	—	19.83
1870	—	—	—	—	—	..
1880	—	—	—	—	n.a.	18.37
1890	622	171	—	—	—	..
1900	43,980	12,015	120	110	—	5.51
1910	45,753	12,494	266	227	16.20	14.85
1920	19,222	6,951	469	701	28.26	26.33
1930	13,001	3,729	509	770	19.37	16.69
1940	37,044	25,393	548	729	25.68	11.19
1941	34,494	23,703	566	779	28.70	14.49
1942	26,376	17,731	590	923	28.64	15.12
1943	16,982	11,421	541	979	32.19	15.09
1944	14,494	9,800	567	1,166	34.81	17.71
1945	14,588	10,021	552	1,146	34.24	23.30
1946	19,191	13,280	652	1,460	34.92	31.81
1947	21,897	15,151	743	1,680	45.64	48.42
1948	20,684	14,314	745	1,760	76.41	64.33
1949	20,155	15,926	763	1,944	94.20	56.11
1950	18,973	18,933	827	2,575	105.91	57.03
1951	19,533	19,451	862	3,434	263.50	62.25
1952	22,706	23,696	843	4,915	138.10	62.64
1953	25,629	26,598	900	6,146	148.04	63.57
1954	26,469	26,627	1,034	7,178	156.20	60.90
1955	26,189	26,749	919	6,179	135.39	52.22
1956	25,256	26,405	843	5,448	112.66	46.57
1957	27,900	29,102	852	5,105	144.67	48.12
1958	26,967	28,357	885	4,561	130.80	56.35
1959	26,967	28,388	926	4,713	91.87	51.76
1960	26,625	28,140	937	4,878	115.37	49.48
1961	27,122	28,584	778	3,361	99.10	49.91
1962	26,717	28,115	934	3,962	109.80	51.90
1963	24,883	26,375	916	3,970	111.38	52.30
1964	22,177	23,383	1,003	4,679	134.47	52.01
1965	20,497	22,381	1,010	4,410	120.58	51.66
1966	19,564	23,316	1,078	4,562	116.00	51.12
1967	17,916	21,690	1,079	4,765	117.46	54.88
1968	15,925	19,407	1,104	4,817	105.69	51.31
1969	14,961	19,040	1,120	4,853	107.60	51.26
1970	12,310	15,811	1,178	5,407	98.11	47.72
1971	10,736	13,674	1,190	5,653	75.33	48.88
1972	10,848	14,835	1,188	5,855	74.94	49.52
1973	9,264	16,718	1,154	6,422	150.21	49.67
1974	7,173	19,183	1,197	7,237	215.36	98.75
1975	6,305	29,788	1,879	12,511	144.37	126.39
1976	7,644	27,141	2,157	17,613	147.62	116.89
1977	7,619	31,586	2,339	21,896	188.10	105.10
1978	13,653	64,741	2,435	24,846	195.76	92.52
1979	12,231	78,313	2,406	34,484	207.87	116.53
1980	11,598	158,253	3,039	54,464	253.81	146.45
1981	10,532	165,376	3,127	63,100	270.01	160.32
1982	16,135	178,566	3,435	75,132	288.61	155.48
1983	22,992	334,802	3,903	95,529	303.41	168.10
1984	26,183	365,453	3,942	106,325	317.08	173.81
1985	37,425	508,892	3,673	109,120	353.01	187.09
1986	46,072	707,114	3,765	126,841	376.50	185.14
1987	64,911	1,300,079	3,782	n.p.	430.31	144.86
1988	90,546	1,843,770	3,702	150,965	651.33	146.18
1989	120,847	2,028,283	3,800	161,241	721.94	202.00

(a) Prior to 1971 comprises gold refined at the Mint and gold contained in gold-bearing materials exported. From 1971 covers gold production as notified by the Department of Mines. (b) From 1969 figures relate to year ended 30 June. (c) From 1978 figures relate to foreign exports only. (d) From 1920 figures relate to year ended 30 June. (e) Prior to 1940 averages generally are based on exports of the previous season's wheat; from 1940 they relate to exports during the year ended 30 June.

SECONDARY PRODUCTION

Year (a)	Manu- facturing estab- lish- ments (b)	Persons employed (c)	Wages and salaries (d)	Turn- over (e)	Value added (f)	Production of selected commodities							Timber from local logs (l)
						Bricks (g)	Scoured wool (h)	Bacon and ham (i)	Butter (j)	Flour (plain) (k)	Cheese (k)	'000 cu m	
	No.	No.	\$'000	\$'000	\$'000	'000	tonnes	tonnes	tonnes	tonnes	tonnes		
1900	632	11,166	2,589	n.a.	n.a.	25,234		n.a.	132	11,375		266	
1910	822	14,894	3,532	10,158	5,472	23,162	n.a.	n.a.	291	33,401	n.a.	412	
1920	998	16,942	6,073	26,283	9,708	31,838		850	553	108,976		325	
1930	1,466	19,643	8,310	33,783	14,976	47,720		1,180	2,143	109,402		377	
1940	2,129	22,967	9,150	40,615	18,055	43,786	2,459	2,106	6,351	127,776	382	360	
1950	3,023	40,733	30,586	172,956	522,088	58,943	7,110	3,599	6,878	144,691	712	363	
1951	3,111	43,761	39,316	168,862	68,441	67,312	5,828	3,615	6,906	197,172	760	416	
1952	3,267	45,097	50,769	213,143	85,491	76,884	5,884	3,739	6,813	201,255	634	471	
1953	3,424	45,188	56,687	238,620	98,383	86,043	6,162	3,752	6,584	203,509	909	527	
1954	3,523	47,459	63,181	269,174	110,294	101,240	6,914	3,503	6,241	170,513	1,224	569	
1955	3,727	49,314	69,476	299,169	121,912	115,412	7,226	3,369	7,260	150,381	1,100	593	
1956	3,871	50,108	74,413	350,293	139,466	102,359	9,483	3,283	7,523	162,715	775	578	
1957	3,935	48,748	73,833	375,272	146,884	101,209	11,044	3,103	7,582	153,800	1,201	539	
1958	3,941	48,462	75,870	392,525	150,624	111,082	11,708	2,999	6,916	134,398	1,033	550	
1959	4,125	48,417	77,464	392,405	157,524	101,521	12,791	3,002	6,265	126,736	1,200	561	
1960	4,279	49,651	83,285	431,165	172,747	110,359	15,271	3,228	7,494	136,780	1,466	532	
1961	4,334	50,666	90,255	481,140	193,262	119,998	13,420	3,214	7,784	152,622	1,373	496	
1962	4,418	51,033	92,840	486,988	196,083	119,868	14,459	3,556	7,603	128,007	1,386	505	
1963	4,492	53,435	99,880	517,899	216,422	131,176	13,312	3,899	7,075	123,296	1,462	486	
1964	4,609	55,705	108,515	555,058	230,511	155,792	12,464	3,841	7,026	129,996	1,530	517	
1965	4,734	58,097	119,978	616,422	260,637	146,057	12,040	4,047	7,887	121,906	1,838	550	
1966	4,906	60,282	134,171	678,751	288,803	140,611	12,107	4,357	8,225	103,115	1,230	552	
1967	5,167	63,757	153,597	765,224	335,788	163,166	12,148	4,654	6,529	91,725	1,726	533	
1968	5,404	67,335	175,100	887,372	388,257	207,575	12,662	5,173	6,009	100,418	1,983	557	
1969	2,585	59,853	183,168	919,555	361,473	273,078	14,415	5,591	6,332	96,641	2,022	444	
1970	2,705	62,597	208,410	1,028,778	414,999	288,949	14,940	5,399	5,915	92,635	1,718	450	
1971			(m)			240,323	10,724	4,863	5,425	96,411	1,917	449	
1972	2,727	64,217	255,879	1,240,106	472,013	227,581	17,009	5,116	5,988	84,227	1,979	407	
1973	2,814	64,074	275,455	1,375,859	501,034	278,610	11,987	5,257	5,324	77,680	1,869	405	
1974	2,818	67,884	346,942	1,741,029	658,412	304,178	10,791	5,530	5,223	79,114	1,922	408	
1975	1,974	65,852	434,272	2,032,374	779,842	262,905	11,779	5,294	4,981	84,486	2,291	392	
1976	2,054	65,953	508,931	2,432,654	944,459	328,356	13,969	5,439	4,531	78,447	2,673	388	
1977	2,035	66,750	594,514	2,882,421	1,151,619	385,942	15,818	5,836	3,340		2,074	375	
1978	2,037	65,740	629,095	3,031,505	1,208,749	357,391	13,308	5,666	2,212		1,812	386	
1979	2,202	65,232	670,772	3,498,828	1,321,683	381,092	16,129	5,516	1,373		2,364	341	
1980	2,301	65,987	734,204	4,259,065	1,643,325	404,954	20,128	5,930	995		2,866	349	
1981	2,426	68,870	869,223	4,902,236	1,876,664	381,909	21,645	6,062	834		3,342	347	
1982	2,603	70,799	1,013,397	5,490,999	2,052,683	391,743	19,574	6,074	799	n.a.	3,322	334	
1983	2,499	64,980	1,038,300	5,596,500	2,040,900	279,164	13,747	6,405	914		3,417	257	
1984	2,408	61,997	1,047,393	5,922,692	2,136,745	n.p.	17,053	6,807	1,269		3,665	265	
1985	2,451	64,242	1,137,558	6,788,471	2,513,218	n.p.	21,938	7,862	1,582		3,736	305	
1986			(m)			n.p.	22,992	8,174	595		3,400	329	
51987	2,660	69,327	1,406,965	8,215,095	2,998,694	n.p.	29,109	8,502	1,400		3,727	317	
1988	2,675	72,069	1,604,782	9,416,932	n.a.	n.p.	25,820	8,377	1,505		3,772	319	
1989			n.y.a.			n.a.	22,921	9,384	1,139		3,541	p335	

(a) From 1930 year ended 30 June. (b) Excludes details of single establishment manufacturing enterprises employing fewer than four persons. For details of breaks in series refer to publications of Censuses of Manufacturing Establishments statistics. (c) Average over whole year including working proprietors. Prior to 1926-27 includes fallers and haulers employed by sawmills. From 1988, employment at 30 June. (d) Figures for 1929-30 and later exclude amounts drawn by working proprietors. (e) Selling value 'at the factory'. (f) Value added in course of manufacture, representing sum available for payment of wages, rent, depreciation, other sundry expenses and for interest and profit. (g) For years prior to 1964-65 figures represent clay bricks only (all sizes). (h) Excludes fellmongered, dead or waste wool. (i) From 1977-78 excludes canned bacon and ham. (j) For 1917 and earlier years, includes butter made on farms. Source: from 1977-78 to 1980-81, Western Australian Department of Agriculture; from 1981-82, the Australian Dairy Corporation. (k) Source: 1933-34 to 1967-68, annual manufacturing census; 1968-69 to 1970-71, Commonwealth Dairy Produce Equalisation Committee Limited; from 1971-72 to 1980-81, Western Australian Department of Agriculture; from 1981-82, the Australian Dairy Corporation. (l) Prior to 1968-69, figures also include hewn timber. (m) No census of manufacturing establishments was conducted for this year.

## BUILDING COMPLETED (a)

Year ended 30 June	Houses (b) (c)		Other residential buildings (b) (c)		Alterations and additions (d) to residential buildings	Non-residential building (e)				Total building (g) \$m
	Number (f)	Value (g) \$m	Number of of units	Value (g) \$m	Value (g) \$m	Factories	Offices	Educational	Total	
1947	1,792	3.5	--	--		0.1			0.7	4.2
1948	2,771	5.8	--	--		0.2			0.9	6.7
1949	3,244	7.6	--	--		0.4			1.8	9.4
1950	3,509	9.0	101	0.2		0.4			1.5	10.7
1951	5,160	15.0	305	0.6		0.4	n.a.	n.a.	2.3	17.9
1952	6,577	24.5	215	0.3		1.4			4.1	28.9
1953	7,965	38.0	100	0.3		1.7			7.5	45.8
1954	7,627	39.8	22	0.8		1.7			11.0	51.6
1955	8,792	48.4	316	1.2		6.2			18.6	68.2
1956	7,760	45.1	584	2.6		3.8	0.8	2.2	19.7	67.4
1957	5,030	29.1	365	1.5	(h)	2.2	2.0	1.2	16.3	46.8
1958	6,196	36.5	171	0.7		2.5	3.9	1.1	17.3	54.5
1959	5,846	34.4	212	0.8		2.8	2.4	4.6	25.3	60.5
1960	5,997	35.5	263	1.0		2.4	1.5	5.8	23.8	60.2
1961	5,973	38.1	440	1.6		4.7	4.1	8.0	32.4	72.0
1962	6,082	39.5	265	1.3		3.0	2.9	6.0	27.3	68.1
1963	6,593	45.8	642	3.0		4.9	1.6	7.7	37.7	86.4
1964	7,276	51.8	1,295	5.6		5.4	6.0	6.2	35.5	92.9
1965	7,445	57.2	1,841	9.0		6.8	2.8	8.0	40.8	107.1
1966	7,265	58.1	1,624	9.1		9.6	10.6	8.5	63.0	130.2
1967	8,272	78.1	1,742	9.3		9.8	7.1	10.5	74.7	162.1
1968	9,858	97.4	2,392	12.6		15.1	14.6	12.1	85.5	195.4
1969	12,840	133.3	3,491	22.4		15.8	10.9	14.1	99.2	254.8
1970	13,933	151.3	5,596	40.5		16.6	14.3	13.3	111.6	303.4
1971	11,900	149.3	5,013	40.0	0.4	18.0	39.7	20.6	175.4	365.0
1972	13,209	165.5	1,595	13.9	1.2	21.3	19.4	16.3	150.8	331.4
1973	13,660	163.4	920	7.3	1.8	15.6	21.2	24.8	151.5	324.0
1974	12,517	176.4	3,546	32.8	2.8	23.4	19.0	21.8	139.2	351.2
1975	10,994	198.6	3,300	38.9	4.4	18.2	18.4	40.0	170.1	412.0
1976	12,080	253.8	2,948	44.0	8.7	22.4	45.7	58.3	227.3	533.8
1977	15,155	395.0	6,152	113.9	15.4	26.6	43.5	29.5	226.4	750.7
1978	12,685	378.8	4,681	98.9	21.5	34.6	18.2	46.1	234.1	733.3
1979	11,148	349.1	3,507	74.9	30.5	44.0	33.2	56.3	339.3	793.8
1980	11,648	380.9	4,156	93.2	33.3	51.5	49.9	33.2	301.9	809.4
1981	10,120	375.5	4,531	108.0	37.5	37.0	75.0	29.6	308.8	829.7
1982	9,440	398.5	5,255	165.0	51.9	52.6	131.5	39.9	495.6	1,111.0
1983	9,070	372.5	4,020	143.4	47.4	45.2	152.1	37.7	464.3	1,027.5
1984	10,340	407.4	2,124	75.9	41.0	19.0	75.0	45.1	351.0	875.4
1985	14,000	583.9	3,735	115.3	51.9	27.9	55.6	30.7	357.5	1,108.6
1986	12,620	615.7	4,217	158.1	60.5	91.5	149.9	65.3	630.8	1,465.1
1987	12,330	651.5	3,619	144.3	70.4	39.0	155.8	99.2	795.0	1,661.2
1988	12,390	694.4	3,518	140.6	80.2	63.4	208.1	120.9	884.5	1,799.7
1989	14,660	906.9	4,631	193.6	99.5	81.3	263.6	65.1	959.5	2,159.5

(a) From 1981 figures are not strictly comparable with those for earlier periods. (b) Prior to 1970-71 figures include alterations and additions to dwellings. Data for 1970-71 and later years relate to new dwellings only. (c) From July 1973 changes in the classification of residential buildings mean that figures for earlier years are not comparable. (d) Valued at \$10,000 and over. (e) From 30 June 1985 includes alterations and additions valued at \$30,000 and over. Prior to 30 June 1985 includes alterations and additions valued at \$10,000 and over. (f) From 1981 numbers of new houses are rounded to nearest ten units. (g) Excludes the value of land. (h) Not available separately; included with Houses and Other residential buildings as appropriate.

## TRANSPORT; CUSTOMS AND EXCISE

Year	State Government railways (a)		Private railways	Air passenger movements Perth Airport		Customs and excise gross revenue (b)		
	Route kilometres at end of year (c)	Paying goods	Route kilometres at end of year	Internal	Inter-national	Customs	Excise	Total
		\$'000		'000	'000	\$'000	\$'000	\$'000
1870	—	—	—	..	..	81	—	81
1880	55	2	61	..	..	186	—	186
1890	303	62	620	..	..	356	—	356
1900	2,181	1,406	1,003	..	..	1,889	63	1,952
1910	3,452	2,278	1,452	..	..	1,543	213	1,756
1920	5,695	2,656	1,477	..	..	1,311	799	2,110
1930	6,616	3,587	1,363	..	..	3,882	1,527	5,409
1940	7,051	2,702	1,337	..	..	3,769	2,395	6,164
1950	6,843	2,889	1,246	..	..	10,166	10,943	21,109
1951	6,804	3,082	1,210	..	..	10,839	11,973	22,812
1952	6,619	3,112	1,210	..	..	14,045	16,312	30,357
1953	6,611	2,661	1,165	..	..	9,908	18,395	28,303
1954	6,616	3,257	1,220	..	..	12,241	19,447	31,688
1955	6,616	3,461	1,204	n.a.	n.a.	12,196	21,812	34,008
1956	6,629	3,854	1,168	..	..	8,473	24,092	32,565
1957	6,626	4,291	1,136	..	..	5,504	30,078	35,582
1958	6,626	3,647	925	..	..	5,476	32,547	38,023
1959	6,626	3,976	925	..	..	4,800	32,398	37,198
1960	6,630	4,605	832	..	..	5,614	33,634	39,248
1961	6,635	4,911	755	..	..	7,470	33,835	41,305
1962	6,198	5,428	898	..	..	7,156	35,705	42,861
1963	6,111	4,870	888	..	..	8,996	35,944	44,940
1964	5,918	5,271	665	..	..	10,369	37,839	48,208
1965	6,008	5,133	34	..	..	10,692	43,349	54,041
1966	6,030	6,486	460	270	26	15,251	53,536	68,787
1967	6,140	7,999	455	294	36	13,569	58,176	71,745
1968	6,140	9,053	455	340	49	19,468	62,903	82,371
1969	6,157	9,078	882	382	54	21,202	69,289	90,490
1970	6,161	10,837	884	467	69	24,649	76,637	101,286
1971	6,175	13,457	884	541	84	32,262	88,978	121,240
1972	6,116	13,867	884	524	105	30,072	101,883	131,955
1973	6,168	13,706	1,220	596	117	25,714	106,054	131,768
1974	6,192	15,059	1,222	668	139	30,612	138,197	168,809
1975	6,075	16,348	1,181	681	165	44,114	148,310	192,424
1976	6,163	17,812	1,179	658	197	46,767	183,838	230,605
1977	6,165	19,003	1,155	746	206	63,037	203,852	266,889
1978	5,764	18,625	1,150	815	225	68,118	216,929	285,047
1979	5,764	19,288	1,155	879	261	71,704	256,486	328,190
1980	5,773	21,388	1,159	928	325	83,620	260,299	343,919
1981	5,773	20,271	1,160	960	377	110,939	283,499	394,438
1982	5,609	19,776	1,181	1,027	434	128,866	198,397	327,263
1983	5,610	19,791	1,177	1,005	414	130,752	379,889	510,641
1984	5,623	19,870	1,177	1,075	455	133,088	492,117	625,205
1985	5,563	22,085	1,285	1,195	502	176,416	496,172	672,588
1986	5,553	20,877	1,185	1,264	569	196,027	444,311	640,338
1987	5,553	21,264	1,185	1,432	649	r213,647	r284,677	r498,324
1988	5,553	21,946	r1,191	1,471	714	232,397	330,699	563,096
1989	5,553	24,294	1,198	..	..	n.y.a.	..	..

(a) From 1900, year ended 30 June. (b) From 1915, year ended 30 June. (c) Open for general and passenger traffic.

## MOTOR VEHICLE REGISTRATIONS; EXPORTS OF CATTLE AND SHEEP

Year	New motor vehicles registered (a)				Motor vehicles on register (b)				Exports of—	
	Motor cars (c)	Utilities, panel vans, trucks and buses	Motor cycles (d)	Total	Motor cars (e)	Utilities, panel vans, trucks and buses	Motor cycles (d)	Total	Cattle	Sheep (f)
									\$'000	\$'000
1860									—	4
1870									—	—
1880									—	—
1890	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1	2
1900									—	2
1910									16	9
1920					3,404			73	28	
1930					31,130	11,358	7,707	50,195	1	46
1940	2,871	1,517	399	4,787	38,907	25,026	6,789	70,222	—	65
1941	1,015	632	200	1,847	36,995	24,788	6,704	68,487	2	112
1942	250	353	74	677	29,022	21,625	4,057	54,704	1	97
1943	218	151	57	426	29,750	21,189	3,935	54,874	1	—
1944	19	1,102	109	1,230	30,295	22,459	4,324	57,078	27	—
1945	40	597	192	829	30,635	23,943	4,501	59,079	2	1
1946	101	456	271	828	31,408	28,904	6,799	67,111	2	91
1947	1,354	1,126	678	3,158	32,879	32,097	8,199	73,175	27	362
1948	2,963	1,975	1,059	5,997	35,596	35,285	8,877	79,758	10	347
1949	4,684	3,122	1,769	9,575	40,199	38,901	10,974	89,994	11	374
1950	8,926	4,707	2,346	15,979	48,632	43,206	12,897	104,735	5	426
1951	8,201	6,610	2,802	17,613	56,235	47,908	14,535	118,678	9	616
1952	8,836	5,750	2,740	17,326	64,277	52,627	16,047	132,951	23	631
1953	6,879	4,881	1,416	13,176	69,917	56,445	15,565	141,927	23	501
1954	9,926	5,601	1,258	16,785	78,312	60,362	15,243	153,917	29	568
1955	12,394	5,993	1,202	19,589	90,255	63,870	14,662	168,787	68	612
1956	10,100	5,203	1,089	16,392	99,206	62,809	12,959	174,974	177	625
1957	9,321	4,418	1,192	14,931	104,506	63,315	12,731	180,552	243	923
1958	10,140	5,562	1,702	17,404	111,825	63,598	12,631	188,054	308	841
1959	10,389	5,140	2,071	17,600	119,957	65,588	12,814	198,359	396	764
1960	13,492	5,695	1,949	21,136	130,476	68,702	12,876	212,054	325	845
1961	15,161	5,542	1,080	21,783	141,612	70,974	12,589	225,175	318	881
1962	17,082	5,833	902	23,817	155,447	74,224	12,390	242,061	55	1,254
1963	23,175	6,367	754	30,296	169,800	75,500	11,500	256,800	160	1,495
1964	24,958	7,013	628	32,599	186,200	77,700	10,200	274,100	331	1,433
1965	23,304	6,897	553	30,754	197,800	78,500	8,900	285,200	427	1,376
1966	23,418	9,170	706	33,294	212,600	83,300	8,400	304,300	283	1,633
1967	27,922	9,404	1,158	38,484	231,200	86,300	8,400	325,900	381	1,771
1968	33,368	10,448	1,525	45,341	252,300	90,800	8,900	352,000	1,229	2,191
1969	35,379	11,018	1,539	47,936	275,300	94,500	9,600	379,400	972	2,943
1970	37,764	11,138	1,945	50,847	301,000	99,900	10,800	411,700	760	2,876
1971	37,769	10,872	2,718	51,359	328,500	104,900	12,200	445,600	1,159	2,710
1972	37,274	9,819	3,985	51,078	346,300	104,600	14,200	465,100	1,865	3,871
1973	36,904	11,425	4,914	53,243	364,400	107,400	16,800	488,600	1,661	7,959
1974	40,302	12,241	7,062	59,605	389,300	112,700	21,000	523,000	2,111	12,539
1975	41,474	13,693	6,613	61,780	414,800	125,000	24,600	564,400	1,498	12,862
1976	40,338	15,863	5,731	61,932	437,200	140,000	27,600	604,800	1,464	14,436
1977	44,363	17,362	3,887	65,612	473,731	153,174	28,022	654,927	2,533	34,905
1978	40,990	16,538	3,339	60,867	500,365	167,107	28,051	695,523	3,071	35,985
1979	40,882	14,025	2,713	57,620	518,705	174,064	26,916	719,685	3,182	45,915
1980	40,232	13,716	4,600	58,548	535,613	179,844	29,531	744,988	1,748	91,763
1981	41,660	15,223	6,088	62,971	552,552	187,599	33,009	773,160	2,899	100,340
1982	42,329	16,079	5,835	64,243	573,400	197,344	35,213	805,957	3,039	94,825
1983	38,812	15,043	5,147	59,002	576,893	196,539	35,852	809,284	5,476	94,630
1984	39,737	15,199	3,969	58,905	592,495	201,754	35,770	830,019	5,824	92,700
1985	46,070	17,956	4,310	68,336	615,442	214,649	36,229	866,320	3,432	82,430
1986	42,645	13,676	3,350	59,671	632,182	218,851	36,324	887,357	5,339	84,317
1987	33,642	10,198	2,305	46,145	647,734	223,030	35,287	906,051	4,969	105,015
1988	36,040	10,617	2,215	48,872	670,158	230,161	35,442	935,761	(g)	
1989	44,100	14,149	2,522	60,771	708,253	241,698	36,294	986,245	3,371	62,256

(a) Year ended 30 June. (b) From 1929, at 30 June; for earlier years, at various dates. For years before 1946, excludes Commonwealth Government-owned vehicles; from 1946, includes Commonwealth Government-owned vehicles other than those of defence services. From 1956 to 1976, series based on the results of the periodic census of motor vehicles. Improvements in the methodology used to produce statistics of motor vehicles on register have resulted in a break in the continuity of the series from 30 June 1983. (c) From 1959, includes station wagons previously included with commercial vehicles. (d) Including motor scooters. (e) From June 1956, includes station wagons previously included with commercial vehicles. (f) Excludes interstate exports. Details are not available for publication. (g) Details not available; see Chapter 20.



## EXPORTS OF CERTAIN COMMODITIES (a)

Year (b)	Meats—Fresh, chilled or frozen									
	Beef and veal		Mutton and lamb		Pigmeat		Rock lobsters (c)		Wheat exports (d)	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	tonnes	\$'000	tonnes	\$'000	tonnes	\$'000	tonnes	\$'000	tonnes	\$'000
1840	—	—	—	—	—	—	—	—	—	—
1850	—	—	—	—	—	—	—	—	1	—
1860	—	—	—	—	—	—	—	—	—	—
1870	—	—	—	—	—	—	—	—	408	8
1880	—	—	—	—	—	—	—	—	—	—
1890	—	—	—	—	—	—	—	—	27	—
1900	—	—	(e)	—	—	—	—	—	54,839	813
1910	—	—	—	—	—	—	—	—	249,049	5,083
1920	300	33	—	—	—	—	—	—	679,109	12,258
1930	5,162	272	—	—	—	—	—	—	—	—
1940	4,826	329	4,665	533	2,263	324	—	—	417,214	4,669
1941	5,583	407	4,396	496	6,015	851	—	—	404,314	5,858
1942	3,576	327	3,684	435	4,670	682	—	—	266,005	4,021
1943	—	—	3,985	458	1,053	155	—	—	139,833	2,111
1944	1,445	190	6,664	763	1,568	238	—	—	328,138	5,813
1945	1,202	168	4,002	410	1,697	254	—	—	642,015	14,955
1946	4,317	558	2,269	275	3,401	545	—	—	367,682	11,696
1947	6,358	691	4,081	409	1,306	248	—	—	185,102	8,964
1948	6,353	604	5,079	584	303	53	—	—	525,857	33,809
1949	8,056	840	4,607	608	624	179	n.a.	(f)500	500,793	28,100
1950	8,625	1,183	2,392	485	163	59	518	463	585,406	33,384
1951	7,699	1,221	939	217	279	113	1,436	1,517	830,346	51,688
1952	6,028	1,135	1,044	301	424	232	1,311	1,861	730,002	45,728
1953	5,016	1,437	6,589	1,463	463	303	1,329	2,085	634,639	40,347
1954	6,148	1,748	3,309	875	215	152	1,461	2,342	185,066	11,272
1955	6,776	2,038	3,225	1,328	1,049	532	1,532	2,490	526,212	27,478
1956	7,601	2,343	6,602	2,156	743	482	1,601	3,022	619,779	28,860
1957	4,127	1,221	5,788	1,741	733	588	1,618	3,514	1,273,578	61,291
1958	11,025	3,302	5,083	1,900	2,324	1,462	2,136	3,965	725,131	40,861
1959	10,535	4,342	9,944	3,177	1,983	1,178	2,715	5,281	639,647	33,113
1960	13,597	6,742	8,735	2,378	1,188	953	2,996	6,499	999,164	49,442
1961	12,413	6,141	11,367	3,901	1,894	1,501	2,316	5,881	1,428,272	71,280
1962	12,544	6,299	8,468	2,436	3,151	2,025	3,607	9,778	2,010,766	104,356
1963	17,268	9,382	7,428	2,401	2,061	1,404	3,490	8,910	1,380,372	72,197
1964	20,528	11,497	5,385	1,895	861	718	3,416	9,211	1,497,453	77,881
1965	19,360	11,730	5,040	1,981	571	516	2,672	10,592	1,102,420	56,955
1966	18,115	12,108	10,319	4,357	420	376	3,193	13,821	1,887,996	96,515
1967	16,912	11,987	9,652	3,723	565	470	3,643	13,873	2,312,777	126,918
1968	16,821	12,995	13,153	4,745	547	474	3,919	17,989	2,373,195	121,764
1969	20,210	16,939	21,523	7,218	642	564	3,038	17,133	1,521,376	77,987
1970	23,645	21,508	29,661	11,271	1,437	1,175	2,976	15,695	1,814,787	86,593
1971	20,257	17,626	24,244	9,396	1,126	895	3,155	19,413	2,670,890	130,564
1972	24,435	22,528	42,994	17,645	2,503	1,995	3,425	24,626	2,587,504	128,132
1973	33,325	36,614	39,853	26,103	7,630	6,382	3,171	20,919	2,249,934	111,744
1974	34,778	43,039	27,189	23,682	5,939	5,772	2,656	18,511	2,139,973	211,333
1975	31,083	25,993	33,240	22,107	2,283	3,037	3,328	25,258	3,241,895	409,758
1976	35,732	32,693	52,120	34,009	2,451	3,696	3,128	27,777	3,215,792	375,897
1977	53,051	53,291	60,373	48,913	1,292	1,968	4,071	47,061	3,009,101	316,258
1978	57,827	64,896	42,532	40,885	620	984	3,902	48,043	3,795,969	351,190
1979	51,932	90,216	26,250	31,059	382	693	4,170	51,064	2,208,985	257,414
1980	41,372	93,547	44,699	51,230	204	460	3,626	50,448	4,205,774	615,944
1981	40,672	87,669	44,142	57,515	144	334	2,858	42,480	2,634,951	422,433
1982	38,399	73,673	25,367	37,057	225	446	4,849	77,930	3,826,760	594,992
1983	41,659	88,972	29,073	43,133	99	344	5,424	88,175	5,031,977	845,855
1984	32,492	80,442	26,000	39,114	282	829	6,506	111,954	3,637,624	632,247
1985	30,327	77,403	21,329	33,808	150	567	4,778	126,644	4,543,782	850,090
1986	28,012	76,709	27,055	41,766	122	373	4,267	114,568	5,342,611	989,144
1987	29,928	88,348	31,010	50,305	481	1,542	4,884	143,665	4,872,265	697,557
1988	—	—	—	—	(g)	—	—	—	—	—
1989	24,980	74,722	19,844	38,006	36	133	7,750	172,779	4,995,551	1,009,103

(a) From 1980 figures relate to foreign exports only. (b) From 1920, year ended 30 June. (c) For years 1950 to 1952, foreign exports only. Figures relate to rock lobster tails only until 1982. From 1982 figures include whole rock lobsters and tails. (d) From 1920, year ended 30 June; from 1978, excludes interstate exports. (e) Separate details not available. Total exports of fresh meats were 84 tonnes valued at \$9,164. (f) Estimated. (g) Details not available; see Chapter 20.

EXPORTS OF CERTAIN COMMODITIES (a) — *continued*

Year (b)	Flour (c)		Potatoes		Fresh fruit (d)	Hides and skins	Timber (e)		Wool (f)	
	Quantity	Value	Quantity	Value	Value	Value	Quantity	Value	Quantity	Value
	tonnes	\$'000	tonnes	\$'000	\$'000	\$'000	'000 cu m	\$'000	tonnes	\$'000
1860	11	—	71	1	—	1	—	2	141	31
1870	—	—	26	—	—	—	2	10	298	99
1880	n.a.	2	—	—	—	—	6	35	811	179
1890	—	—	—	—	—	8	19	133	1,970	543
1900	47	1	113	1	1	49	33	164	3,161	523
1910	2,559	49	18	—	11	150	162	916	4,125	541
1920	117,254	5,045	1,637	54	300	482	342	1,945	11,883	1,934
1930	62,659	1,540	5,037	151	312	1,246	143	931	27,034	7,875
1940	83,159	1,301	11,953	214	740	745	143	1,251	28,487	5,558
1941	107,588	2,185	18,501	373	282	580	172	1,546	10,334	3,119
1942	77,087	1,681	10,452	213	114	772	148	1,369	36,590	10,866
1943	70,412	1,581	6,410	139	139	348	100	1,189	14,173	4,757
1944	96,941	2,344	772	22	96	680	103	1,216	33,240	11,759
1945	92,438	2,505	17,939	581	132	537	81	1,131	25,829	9,107
1946	106,088	4,667	13,219	446	488	1,274	96	1,429	54,398	19,914
1947	117,661	7,628	12,939	484	1,445	2,131	98	1,719	42,022	20,521
1948	127,002	11,326	18,623	681	1,688	2,048	102	2,230	43,671	33,244
1949	119,025	10,516	13,723	431	1,452	2,134	91	1,986	45,135	43,069
1950	105,065	8,335	10,090	384	1,780	2,329	81	1,949	45,766	50,923
1951	144,914	11,774	11,181	506	2,295	5,294	66	1,783	41,633	112,559
1952	146,584	13,669	13,514	733	2,853	3,194	68	2,075	46,633	67,680
1953	159,883	15,090	12,860	750	4,556	3,942	112	4,147	51,489	79,122
1954	134,126	11,704	16,026	1,300	3,300	3,295	109	4,480	51,083	82,260
1955	109,172	7,219	9,020	512	3,845	2,921	99	3,847	49,811	70,563
1956	117,409	7,766	2,275	171	3,393	3,274	129	5,598	58,982	70,313
1957	115,658	7,474	7,728	736	4,598	4,650	132	6,215	57,755	87,510
1958	101,448	6,907	13,998	832	3,725	3,898	158	7,496	52,167	72,686
1959	94,854	6,337	8,577	368	3,609	3,489	183	8,415	60,280	58,537
1960	79,697	5,100	9,612	436	2,437	4,767	174	7,760	62,838	77,957
1961	122,839	7,840	7,821	437	4,636	3,828	157	7,175	71,681	74,842
1962	88,889	5,891	10,328	632	2,818	4,580	161	7,528	73,584	83,865
1963	67,652	4,645	18,032	810	4,982	4,339	155	7,241	71,058	82,107
1964	62,677	4,396	9,925	353	4,016	4,966	149	6,813	82,628	114,239
1965	83,826	5,926	12,935	841	5,165	4,177	133	6,279	79,106	98,294
1966	49,130	3,378	21,362	1,393	4,838	5,447	69	3,687	97,698	115,128
1967	34,804	2,507	17,478	692	5,704	5,377	139	7,475	106,886	126,995
1968	41,918	2,944	13,142	622	4,068	4,699	85	4,947	124,708	126,417
1969	35,100	2,433	21,944	1,149	6,552	6,013	88	5,068	144,388	157,950
1970	31,173	2,257	19,888	831	6,054	7,968	96	5,666	132,778	134,796
1971	26,670	1,958	9,390	510	7,208	5,395	79	4,808	128,388	98,289
1972	18,882	1,345	8,600	371	5,245	5,356	101	6,440	159,284	120,460
1973	9,798	859	(g)4,911	(g)334	6,135	13,945	113	7,087	146,456	220,719
1974	11,232	1,380	(g)9,576	(g)1,113	5,835	13,536	100	7,407	121,113	263,330
1975	19,281	3,439	8,527	1,217	7,547	11,195	109	9,252	114,069	167,631
1976	11,658	2,022	12,196	1,636	6,047	13,728	94	9,823	153,248	231,301
1977	11,355	2,051	7,190	1,127	5,285	24,708	78	10,152	169,674	331,164
1978	8,291	1,481	5,853	390	5,976	21,147	59	8,885	123,071	251,321
1979	7,872	1,660	2,735	373	8,703	29,280	66	10,508	150,185	326,466
1980	(h)4,342	(h)1,055	(h)5,292	(h)616	(h)10,314	(h)34,716	72	12,226	141,262	378,557
1981	4,952	1,279	3,824	585	9,506	17,467	32	7,050	135,529	398,051
1982	1,578	594	5,466	947	10,783	16,736	25	5,830	127,308	394,367
1983	1,086	343	7,274	1,278	12,655	18,783	18	4,813	123,953	392,144
1984	3,127	833	2,806	756	10,013	23,998	20	5,251	121,511	406,207
1985	3,140	876	5,084	946	10,220	27,629	22	7,173	140,675	523,304
1986	1,750	550	2,338	511	12,573	13,979	22	7,330	153,987	614,202
1987	1,879	528	2,311	570	13,879	40,292	10	4,199	161,085	731,352
1988					(i)					
1989	1,957	642	2	4	8,338	32,009	13	5,497	153,548	1,167,056

(a) From 1981 figures relate to foreign exports only. (b) From 1920, year ended 30 June. (c) From 1973, figures include meal and flour of wheat or meslin; from 1978, figures include meal and flour of all cereal grains. (d) Includes tomatoes for 1933 and earlier years. (e) Excludes plywood and veneers and small quantities of timber for which details are not recorded. (f) Includes greasy and degreased wool. (g) Some interstate details for 1973 included in 1974. (h) Figures represent foreign exports only. (i) Details not available; see Chapter 20.

EXPORTS OF CERTAIN COMMODITIES (a) — *continued*

Year (b)	Iron ore and concentrates		Lead and zinc ores (c) (d)	Tin ore and concentrates	Ilmenite concentrate (including leucoxene) (e)		Iron and steel (f)	Gold mint bullion (g)	
	Quantity	Value	Value	Value	Quantity	Value	Value	Quantity	Value (h)
	'000 tonnes	\$'000	\$'000	\$'000	'000 tonnes	\$'000	\$'000	kg	\$'000
1850	—	—	—	—	—	—	—	—	—
1860	—	—	2	—	—	—	—	—	—
1870	—	—	29	—	—	—	—	—	—
1880	—	—	31	—	—	—	—	—	—
1890	—	—	4	11	—	—	—	715	173
1900	—	—	—	76	—	—	7	31,103	7,589
1910	—	—	4	93	—	—	5	10,389	2,835
1920	—	—	102	129	—	—	16	1,275	452
1930	—	—	19	29	—	—	3	4	1
1940	—	—	2	14	—	—	31	36,329	24,056
1941	—	—	2	12	—	—	35	37,386	25,096
1942	—	—	2	6	—	—	19	30,326	20,590
1943	—	—	1	5	—	—	5	23,514	15,744
1944	—	—	1	6	—	—	23	10,855	7,250
1945	—	—	1	5	—	—	100	—	—
1946	—	—	—	8	—	—	9	—	—
1947	—	—	5	12	—	—	99	—	—
1948	—	—	146	17	—	—	89	11,073	7,656
1949	—	—	235	31	—	—	59	—	—
1950	—	—	272	49	—	—	95	2	2
1951	—	—	263	62	—	—	83	—	—
1952	53	102	1,369	107	—	—	58	12,286	13,143
1953	553	1,079	1,681	153	—	—	357	23,608	24,798
1954	592	1,157	270	97	—	—	279	13,001	13,280
1955	589	1,149	108	146	—	—	602	19,222	19,338
1956	480	936	888	322	—	—	530	12,752	12,842
1957	334	649	960	293	—	—	1,174	23,950	24,119
1958	446	870	410	166	89	1,011	2,470	6,470	6,511
1959	598	1,169	238	304	66	648	4,218	4,106	4,118
1960	809	1,601	229	415	90	713	11,198	18,662	18,738
1961	1,035	2,101	83	325	132	1,198	12,781	78,754	79,271
1962	1,069	2,209	45	563	159	1,441	13,826	14,090	12,195
1963	1,495	2,898	33	532	183	1,717	15,107	12,970	13,048
1964	1,381	2,743	18	1,080	263	2,571	15,029	11,975	12,045
1965	1,562	3,040	662	1,229	330	3,194	17,933	15,956	16,127
1966	2,657	6,967	124	1,521	430	4,181	14,458	25,909	26,147
1967	8,530	50,890	177	2,214	443	4,440	15,658	14,930	15,107
1968	14,563	104,506	58	2,330	462	4,645	11,442	11,602	11,816
1969	19,898	151,797	161	1,843	557	5,751	27,002	11,228	12,701
1970	31,542	233,580	41	1,386	573	6,068	34,306	12,037	13,874
1971	46,273	341,702	—	1,511	563	6,631	34,571	14,665	15,760
1972	48,658	347,500	—	2,043	580	7,416	36,415	17,646	21,950
1973	66,036	420,255	6	2,277	595	7,696	36,529	16,314	30,193
1974	79,286	488,239	15	2,732	728	9,774	60,811	10,093	27,393
1975	88,070	699,843	—	3,019	672	9,893	71,493	9,263	36,666
1976	83,090	772,199	—	2,538	647	9,995	60,765	13,659	50,527
1977	84,939	900,987	—	3,939	1,184	20,155	74,508	9,980	36,863
1978	80,128	935,018	—	4,947	986	17,653	50,285	10,344	50,906
1979	84,016	978,315	—	5,074	883	17,475	72,591	n.a.	(i)99,708
1980	76,725	1,025,660	220	5,841	1,119	25,433	83,447	n.a.	(i)56,317
1981	72,756	1,069,087	—	2,469	929	23,726	42,423	1,279	22,024
1982	72,532	1,195,486	11,285	1,057	890	25,003	6,645	5,054	72,060
1983	64,551	1,405,840	14,925	1,234	780	21,986	2,959	9,536	141,340
1984	80,942	1,551,299	18,420	127	1,068	35,176	2,473	21,312	308,580
1985	87,670	1,796,578	17,407	—	1,009	36,473	741	23,036	308,424
1986	80,309	1,861,779	6,040	—	999	45,149	747	28,483	458,728
1987	74,321	1,701,851	—	—	864	55,398	916	23,247	479,790
1988	—	—	—	—	(j)	—	—	—	—
1989	(k)94,949	(k)1,718,621	31,891	—	825	73,075	944	26,539	414,025

(a) From 1980, figures relate to foreign exports only. (b) From 1920, year ended 30 June. (c) Includes silver-lead and silver-lead-zinc ores and concentrates. (d) Between 1971 and 1988, the value of foreign exports of lead has been nil. From 1973, figures exclude interstate exports of lead ores and concentrates, and from 1978 interstate exports of zinc ores and concentrates. (e) From 1972, figures exclude foreign exports of beneficiated ilmenite; from 1978, figures also exclude interstate exports of all ilmenite and leucoxene. From April 1987 figures exclude ilmenite ores and concentrates in bags, drums and similar containers. (f) Principally pig-iron, cast iron and basic shapes and sections of iron and steel. (g) Gold sold abroad before consignment is not recorded as an export until actually shipped. (h) Includes additional premiums on sales of industrial gold. (i) Includes all processed gold, but excludes gold ores and concentrates. (j) Details not available; see Chapter 20. (k) Source: Western Australian Department of Mines.

## STATISTICAL SUMMARY

EXTERNAL TRADE  
(\$'000)

Year (a)	Imports (b)			Exports (b) (c)			Excess of—		Ships' stores
	Foreign	Interstate	Total	Foreign	Interstate	Total	Imports	Exports	
1850	n.a.	n.a.	125	n.a.	n.a.	44	80	..	n.a.
1860	318	20	338	160	16	175	163	..	3
1870	260	167	427	348	46	394	33	..	8
1880	349	358	707	736	252	988	..	280	11
1890	1,025	724	1,749	961	369	1,330	419	..	14
1900	6,574	5,350	11,924	11,246	2,250	13,496	..	1,572	208
1910	8,750	7,067	15,817	11,679	4,627	16,306	..	489	294
1920	9,918	14,819	24,737	28,918	2,392	31,311	..	6,574	827
1930	17,758	19,805	37,563	32,009	2,213	34,223	3,341	..	1,316
1940	12,568	27,450	40,017	19,256	28,518	47,774	..	7,756	1,380
1941	9,710	27,519	37,229	16,900	30,808	47,708	..	10,479	1,971
1942	10,391	26,110	36,501	23,157	25,241	48,398	..	11,897	2,305
1943	7,383	24,803	32,186	10,625	20,117	30,741	1,445	..	1,983
1944	7,770	26,628	34,399	22,845	13,472	36,317	..	1,919	2,747
1945	9,215	26,863	36,079	24,765	11,533	36,298	..	219	2,508
1946	11,018	32,238	43,256	38,917	11,662	50,579	..	7,322	2,511
1947	18,929	42,253	61,182	46,015	11,459	57,474	3,708	..	1,966
1948	34,311	51,329	85,640	97,389	11,599	108,989	..	23,349	2,474
1949	44,075	61,182	105,258	96,982	9,495	106,477	..	1,220	4,710
1950	68,844	70,044	138,887	106,590	12,421	119,011	19,876	..	4,720
1951	80,517	95,828	176,345	197,686	18,780	216,466	..	40,122	7,249
1952	120,474	124,209	244,683	151,562	35,404	186,966	57,717	..	8,419
1953	59,748	137,213	196,961	166,286	49,659	215,945	..	18,984	10,321
1954	85,051	165,374	250,425	136,849	39,190	176,039	74,386	..	7,266
1955	101,295	182,110	283,405	137,013	47,310	184,323	99,082	..	7,865
1956	92,963	177,952	270,915	152,286	68,466	220,752	50,164	..	10,592
1957	80,423	188,680	269,103	216,599	81,545	298,144	..	29,041	12,902
1958	91,775	195,103	286,879	179,516	79,836	259,352	27,527	..	11,602
1959	89,972	202,430	292,402	174,585	68,919	243,504	48,898	..	9,482
1960	92,363	246,696	339,059	231,766	77,278	309,043	30,016	..	8,954
1961	110,531	245,474	356,005	309,332	89,922	399,254	..	43,249	10,285
1962	100,178	245,208	345,386	287,619	84,626	372,245	..	26,859	9,379
1963	112,640	313,712	426,351	246,823	91,636	338,459	87,892	..	7,904
1964	121,677	323,176	444,854	286,132	101,811	387,943	56,911	..	9,733
1965	153,540	343,899	497,439	243,078	119,954	363,033	134,407	..	9,009
1966	175,690	403,054	578,744	314,404	119,619	434,023	144,721	..	10,058
1967	159,390	474,852	634,242	421,325	116,030	537,355	96,887	..	10,936
1968	206,980	527,052	734,031	475,260	124,505	599,765	134,266	..	14,824
1969	203,533	562,312	765,846	546,366	149,892	696,258	69,588	..	14,327
1970	242,299	640,189	882,487	675,027	149,861	824,888	57,600	..	15,092
1971	278,344	726,778	1,005,122	862,421	163,812	1,026,233	..	21,111	20,561
1972	283,263	787,788	1,071,051	946,504	156,303	1,102,807	..	31,756	22,477
1973	227,305	786,177	1,013,483	1,154,359	173,839	1,328,198	..	314,715	17,542
1974	368,910	939,361	1,308,272	1,414,968	222,208	1,637,176	..	328,904	29,224
1975	577,416	1,134,510	1,711,926	1,880,082	253,424	2,133,506	..	421,580	50,157
1976	637,439	1,418,726	2,056,165	2,117,898	290,733	2,408,631	..	352,466	46,638
1977	829,411	1,641,545	2,470,955	2,596,107	305,836	2,901,943	..	430,987	64,141
1978	937,350	1,828,510	2,765,860	2,588,954	355,151	2,944,105	..	178,245	71,009
1979	1,161,164	2,044,447	3,205,611	2,820,134	446,208	3,266,343	..	60,732	72,611
1980	1,449,694	2,337,808	3,787,502	3,854,047	635,388	4,489,434	..	701,933	126,176
1981	1,663,378	2,841,110	4,504,488	3,595,048	812,996	4,408,044	96,444	..	144,285
1982	2,535,112	3,141,096	5,676,208	3,907,623	888,540	4,796,163	880,045	..	134,198
1983	2,523,046	3,160,789	5,683,835	4,797,766	1,155,698	5,953,464	..	269,129	129,484
1984	1,935,552	3,638,883	5,574,436	5,062,112	1,410,145	6,466,257	..	891,822	110,706
1985	2,155,270	4,291,229	6,446,499	6,028,430	1,507,370	7,535,850	..	1,089,351	123,237
1986	2,202,948	4,783,474	6,986,422	6,529,348	1,623,017	8,152,365	..	1,165,943	87,674
1987	2,768,663	5,071,476	7,840,139	6,911,427	1,805,667	8,717,094	..	876,955	84,476
1988	3,216,985	5,404,518	8,621,503	7,491,773	1,808,478	9,300,251	..	678,748	87,220
1989	3,581,772	6,430,737	10,012,509	8,856,643	1,777,058	10,633,701	..	621,291	72,455

(a) From 1920, year ended 30 June. (b) From 1976, excludes interstate value of horses. Details are not available for publication. (c) Excludes ships' stores up to and including 1982. Ships' and aircraft stores for foreign owned vessels and aircraft are included in foreign and total exports from 1983 onwards. From 1982, excludes value of re-exports.

## INDUSTRIAL DISPUTES; WAGE RATES; UNEMPLOYMENT BENEFIT

Year	Industrial disputes (a)				Award rates of pay		Unemployment
	Number of disputes	Workers involved (e)	Working days lost		index numbers (b)		Persons on benefit (f)
			Number	Average per worker involved	Adult male wage and salary earners (c)(d)		
					Weekly	Hourly	
'000	'000	No.					
1920	45	12.0	166.6	13.87	n.a.	n.a.	..
1930	2	0.5	27.1	57.85	n.a.	n.a.	..
1940	4	3.0	7.4	2.44	36.8	33.1	..
1941	3	0.3	0.8	2.79	39.0	35.4	..
1942	8	1.8	8.9	4.89	41.5	37.6	..
1943	10	2.5	38.4	15.11	42.8	38.8	..
1944	30	11.0	90.0	8.16	42.6	38.6	..
1945	16	3.8	32.5	8.55	42.6	38.7	..
1946	11	6.4	69.6	10.94	43.6	39.5	422
1947	7	1.8	6.1	3.44	48.4	44.1	1,095
1948	9	2.4	7.8	3.33	53.9	53.9	409
1949	16	5.7	26.3	4.64	59.6	59.7	126
1950	15	2.0	5.7	2.93	71.0	71.7	267
1951	10	4.2	5.1	1.22	85.5	85.7	60
1952	21	19.2	127.8	6.67	97.5	97.7	57
1953	11	3.7	5.0	1.36	100.4	100.7	844
1954	15	5.5	21.7	3.94	101.7	101.9	427
1955	16	9.8	9.6	0.97	106.3	106.6	157
1956	14	11.1	31.9	2.87	110.8	111.0	473
1957	14	5.4	3.1	0.57	113.9	114.1	1,940
1958	20	11.0	3.0	0.27	114.7	114.9	2,330
1959	20	11.2	11.2	1.00	120.7	120.8	2,852
1960	43	25.7	27.3	1.06	126.8	127.1	2,512
1961	22	9.7	23.2	2.40	128.8	129.0	2,154
1962	28	8.4	6.3	0.75	129.5	129.7	2,932
1963	28	42.6	32.0	0.75	132.8	133.0	2,674
1964	26	6.2	7.1	1.16	137.5	137.6	2,677
1965	33	12.6	10.0	0.79	143.5	143.5	1,679
1966	25	2.9	6.2	2.17	153.6	153.8	785
1967	26	5.1	6.0	1.18	159.6	159.9	718
1968	70	18.7	21.8	1.16	169.0	168.7	608
1969	104	59.1	101.4	1.72	179.5	179.3	524
1970	125	46.5	141.1	3.03	198.2	198.0	474
1971	132	35.8	69.4	1.94	219.5	219.4	872
1972	105	28.3	94.6	3.34	234.2	232.5	2,808
1973	160	37.6	117.3	3.12	267.9	266.3	4,960
1974	257	188.1	256.9	1.37	357.7	356.5	2,863
1975	236	53.8	100.7	1.87	401.2	398.5	9,317
1976	250	100.7	252.1	2.50	104.8	104.8	13,598
1977	229	54.9	220.5	4.02	116.0	116.0	15,706
1978	306	76.1	197.9	2.60	125.3	125.3	20,470
1979	252	169.5	348.1	2.06	131.7	131.7	(g)29,000
1980	368	69.4	191.0	2.75	145.7	145.8	(g)29,800
1981	364	72.9	244.0	r3.35	166.1	166.2	28,638
1982	436	63.6	r158.9	r2.50	187.6	190.3	31,636
1983	300	42.3	270.6	6.40	197.2	200.9	50,992
1984	406	69.2	119.2	1.72	205.9	210.7	(g)57,514
1985	r361	48.7	92.9	1.91	103.8	103.8	(g)54,028
1986	r267	50.6	143.1	r2.83	106.3	106.5	55,089
1987	245	43.1	115.3	2.68	110.0	110.3	52,755
1988	221	60.9	160.6	2.64	118.5	119.1	31,697

(a) Excludes disputes involving cessation of work of less than 10 man-days. Details of the number of disputes and workers involved in disputes which commenced in any year and were still in progress during the following year are included in the figures for both years. (b) End of December. Prior to 1976 - Base: weighted average wage rate for Australia, 1954 = 100. From 1976 to June 1985 - Base: weighted average wage rate for Australia, June 1976 = 100. From June 1985 - Base: weighted average wage rate for Australia, June 1985 = 100. (c) Excludes workers in rural industry. (d) Prior to June 1985 index related to wage earners only. From June 1985 relates to wage and salary earners. (e) Includes workers indirectly involved, i.e. those put out of work at an establishment where a stoppage occurred but not themselves parties to the dispute. (f) Year ended 30 June; average number of persons on benefit at end of each week. (g) Estimated.

## CONSUMER PRICE INDEX (a)

Year ended 30 June	Group index numbers—Perth								Weighted average of eight capital cities (b)	
	Food	Clothing	Housing	Household equipment and operation	Transportation	Tobacco and alcohol	Health and personal care	Recreation and education (c)	All groups	All groups
1949	12.1	15.9	11.4						14.1	14.0
1950	13.4	18.3	12.1						15.4	15.2
1960	26.0	28.8	24.3						27.1	27.3
1961	27.3	29.5	25.8	n.a.	n.a.	n.a.	n.a.		28.1	28.4
1962	27.2	29.7	26.6						28.2	28.5
1963	27.3	29.8	27.5						28.4	28.6
1964	27.6	30.1	28.4						28.7	28.8
1965	28.7	30.4	29.1						29.6	29.9
1966	30.0	30.8	30.1						30.7	31.0
1967	31.5	31.4	31.6	35.5	32.5	31.5			32.0	31.8
1968	32.5	32.1	33.4	36.1	33.6	32.3			32.9	32.9
1969	33.0	32.8	35.6	36.8	34.2	33.0			33.7	33.7
1970	34.1	33.9	37.9	37.4	35.9	33.3	26.7	n.a.	35.0	34.8
1971	35.5	35.3	39.7	38.9	37.3	35.7	27.1		36.5	36.5
1972	36.7	37.3	42.2	41.3	39.1	38.7	30.1		38.6	39.0
1973	39.3	39.6	44.2	43.2	40.1	41.3	31.9		40.7	41.3
1974	44.7	45.0	47.1	46.4	43.1	43.8	36.6		45.0	46.6
1975	50.8	54.7	55.0	54.9	51.4	52.8	47.2		53.1	54.5
1976	56.8	63.5	66.2	65.4	60.1	65.0	39.2		60.6	61.5
1977	64.8	73.1	77.2	70.7	67.0	71.3	77.3		70.2	70.0
1978	74.4	81.2	85.1	77.4	73.1	74.8	91.7		77.8	76.7
1979	82.1	87.0	89.2	83.0	81.1	87.3	84.5		84.0	83.0
1980	91.7	92.9	92.5	89.4	90.6	94.4	96.6		91.9	91.4
1981	100.0	100.0	100.0	100.0	100.0	100.0	100.0		100.0	100.0
1982	110.2	107.2	109.0	109.5	111.9	109.1	130.9		111.2	110.4
1983	119.8	114.0	118.6	120.4	123.5	122.9	159.8	105.8	122.5	123.1
1984	128.9	120.9	124.1	129.1	133.9	141.0	156.9	111.8	131.0	131.6
1985	136.2	128.8	131.6	134.7	142.8	153.2	125.7	115.1	136.1	137.2
1986	146.3	140.2	141.7	145.7	153.7	168.7	135.9	123.9	147.1	148.7
1987	157.1	154.4	154.7	159.0	172.3	188.1	156.0	135.7	161.8	162.6
1988	166.3	165.8	163.6	170.3	184.5	203.0	175.1	146.5	173.3	174.5
1989	181.2	177.4	(d)184.7	181.4	191.4	212.9	190.8	155.4	186.1	187.3

(a) The base of each index is Year 1980-81 = 100 unless otherwise noted. (b) Prior to 1980-81, weighted average of six State capital cities. (c) Base of index is March quarter 1982 = 100. (d) These series have been affected by the adoption of a new approach to the treatment of mortgage interest charges. For more detail refer to an information paper *The Australian Consumer Price Index: Treatment of Mortgage Interest Charges* (ABS Catalogue No. 6442.0).

## STATE AND LOCAL AUTHORITIES: RECEIPTS AND OUTLAY

NOTE: This series replaces 'Public Revenue and Expenditure: Consolidated Revenue Fund' and 'Net Expenditure from Loan Funds; Public Debt' on later pages.

(\$ million)

Year ended 30 June	Receipts and financing transactions						Outlay				
	Taxes, fees, fines	Net operating surpluses public trading enterprises	Property and other income	Grants from the Commonwealth Government	Financing transactions	Total funds available	Final consumption expenditure	Capital expenditure on goods(a)	Transfer payments	Net advances paid	Total outlay
1976	322.1	66.2	98.9	772.5	52.8	1,312.5	728.5	435.1	131.2	17.8	1,312.5
1977	371.0	36.9	119.9	844.6	155.3	1,527.6	870.7	482.6	157.1	17.2	1,527.6
1978	423.2	80.3	167.9	974.5	258.8	1,904.6	1,004.7	550.6	330.3	18.8	1,904.6
1979	466.3	90.0	172.1	1,056.2	315.3	2,100.0	1,112.7	608.5	363.4	15.5	2,100.0
1980	518.6	97.7	184.7	1,168.1	352.0	2,321.0	1,267.0	645.6	408.8	-0.4	2,321.0
1981	589.9	130.2	212.4	1,307.0	280.8	2,520.4	1,425.1	627.4	465.5	2.4	2,520.4
1982	690.3	154.7	249.1	1,430.1	316.4	2,840.5	1,608.9	716.7	516.2	-1.3	2,840.6
1983	771.7	193.5	316.3	r1,618.8	r856.6	r3,756.8	1,863.6	1,196.3	677.0	19.9	3,756.8
1984	923.5	274.0	355.2	r1,874.4	r834.7	r4,261.8	2,096.1	1,252.3	850.3	63.1	4,261.8
1985	1,062.0	300.9	394.5	2,067.3	r584.9	r4,409.5	r2,312.8	1,102.2	r972.5	21.9	r4,409.4
1986	1,145.0	400.7	510.1	r2,214.5	r644.3	r4,914.6	r2,581.0	1,147.2	r1,110.0	76.4	r4,914.6
1987	1,397.2	518.3	r529.4	r2,394.8	r678.6	r5,518.3	r2,815.3	1,328.4	r1,293.7	80.9	r5,518.4
1988	1,698.7	563.4	599.9	2,594.3	432.0	5,888.3	3,133.8	1,222.4	1,482.1	49.8	5,888.2

(a) Includes gross fixed capital expenditure, increase in stocks and expenditure on land and intangible assets (net).

PUBLIC REVENUE AND EXPENDITURE: CONSOLIDATED REVENUE FUND  
(\$'000)

Year (a)	Revenue					Expenditure						
	Common-wealth funds	Public utilities	Departmental (b)	Taxation	Territorial (c)	Total revenue	Public utilities	Interest and sinking fund	Departmental			Total expenditure
									Educa-tion	Health	Other	
1840					5	34		n.a.	n.a.			30
1850					4	38		n.a.	n.a.			33
1860					35	140		n.a.	3			123
1870	n.a.	n.a.	n.a.	n.a.	40	196	n.a.	n.a.	7	n.a.	n.a.	226
1880					72	360		40	19			409
1890					217	829		144	23			803
1900		2,612	182	244	380	5,751	1,863	880	138	198	2,049	5,231
1910	1,407	3,916	551	673	649	7,315	2,440	2,006	367	328	1,533	6,895
1920	1,197	6,364	1,188	1,688	818	11,727	5,156	4,124	829	642	1,931	13,063
1930	1,547	10,596	3,134	2,906	950	19,501	8,073	6,891	1,385	649	2,872	20,537
1931	1,547	9,228	3,279	2,269	678	17,374	6,654	7,243	1,346	486	3,950	20,215
1932	1,547	8,818	2,766	2,014	585	16,071	5,724	7,015	1,098	328	4,543	19,186
1933	1,947	8,873	2,701	2,257	558	16,664	5,682	7,009	1,108	333	3,761	18,392
1934	2,147	8,867	2,240	2,737	626	16,963	5,870	7,095	1,153	309	3,560	18,541
1935	2,413	9,837	1,562	3,804	812	18,663	6,391	7,100	1,225	326	3,342	18,997
1936	2,617	10,366	1,677	4,372	767	20,067	6,756	7,135	1,331	341	3,595	19,891
1937	2,013	10,633	1,727	4,807	773	20,371	7,247	7,237	1,432	381	4,024	21,113
1938	2,097	11,148	1,980	5,190	749	21,638	7,249	7,579	1,474	380	4,158	21,659
1939	2,087	11,159	1,786	5,728	634	21,899	7,857	7,779	1,514	401	3,992	22,340
1940	2,137	11,102	1,942	5,992	632	22,240	7,662	8,021	1,545	416	4,070	22,534
1941	2,247	11,366	1,916	6,255	638	22,864	7,534	8,114	1,568	421	4,262	22,842
1942	2,207	12,133	2,204	6,222	620	23,880	8,282	8,204	1,662	436	4,293	23,877
1943	7,852	13,518	2,497	1,330	634	26,303	9,377	8,183	1,627	458	5,564	26,254
1944	7,935	13,626	2,868	1,553	700	27,178	9,870	8,185	1,747	506	5,780	27,102
1945	8,044	13,618	3,402	1,715	697	27,908	10,064	8,251	1,778	485	6,261	27,899
1946	9,960	13,303	2,519	1,936	709	28,815	10,825	8,168	2,005	1,010	5,621	28,815
1947	11,461	11,769	3,105	2,138	1,053	29,962	10,866	8,012	2,447	1,369	5,910	30,057
1948	14,515	13,242	3,575	2,354	1,202	35,421	13,996	8,089	3,298	1,841	7,280	36,125
1949	17,136	15,032	4,564	2,683	1,106	41,121	16,720	8,215	3,519	2,613	9,942	42,756
1950	22,975	17,792	5,733	3,240	1,225	51,622	20,237	8,508	4,160	3,633	13,096	51,574
1951	25,343	19,085	5,911	3,912	1,230	56,312	21,974	8,994	5,269	4,465	13,180	55,994
1952	29,923	24,335	6,863	4,633	1,300	67,910	27,490	9,741	7,262	6,269	15,696	69,094
1953	39,056	22,385	8,557	5,247	1,513	77,768	32,044	10,611	8,686	6,926	17,639	78,784
1954	38,342	29,860	8,378	6,468	1,929	86,292	35,234	12,147	9,503	7,675	18,797	86,497
1955	38,759	32,645	9,433	7,258	2,014	91,440	36,089	13,857	11,217	8,026	19,838	92,408
1956	43,373	33,969	9,779	8,036	2,498	99,225	39,184	15,451	12,482	9,344	21,501	102,886
1957	46,759	37,133	12,548	9,027	2,433	108,662	42,022	17,043	13,636	10,067	33,645	112,487
1958	51,808	34,525	13,640	10,729	2,516	114,108	40,103	19,303	15,172	11,026	25,572	116,355
1959	55,496	36,080	14,522	10,368	2,783	120,136	40,317	20,844	15,819	11,967	29,244	123,506
1960	58,871	38,575	15,696	11,834	2,878	128,776	42,418	23,053	17,282	13,565	29,861	131,587
1961	65,519	40,830	16,372	12,079	2,797	138,665	41,072	24,628	19,541	15,018	35,160	141,075
1962	73,430	42,456	16,549	12,926	3,283	149,852	42,097	27,250	21,417	14,935	40,131	151,780
1963	75,847	43,559	18,134	14,762	3,501	157,182	42,267	29,980	22,850	16,073	41,254	158,687
1964	78,988	45,376	20,948	17,604	3,751	167,888	44,247	31,771	25,880	18,705	43,430	170,681
1965	88,565	39,778	26,712	19,512	4,107	180,143	43,360	34,669	29,133	21,160	49,401	184,840
1966	103,459	45,683	28,753	22,574	4,598	206,655	47,106	37,926	34,016	23,086	56,869	206,665
1967	106,748	52,787	31,461	27,536	7,655	228,146	53,182	41,662	36,746	26,429	61,512	228,174
1968	112,617	56,226	33,135	34,916	11,845	250,738	60,728	43,864	41,224	29,294	65,362	249,909
1969	126,621	54,407	33,035	41,602	17,301	275,081	64,016	47,083	46,441	33,613	74,822	276,135
1970	141,326	62,921	36,905	50,865	23,633	318,189	71,166	51,427	55,839	41,343	87,660	318,901
1971	170,396	68,350	45,583	48,434	32,187	367,252	79,717	54,178	66,341	52,575	107,129	371,620
1972	180,132	73,446	54,131	78,490	34,992	423,999	82,410	62,029	82,472	59,862	125,260	424,890
1973	200,633	69,158	66,711	97,141	37,162	473,840	88,372	65,280	94,547	71,866	144,005	477,330
1974	232,111	85,291	76,306	126,929	43,346	567,683	104,178	69,200	115,982	100,841	168,122	573,414
1975	313,846	108,921	96,930	160,307	49,010	734,240	121,494	75,300	165,705	148,161	213,042	743,373

(a) From 1900, year ended 30 June. (b) Reimbursements, fees, etc. (c) Revenue from sales, leases, licences and royalties relating to land, mining and timber.

NOTE: This table has been replaced by a new series 'State and Local Authorities: Receipts and Outlays' on previous page.

**NET EXPENDITURE FROM LOAN FUNDS; PUBLIC DEBT**  
(**\$'000**)

Year (a)	<i>Net expenditure from loan funds on public works and services (b)</i>							<i>Public debt (at end of year)</i>	
	<i>Railways, tramways and buses</i>	<i>Electricity supply</i>	<i>Harbours, rivers, light-houses, etc.</i>	<i>Water supplies, sewerage, drainage and irrigation</i>	<i>Public buildings</i>	<i>Other</i>	<i>Total</i>	<i>Gross amount outstanding</i>	<i>Sinking fund</i>
1860	-	-	-	-	-	-	-	4	-
1870	-	-	-	-	-	-	-	-	-
1880	-	(c)549	(d)38	-	-	n.a.	(d)802	722	n.a.
1890	-	3	6	2	(e)76	-	32	2,735	170
1900	-	302	395	949	-	110	1,757	23,349	754
1910	-	908	174	199	152	626	2,058	46,575	5,139
1920	-	242	204	94	21	4,765	5,327	93,644	13,656
1930	-	1,819	529	610	108	4,226	7,291	142,389	2,081
1931	-	878	257	420	-	1,457	3,012	153,130	2,621
1932	-	263	155	1,152	-	1,055	2,624	159,416	2,618
1933	-	374	485	1,355	69	1,838	4,121	167,029	2,693
1934	-	659	492	1,606	196	2,344	5,297	171,696	743
1935	-	997	610	2,155	213	1,103	5,076	177,180	1,048
1936	-	946	602	2,487	169	700	4,903	180,688	1,138
1937	-	491	352	2,303	178	741	4,064	184,666	1,292
1938	-	950	201	1,843	183	1,144	4,321	187,424	614
1939	-	441	184	1,777	230	640	3,272	190,945	719
1940	-	200	104	1,615	732	974	3,224	192,461	608
1941	214	18	152	1,649	306	480	2,819	195,583	1,147
1942	110	25	111	605	70	437	1,359	194,718	535
1943	157	92	133	100	55	217	754	193,976	347
1944	49	31	Cr. 143	75	166	34	212	192,957	140
1945	140	11	61	150	241	492	1,094	191,790	254
1946	142	208	75	473	451	276	1,625	193,852	1,008
1947	535	332	173	1,453	772	821	4,087	198,005	1,091
1948	676	1,471	316	1,388	1,097	125	5,074	200,549	309
1949	913	2,131	449	1,626	1,099	942	7,161	207,377	126
1950	4,496	4,691	804	2,002	1,357	2,859	16,209	219,100	142
1951	3,723	6,591	1,164	4,091	2,003	3,081	20,653	246,374	17
1952	15,198	6,684	2,694	4,803	2,729	3,409	35,517	276,577	647
1953	13,533	179	2,422	4,858	5,432	8,787	35,213	306,144	1,861
1954	11,295	1,406	2,328	3,939	3,144	6,276	28,388	331,565	822
1955	9,752	1,410	1,920	5,661	3,993	6,726	29,462	355,763	442
1956	6,139	2,049	1,638	5,516	4,187	7,098	26,629	377,465	245
1957	5,519	4,200	950	7,119	5,599	9,169	32,556	410,290	112
1958	4,209	2,480	1,398	7,694	5,891	6,599	28,272	436,857	147
1959	5,711	2,200	1,428	8,395	7,410	7,199	32,342	464,237	173
1960	4,953	1,553	1,373	9,547	8,723	6,355	32,504	493,575	171
1961	4,221	400	1,966	10,314	10,479	8,037	35,418	523,070	94
1962	5,432	300	2,587	10,952	12,032	6,449	37,751	555,130	222
1963	6,204	500	2,438	10,770	13,420	5,563	38,894	587,336	485
1964	7,496	-	3,028	10,537	15,630	6,409	43,100	626,045	442
1965	6,800	794	2,822	10,957	19,948	5,457	46,779	665,620	473
1966	7,628	1,434	2,583	12,667	19,908	3,580	47,800	705,514	267
1967	9,068	2,427	1,746	13,642	18,230	5,902	51,015	748,601	216
1968	7,750	4,542	2,402	14,552	18,816	5,115	53,177	792,969	408
1969	10,547	5,679	1,190	12,560	20,116	4,765	54,859	840,343	3,015
1970	6,331	4,566	2,055	13,330	24,627	8,594	59,504	886,778	182
1971	7,194	27	2,202	15,176	25,549	13,492	63,640	924,111	582
1972	5,919	3,666	1,902	18,369	23,994	32,606	86,456	975,958	1,216
1973	4,179	4,104	2,371	23,598	32,872	21,882	89,006	1,030,060	265
1974	5,569	3,467	2,505	26,708	34,324	3,291	75,863	1,074,111	4,899
1975	6,185	4,069	3,728	24,487	45,262	6,140	89,871	1,120,313	1,037

(a) From 1900, year ended 30 June. Sinking fund at 31 March from 1900 to 1928. (b) From 1928 includes expenditure from Loan Suspense Account. (c) Total amount for the years 1877 to 1881. (d) Total amount for the years 1872 to 1881. (e) Includes expenditure prior to 1890.

NOTE: This table has been replaced by a new series 'State and Local Authorities: Receipts and Outlay' on an earlier page.



BANKING AND PERMANENT BUILDING SOCIETIES

Year	Trading banks			Savings banks (a)		Permanent building societies (b)			
	Depositors' balances (c)	Loans advances and bills discounted (c)	Weekly debits to customers' accounts (d)	Operative accounts at end of year	Depositors' balances at end of year	Liabilities		Assets	
						With-drawable shares	Deposits	Amount due on loans	Total
	\$'000	\$'000	\$m	No.	\$'000	\$'000	\$'000	\$'000	\$'000
1870	n.a.	n.a.		895	27				
1880	n.a.	n.a.		1,299	45				
1890	1,904	2,809		3,014	69				
1900	8,781	5,514	n.a.	33,646	2,598				
1910	12,627	12,228		84,262	6,955				
1920	24,742	21,594		211,415	14,516				
1930	25,524	41,773		367,665	23,457				
1940	42,219	47,529		233,649	23,720				
1950	116,458	55,301	27.4	378,670	79,225				
1951	149,244	66,680	38.6	392,790	89,345				
1952	170,923	83,353	43.6	403,678	94,342				
1953	170,234	87,353	44.2	414,288	99,589				
1954	181,863	106,429	50.8	422,480	105,229				
1955	180,895	137,830	52.4	426,637	107,258				
1956	174,070	142,156	53.9	446,419	115,868				
1957	185,576	135,074	57.1	473,548	125,386				
1958	186,478	141,198	60.4	497,690	131,896				
1959	180,300	147,106	61.5	527,079	142,998				
1960	192,076	142,064	69.7	550,966	157,246	n.a.	n.a.	n.a.	n.a.
1961	190,094	146,244	75.7	577,619	161,424				
1962	209,274	139,204	80.4	625,070	181,056				
1963	219,952	153,528	88.2	683,417	208,812				
1964	242,268	164,878	96.4	736,009	239,766				
1965	272,430	186,000	106.3	786,340	261,654				
1966	310,432	195,190	122.4	848,562	292,871				
1967	355,899	212,023	138.6	905,349	330,807				
1968	398,837	252,627	169.1	970,120	373,602				
1969	462,559	280,147	209.0	1,036,180	412,984				
1970	558,017	323,824	246.4	1,096,466	431,877				
1971	544,732	351,110	295.3	1,153,420	464,611				
1972	552,546	357,410	318.4	1,205,448	511,457				
1973	693,456	443,330	355.9	1,250,576	608,133				
1974	829,002	604,460	439.4	1,327,699	684,974				
1975	906,589	673,526	515.9	1,401,485	779,427				
1976	1,092,350	791,376	680.0	1,443,883	897,693	522,517	286,320	632,929	849,182
1977	1,376,813	927,709	814.4	1,466,200	960,548	646,176	383,451	851,896	1,078,720
1978	1,448,206	1,163,207	975.9	1,511,092	1,048,510	747,307	508,710	1,046,718	1,308,935
1979	1,621,852	1,368,657	1,173.7	1,539,416	1,133,627	858,380	681,851	1,270,625	1,601,527
1980	1,742,801	1,678,121	1,463.3	1,579,722	1,216,182	966,319	812,817	1,491,983	1,849,490
1981	2,026,507	1,943,299	1,826.3	1,647,837	1,360,315	1,020,465	994,100	1,650,304	2,100,204
1982	2,521,072	2,288,020	2,283.4	1,741,114	1,514,207	1,129,730	1,030,780	1,793,793	2,261,263
1983	2,877,685	2,571,177	2,651.2	1,835,917	1,910,538	1,265,212	948,426	1,743,068	2,312,162
1984	3,004,651	2,874,000	3,043.7	1,961,811	2,214,373	1,374,872	861,647	1,664,158	2,345,479
1985	3,622,307	3,342,663	3,857.6	2,051,681	2,402,828	1,463,808	908,036	1,807,865	2,468,670
1986	4,653,781	4,032,226	4,846.9	2,153,457	2,649,943	1,534,979	1,058,426	1,977,938	2,702,788
1987	5,143,047	4,652,428	5,133.2	2,618,596	3,975,333	1,685,760	1,104,696	2,056,374	2,913,559
1988	5,881,611	5,440,095	6,167.8	2,638,557	5,442,147	1,105,345	518,082	1,222,144	1,707,310

(a) From 1900, year ended 30 June. (b) At 30 June. (c) Average based on amounts as at close of business each week. From 1927, year ended 30 June. (d) Weekly average for year ended 30 June. Excludes debits to Commonwealth Government accounts at city branches. From 1946-47 includes The Rural and Industries Bank of Western Australia (General Banking Department).

## WESTERN AUSTRALIA IN RELATION TO AUSTRALIA

	Unit	Date or period	Western Australia	Australia	Percentage
Area	sq km	..	2,525,500	7,682,300	32.9
Proportion of area having rainfall —					
Under 250 mm	per cent	..	58.0	39.0	..
250 mm and under 500 mm	per cent	..	29.2	31.8	..
500 mm and over	per cent	..	12.8	29.2	..
Population (a) (b)	number	30 December 1988p	1,568,701	16,676,839	9.4
Population increase	number	1987–1988	48,394	277,908	17.4
Rate of population increase	per cent	1987–1988	3.1	1.7	..
Births registered (b)	number	1988	25,143	246,193	10.2
Deaths registered (b)	number	1988	9,532	119,866	8.0
Marriages registered	number	1988	10,578	116,816	9.1
Divorce – Dissolutions granted	number	1988	3,964	41,007	9.7
Employed labour force (c)	'000	November 1989	758.0	7,870.7	9.6
Average weekly earnings – all male employees (d)	\$	August 1989	531.7	527.1	..
Unemployed on benefit	number	30 June 1989	31,697	374,295	8.5
Industrial disputes – Working days lost	'000	1988	160.6	1,641.3	9.8
Area under crop	'000 hectares	1988–89	5,082	17,527	29.0
Area under sown pasture	'000 hectares	1988–89	7,788	30,185	25.8
Area of —					
Wheat for grain	'000 hectares	1988–89	3,297	8,827	37.4
Oats for grain	'000 hectares	1988–89	389	1,309	29.7
Barley for grain	'000 hectares	1988–89	383	2,190	17.5
Hay	'000 hectares	1988–89	248	1,350	18.4
Fruit and vineyards	'000 hectares	1988–89	8	173	4.5
Livestock —					
Sheep	'000	31 March 1989	37,090	161,603	23.0
Cattle	'000	31 March 1989	1,702	22,434	7.6
Pigs	'000	31 March 1989	285	2,671	10.7
Production —					
Wheat for grain	'000 tonnes	1988–89	5,225	13,935	37.5
Wool (e)	'000 tonnes	1988–89	203.2	960.7	21.2
Meat (f)	'000 tonnes	1988–89	218.3	2,746.0	7.9
Whole milk (g)	mil. litres	1988–89	245	6,289	3.9
Butter (g)	tonnes	1988–89	1,139	95,853	1.2
Value of agricultural commodities produced	\$m	1988–89	3,719	21,983	16.9
Mining establishments – Value added	\$m	1987–88	(h)4,227	13,754	30.7
Iron ore production	'000 tonnes	1987–88	97,967	102,202	95.9
Coal production	'000 tonnes	1987–88	(i)3,702	136,428	2.7
Crude oil production (j)	megalitres	1988–89	3,205	28,255	11.3
Manufacturing establishments (k) —					
Number	..	1987–88	2,675	31,606	8.5
Employment – At 30 June	'000	1987–88	72.1	1,063.8	6.8
Wages and salaries paid	\$m	1987–88	1,604.8	23,949.8	6.7
Turnover	\$m	1987–88	9,416.9	133,819.6	7.0
New dwelling units commenced (l)	number	1988–89	26,620	174,960	15.2
Value of all building commenced	\$m	1988–89	3,226.6	30,189.4	10.7
Foreign imports	\$m f.o.b.	1988–89	3,581.8	47,064.2	7.6
Foreign exports	\$m f.o.b.	1988–89	8,856.6	43,462.2	20.4
Motor vehicles on register	'000	30 June 1989	986.2	9,806.1	10.1
New motor vehicles registered	'000	1988–89	60.8	588.3	10.3
Road traffic accidents – Persons killed	number	1989	213	2,403	8.9
Retail turnover (excluding motor vehicles, etc.)	\$m	1988–89	6,749.1	76,842.2	8.8
Savings bank deposits per head	\$	31 December 1988	3,799	4,091	..
Household income per head	\$	1988–89	15,092	15,702	..
Age and invalid pensions (including wives and spouse/ carers pensions)	number	30 June 1989	146,115	1,762,614	8.3
Disability and service pensions (including dependants)	number	30 June 1989	67,007	756,784	8.9
Education Institutions—					
Government schools	number	1989	753	7,515	10.0
Non-government schools	number	1989	241	2,523	9.6
Higher education institutions (m)	number	31 March 1989	4	82	4.9
Student enrolment —					
Government schools	number	1989	212,461	2,194,355	9.7
Non-government schools	number	1989	67,503	837,032	8.1
Higher education institutions (m)	number	31 March 1989	44,479	441,076	10.1

(a) Based on Estimated Resident Population. (b) Based on State of usual residence. (c) In civilian employment. Excludes defence forces and employees in agriculture and private domestic service, and trainee teachers. (d) Not comparable with 'Average weekly earnings per employed male unit' previously published. (e) In terms of greasy wool. Comprises shorn wool, dead wool, fellmongered wool and wool exported on skins. (f) Comprises sheep, cattle, pig and poultry meat. Excluding Tasmanian poultry production. Dressed carcass weight. Excludes offal. (g) Source: Australian Dairy Corporation. (h) Excludes establishments predominantly engaged in quarrying sand and gravel. (i) Source: Department of Mines. (j) Source: Department of Primary Industries and Energy. (k) Excludes details for single establishments manufacturing enterprises employing fewer than four persons. Excludes electricity and gas establishments. (l) Number of new dwelling units has been rounded to nearest ten. (m) Commonwealth-funded only.

## APPENDIX

### Articles Published in Previous Issues (a)

In cases where an article has been published in more than one previous issue, the reference to its last appearance only is given.

<i>Article</i>	<i>Year Book</i>
Aboriginal population, history of ... ..	1984, pp.1-8
Agriculture, Institute of, University of Western Australia ... ..	1975, pp. 217-18
Air pollution and the weather ... ..	1975, pp. 63-5
Albany, Port of ... ..	1971, pp. 449-51
ANZAAS Congress: Perth, 1973 ... ..	1973, pp. 562-4
Australian Stock Exchange (Perth) Ltd. ... ..	1989 pp.257-9
Basic wage, historical summary—	
Commonwealth ... ..	1968, pp. 396-401
State ... ..	1968, pp. 403-5
Captain Fremantle's Report of Arrival of First Settlers, text of ... ..	1976, pp. 541-2
Captain Stirling's 'Narrative of Operations', text of ... ..	1974, pp. 533-41
Census of Wholesale Establishments, 1968-69 ... ..	1976, pp. 434-7
Censuses of population and housing, 1911 to 1966 ... ..	1972, pp. 547-70
Centenary of the discovery of the Collie coalfields ... ..	1983, pp. 393-7
Community Welfare, Department for, history of ... ..	1981, pp. 135-9
Computer Service Centre, Perth ... ..	1969, p. 504
Conservation of the fauna ... ..	1976, pp. 93-5
Conservation of the flora ... ..	1975, pp. 78-80
Crown Law Department, history of ... ..	1983, pp. 129-31
Education Department, history of ... ..	1972, pp. 117-21
Electoral Divisions (Commonwealth) ... ..	1971, pp. 97-8
Electoral Divisions (Commonwealth), origin of name of ... ..	1970, p. 530
Electoral Provinces and Electoral Districts (State) ... ..	1976, pp. 116-17
Esperance, Port of ... ..	1973, pp. 444-6
Exploration in Western Australia ... ..	1975, pp. 9-28
Export price index ... ..	1970, p. 507

## Articles Published in Previous Issues (a) – *continued*

In cases where an article has been published in more than one previous issue, the reference to its last appearance only is given.

<i>Article</i>	<i>Year Book</i>
Fisheries and Wildlife, Department of, history of	1984, pp. 121-4
Flag of Western Australia, history	1984, p. 120
Flora of Western Australia—	
Acacia	1965, pp. 59-60
'Christmas tree' ( <i>Nuytsia floribunda</i> )	1962, p. 51
Economic value of the flora	1968, pp. 54-5
Grasses	1976, pp. 69-72
Orchids	1968, pp. 48-9
Proteaceae family in Western Australia	1974, pp. 52-4
Rutaceae family in Western Australia	1972, pp. 53-5
Special features of the flora	1962, pp. 51-2
Forests Department, history of	1976, pp. 125-7
Fremantle, Port of	1970, pp. 441-3
Geraldton, Port of	1972, pp. 447-9
Government administration, Commonwealth	1973, p. 542
Governor Darling's letter to the Earl of Bathurst, text of	1974, pp. 541-2
Governors and Acting Governors of Western Australia	1982, pp. 121-2
Governor Stirling's Commission dated 4 March 1931, text of	1979, pp. 12-16
Historical review — chronological notes from 1829	1967, pp. 2-33
Historical survey of Western Australia	1973, pp. 1-15
Housing and Construction, historical review	1986, pp. 367-9
Hydrocarbon Exploration on the North-West Shelf	1976, pp. 37-9
Industrial development, Department of	1974, p. 403
Integrated Economic Censuses, 1968-69	1971, pp. 552-64
Jesus People	1989 pp.115-6
Kuri Bay pearls	1974, pp. 558-9
Labour Force Survey	1971, pp. 508-10
Land settlement schemes, government	1976, pp. 328-9
Land tenure system, origin and development of	1960, pp. 198-9
Lands and Surveys Department, history of	1980, pp. 128-31
Linseed, area and production	1973, pp. 349-50
Local government in Western Australia, development of	1971, pp. 565-70
Lower Great Southern Statistical Division Profile	1989 pp.260-71
McNess Housing Trust	1969, p. 205
Major Lockyer's letter to Colonial Secretary MacLeay, text of	1977, pp. 553-7
Maritime Museum, Western Australian	1986, pp. 237-8
Meteorites, Western Australian	1973, pp. 34-5
Meteorological services—	
History of	1960, pp. 34-5
Provision of	1966, pp. 46-7
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## Articles Published in Previous Issues (a) – *continued*

In cases where an article has been published in more than one previous issue, the reference to its last appearance only is given.

<i>Article</i>	<i>Year Book</i>
Parliamentary procedure and administrative machinery	1970, pp. 106-9
Perth's underground water	1980, pp. 43-5
Pest control without insecticides	1973, pp. 93-5
Pesticides, effect on beneficial forms of life	1969, pp. 90-1
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Settlement at King George's Sound, early history of	1977, pp. 556-9
South-West Statistical Division Profile	1986, pp.260-9
Sport and Recreation, Department of	1985, pp. 115-123
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Trade, historical summary of	1967, pp. 346-7
Trade, overseas, encouragement of	1973, pp. 412-13
Treasury Department, history of	1982, pp. 134-9
Tropical cyclones	1983, pp. 52-61
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Use of pesticides in Western Australia	1971, pp. 87-90
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West Australian Economy, 1959 to 1973	1973, pp. 565-71
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Wheat, development of production	1968, p. 270

(a) Commencing with the present series: No. 1 1957

## Maps Published in Previous Issues (a)

<i>Map</i>	<i>Year Book</i>
Agricultural Areas — Growing Season ... ..	1982, p. 64
Air routes at 31 December 1956 ... ..	1957, p. 289
Air routes at 30 June 1969 ... ..	1970, <i>between</i> p. 448 <i>and</i> p. 449
Areas of current development ... ..	1970, <i>facing</i> p. 336
Comprehensive Agricultural Areas Water Supply Scheme ... ..	1985, p. 258
Electoral Boundaries(Federal) ... ..	1989 p. 78
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Electricity supplies ... ..	1967, <i>facing</i> p. 320
Epicentres of large earthquakes ... ..	1971, p. 33
General map of the State showing statistical divisions, local government areas, roads, railways, air routes and isohyets ... ..	1973, <i>inside back</i> <i>cover</i>
General map of the State showing physical features, roads, railways and airfields ... ..	<i>inside back</i> <i>cover</i>
Geological sketch map ... ..	1986, p. 12
Perth Statistical Division ... ..	1978, <i>facing</i> p.112
Port of Fremantle (Outer and Inner Harbour) ... ..	1970, <i>facing</i> p. 448
Port of Port Hedland ... ..	1974, p. 437
Principal ports, Western Australia ... ..	1989 p. 212
Production, main areas of ... ..	1975, <i>inside back</i> <i>cover</i>
Railways and road services — routes operated ... ..	1967, <i>facing</i> p 384
Railways road services — routes operated ... ..	1964, p. 354
Rainfall ... ..	1969, <i>facing</i> p. 32
Rainfall in agricultural areas, 1969 ... ..	1970, p. 529
Roads, main and important secondary ... ..	1968, <i>facing</i> p.368
Sedimentary basins and Precambrian blocks ... ..	1986, p. 17
South-West Irrigation Districts ... ..	1985, p. 262
South-West of Western Australia showing median rainfall, July-September ... ..	1986, p. 47
South-West of Western Australia showing decile 1 rainfall, July-September ... ..	1986, p. 47
South-West of Western Australia showing predominant agricultural activities ... ..	1986, <i>facing</i> p. 300
The forest estate ... ..	1986, <i>facing</i> .p. 268
Tracks of tropical cyclones (1975-1982) ... ..	1983, p. 60
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Wettest six monthly period of year ... ..	1986, p. 34

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1301.5	\$27.50	Western Australian Year Book (Hardcover)
1302.5	\$7.95	Western Australian Facts and Figures (Previously Western Australian Pocket Year Book )
1303.5	\$7.50	Local Government
1305.5	\$8.00	Monthly Summary of Statistics m
1306.5	Free	Western Australia in Brief
1307.5	\$5.00	Economic Indicators m
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2201.5	\$6.00	Overseas Born and Other Ethnic Population irr
		Perth...a social atlas:
2501.5	\$8.00	Part 1 - Socio-Economic Characteristics irr
2502.5	\$10.00	Part 2 - Demographic Characteristics irr
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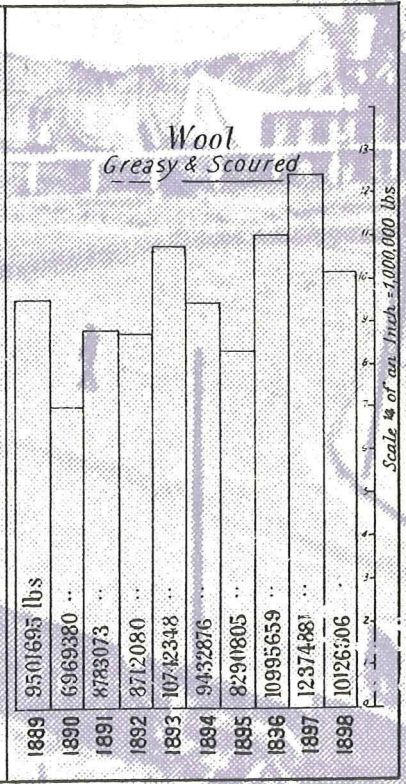
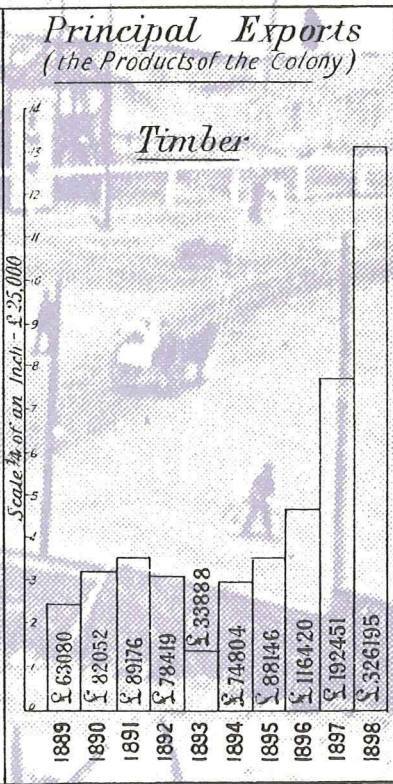
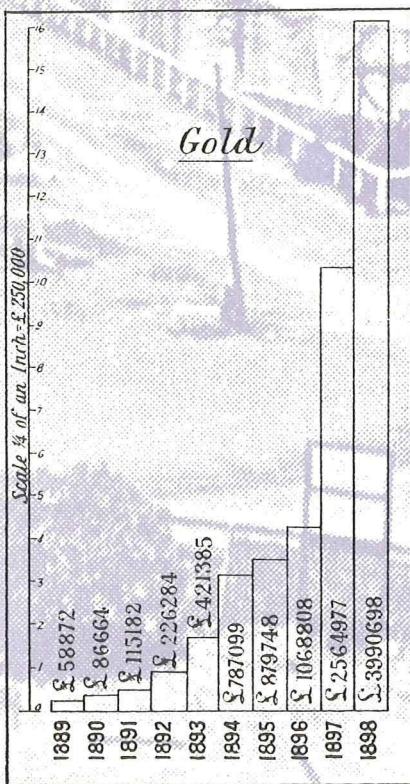
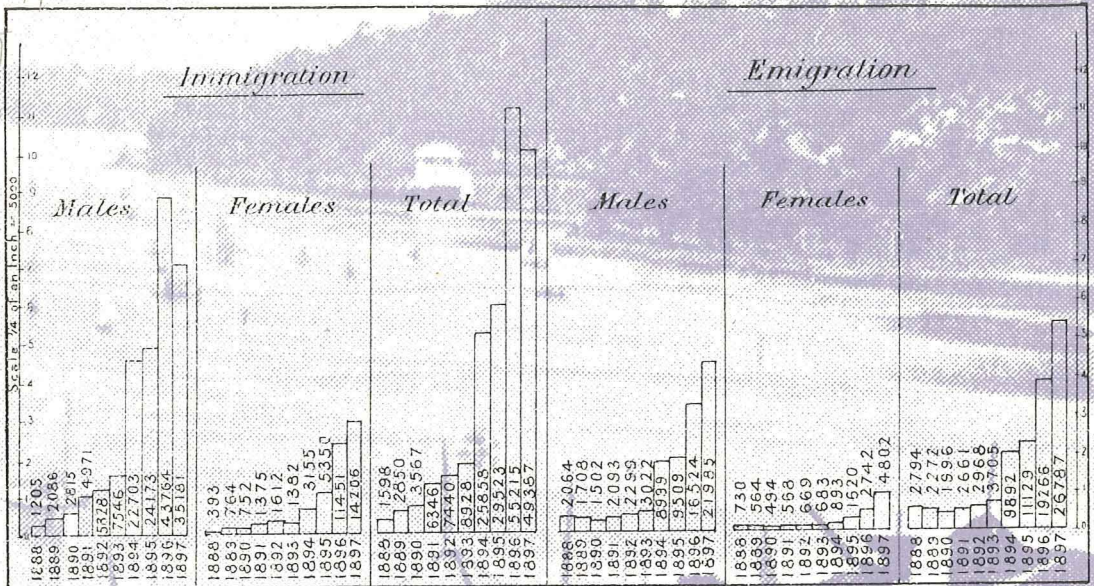
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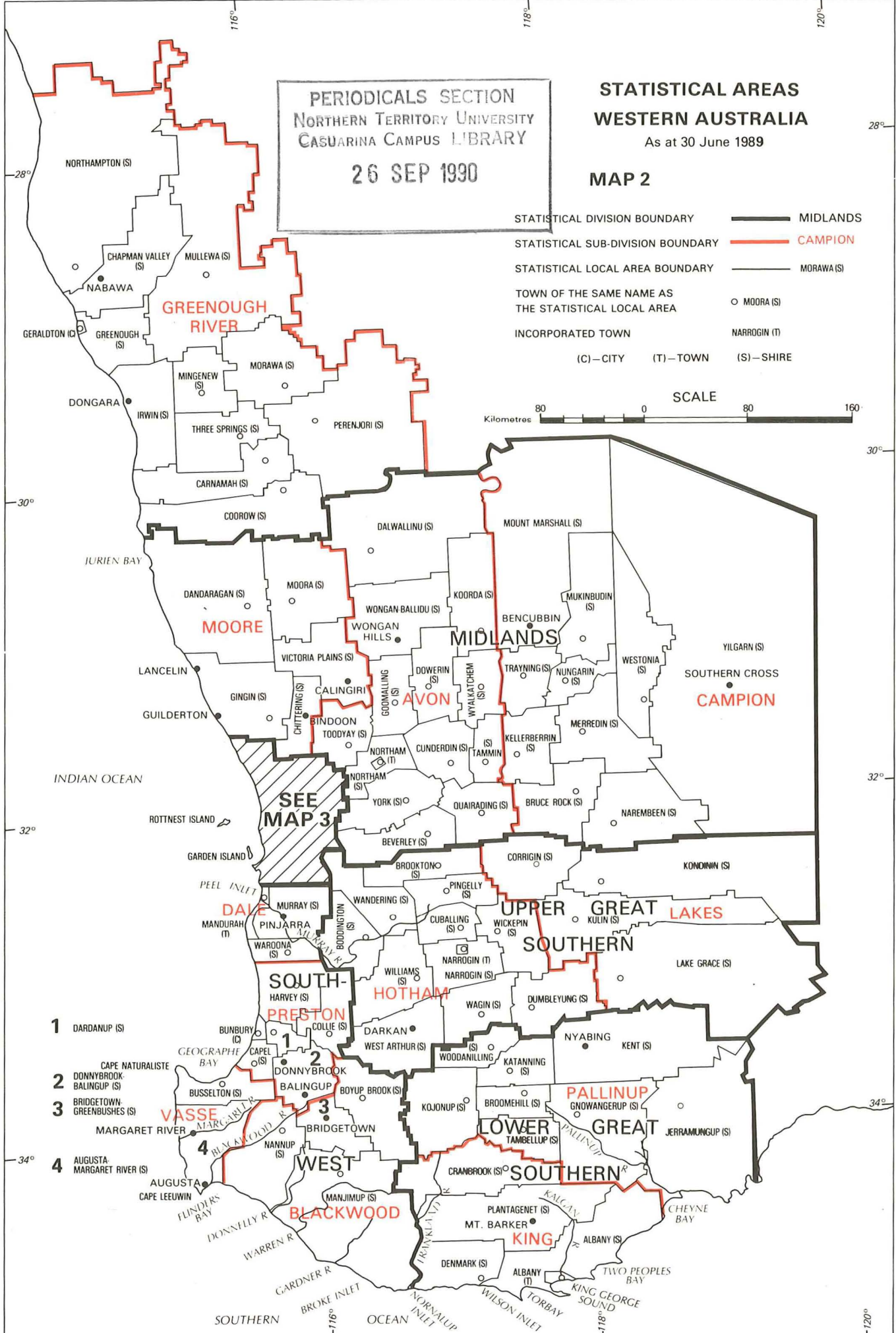
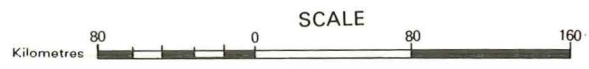
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STATISTICAL AREAS  
 WESTERN AUSTRALIA

As at 30 June 1989

MAP 2

- STATISTICAL DIVISION BOUNDARY ——— MIDLANDS
- STATISTICAL SUB-DIVISION BOUNDARY ——— CAMPION
- STATISTICAL LOCAL AREA BOUNDARY ——— MORAWA(S)
- TOWN OF THE SAME NAME AS THE STATISTICAL LOCAL AREA ○ MOORA(S)
- INCORPORATED TOWN ○ NARROGIN(T)
- (C)—CITY (T)—TOWN (S)—SHIRE



- 1 DARDANUP (S)
- 2 DONNYBROOK, BALINGUP (S)
- 3 BRIDGETOWN, GREENBUSHES (S)
- 4 AUGUSTA, MARGARET RIVER (S)

SEE MAP 3

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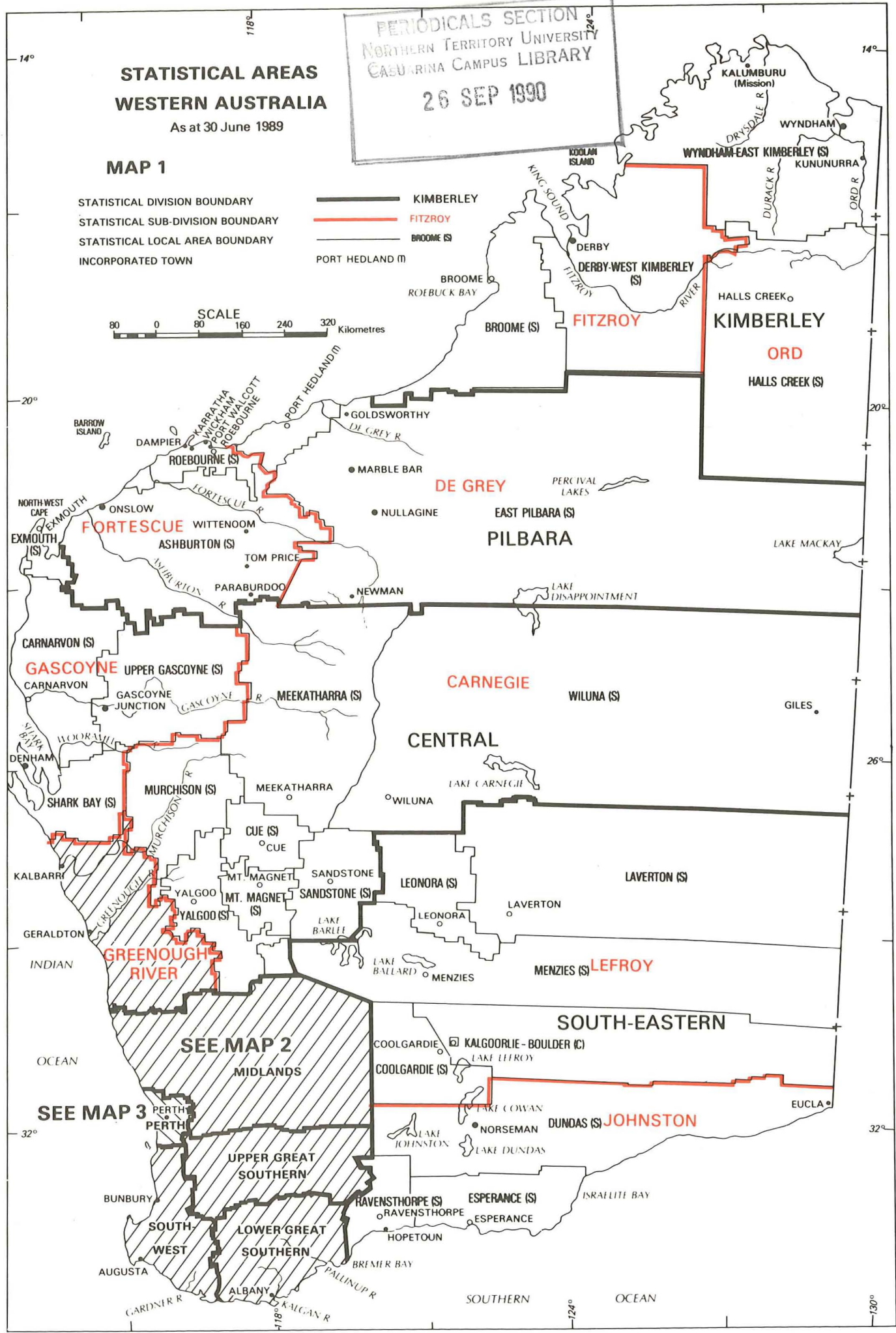
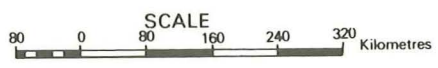
**STATISTICAL AREAS  
 WESTERN AUSTRALIA**

As at 30 June 1989

**MAP 1**

STATISTICAL DIVISION BOUNDARY  
 STATISTICAL SUB-DIVISION BOUNDARY  
 STATISTICAL LOCAL AREA BOUNDARY  
 INCORPORATED TOWN

— KIMBERLEY  
 — FITZROY  
 — BROOME (S)  
 PORT HEDLAND (M)



SEE MAP 2

SEE MAP 3



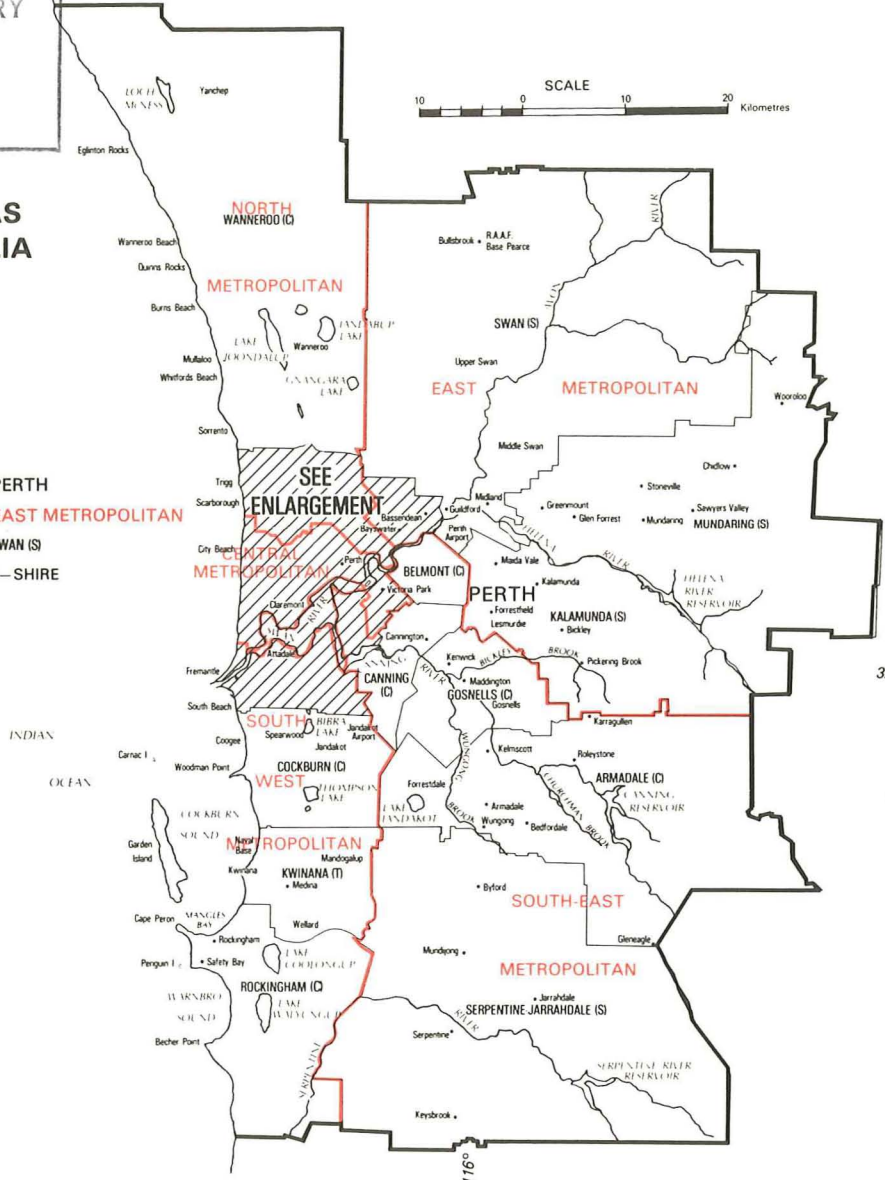
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**STATISTICAL AREAS  
 WESTERN AUSTRALIA**

As at 30 June 1989

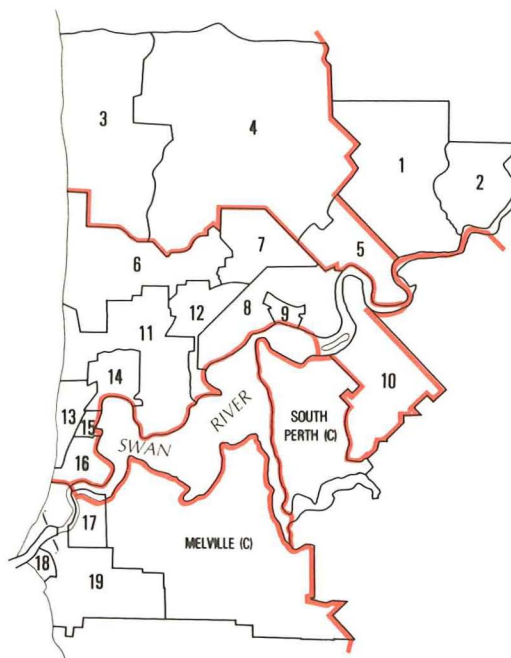
**MAP 3**

STATISTICAL DIVISION BOUNDARY ——— PERTH  
 STATISTICAL SUB-DIVISION BOUNDARY ——— EAST METROPOLITAN  
 STATISTICAL LOCAL AREA BOUNDARY ——— SWAN (S)  
 (C)—CITY (T)—TOWN (S)—SHIRE



**ENLARGEMENT**

1. BAYSWATER (C)
2. BASSEDEAN (T)
3. STIRLING (C)—WEST
4. STIRLING (C)—CENTRAL
5. STIRLING (C)—SOUTH-EASTERN
6. PERTH (C)—WEMBLEY—COASTAL
7. PERTH (C)—NORTH
8. PERTH (C)—OUTER
9. PERTH (C)—INNER
10. PERTH (C)—SOUTH
11. NEDLANDS (C)
12. SUBIACO (C)
13. COTTESLOE (T)
14. CLAREMONT (T)
15. PEPPERMINT GROVE (S)
16. MOSMAN PARK (T)
17. EAST FREMANTLE (T)
18. FREMANTLE (C)—INNER
19. FREMANTLE (C)—REMAINDER



GOLD YIELD OF AUSTRALASIA

1889

1898

Quantity Value

L

GOLD

WESTER

(18

Quantity

Ozs

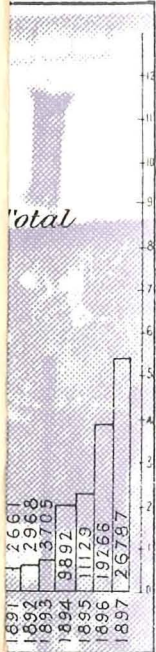
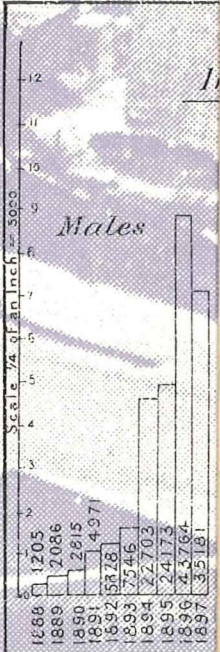
Scale: 1 Inch = 1000000000 Ozs

1889	15493
1890	22806
1891	30310
1892	59549
1893	110892
1894	207130
1895	231513
1896	281265

Scale: 1 Inch = £100000000

Scale: 1 Inch = 95053

1889's  
S. A.  
10s3<sup>3</sup>/<sub>4</sub>d.  
19s6<sup>1</sup>/<sub>4</sub>d.



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