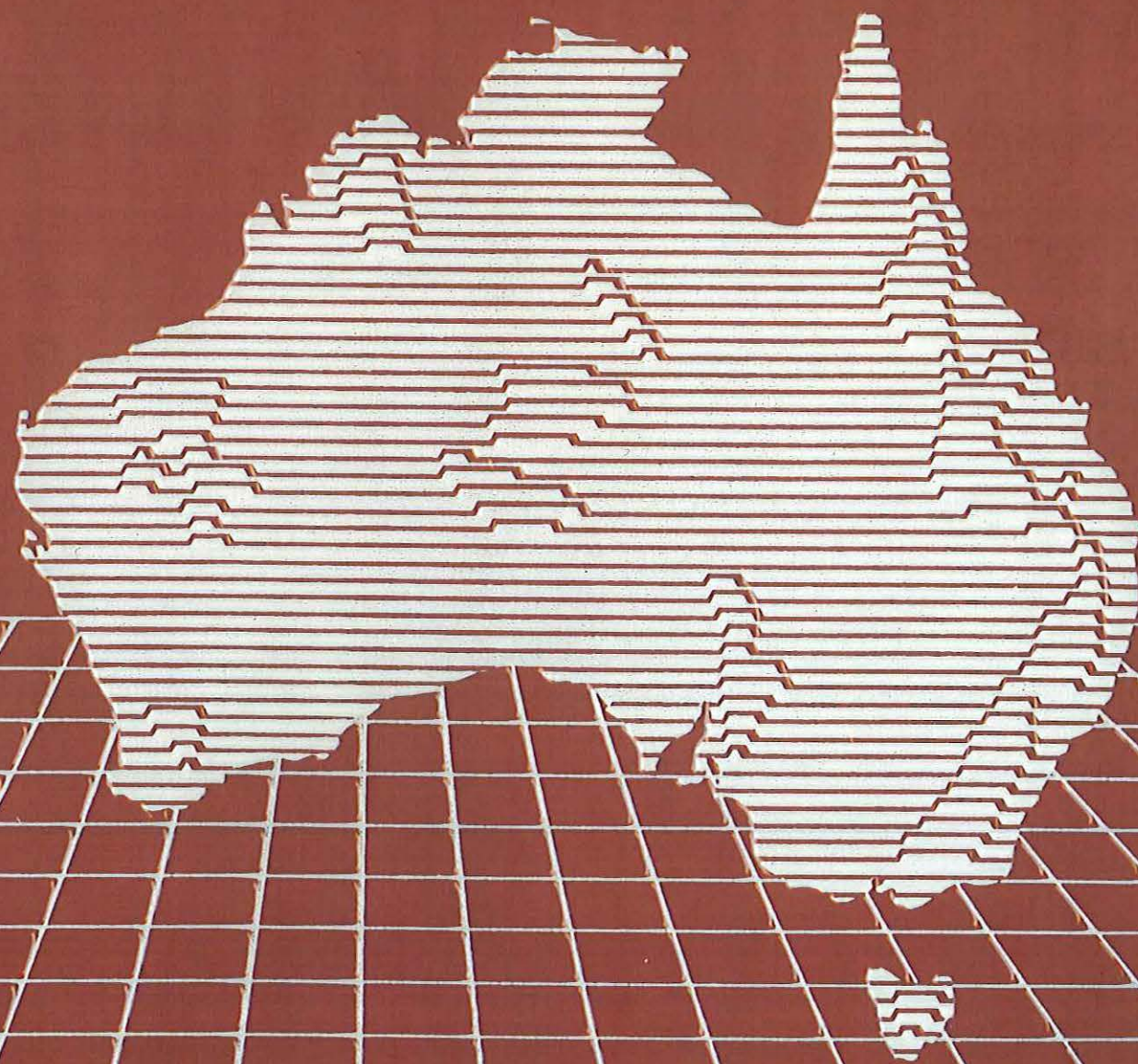


Tactical Atlas of Australia

VOLUME 2

People and Industry

MAPS



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SECTION A

Introduction to Reading Tactual Maps

Map themes in Volume 2, *People and Industry*, of the Tactual Atlas include such topics as discovery, settlement, population, land use, agriculture, minerals, energy, industry and trade.

All maps are of Australia, except for some in Section C, 'People', where there are State maps showing cities and towns. For some topics bar graphs have been used, either alone or with maps.

To read each map effectively you need to understand some basic mapping concepts and cartographic conventions, and to adopt systematic reading strategies.

Briefly the concepts involve:

- map scale
- map direction
- map reference systems
- map symbols and legends
- simplification of map detail
- name placement on maps

These concepts and conventions are described with examples in the book *A Map User Guide to Reading Tactual and Low Vision Maps*. They are also summarised in the Introduction to Volume 1 of the Tactual Atlas.

In addition, the following points should be kept in mind:

- When reading each map, firstly scan the whole page, perhaps most effectively in vertical strips using both hands. This gives you a general idea of page layout, and the position of the map and its legend, etc.
Other methods of scanning may be preferred; but whatever method is used, an appreciation of the whole page is necessary before attempting to read map detail.
- Read the map commentary in conjunction with the map. The commentaries help make the maps meaningful and point out particular aspects of the data shown. They also provide a reading strategy for each map. In general, the maps cannot be read effectively without the commentaries.
- A clear mental picture of the outline of Australia and its States, and the locations of capital cities and major geographic features is essential for reading each map. This knowledge will enable you to recognise the location, extent and distribution of information shown on the maps. The first map and commentary, 'Australia: General Reference', will help you develop the necessary framework.

You will also find it helpful to use this map and the maps in Section C showing cities and towns in each State as references for locating features mentioned in other map commentaries.

Turn to the map 'Australia: General Reference' on page 9 and read it together with its text in the braille commentary book.

This map, with its accompanying text, has been included for two reasons. Firstly, it will familiarise you with the shape of Australia, and its States and Territories, and with the location of capital cities and other major features. Secondly, the map and text will provide practice in developing map reading skills.

The skills required for efficient map reading include:

- systematic scanning and perception of map data
- use of map scale
- use of map (compass) directions
- use of map reference systems
- symbol recognition and discrimination
- shape (outline) recognition and
- tracing line symbols.

Reading the map will introduce you to these skills.

Reading Strategy

Step 1: Carry out a preliminary scan of the entire map. You may do this in vertical strips using both hands, or in any way which gives you a clear picture of the whole map layout. Note the location of the legend in the upper left corner, the compass diagram in the lower left corner and the scale bar along the lower margin.

Step 2: Read the map title along the upper margin.

Step 3: Establish what features are represented in the legend located in the upper left.

Step 4: In the lower left, locate the diagram illustrating the 4 main points of the compass: north (N), south (S), east (E) and west (W). These points are subdivided to indicate north-east (NE), south-east (SE), north-west (NW) and south-west (SW). Familiarise yourself with them, as they are used in the text to guide you from one part of the map to another.

Step 5: Locate the scale bar along the bottom of the map. With this it is possible to measure distances between features and places on the map. The scale bar represents a total length of 2000 kilometres (km) and is divided by ticks into four equal intervals, each representing 500 km.

If you are unfamiliar with the concept of map scale, or have had no experience in using a scale bar, refer to the Map User Guide or Volume 1 of the Tactual Atlas for a full explanation.

To practise using the scale bar, try this exercise. Position a ruler with one end on the symbol for Adelaide and with its edge passing through the Canberra symbol. Place your finger on the ruler to coincide with the symbol for Canberra and transfer this length to the scale bar, with the end of the ruler at zero on the scale bar. The length on the scale bar from zero to your finger represents the ground distance in kilometres between the two cities. The distance is about 1000 km.

As a further exercise in using the scale bar, you may like to measure the distances between other places on the map.

Step 6: Trace the outline of Australia. If you are unsure of the directions given, refer to the compass diagram described in Step 4.

Beginning in the SE corner of the map, locate the island State of Tasmania (T) and trace its outline. From the NE tip of Tasmania move north and locate:

- (1) Flinders Island between Tasmania and the mainland and
- (2) Cape Howe on the mainland where the border between Victoria (V) and New South Wales (NSW) reaches the coast.

Proceed north along the east coast of the mainland and locate the following coastal features in order:

- (3) Port Jackson (Sydney Harbour),
- (4) North Stradbroke and Moreton islands, off the coast near Brisbane and
- (5) Fraser Island.

Following the coast in a NW direction until you reach Cape York (6), you will notice the Great Barrier Reef (gbr) running parallel to the coast. Cape York (6) is the most northerly point on the Australian mainland.

Then find:

- (7) Thursday Island just NW of Cape York.

From Cape York follow the coastline south, NW and then NE observing:

- (8) the Gulf of Carpentaria and
- (9) Gove Peninsula and, further to the west,
- (10) Cobourg Peninsula and
- (11) Melville and Bathurst islands, which are to the north of Darwin.

Then move SW around:

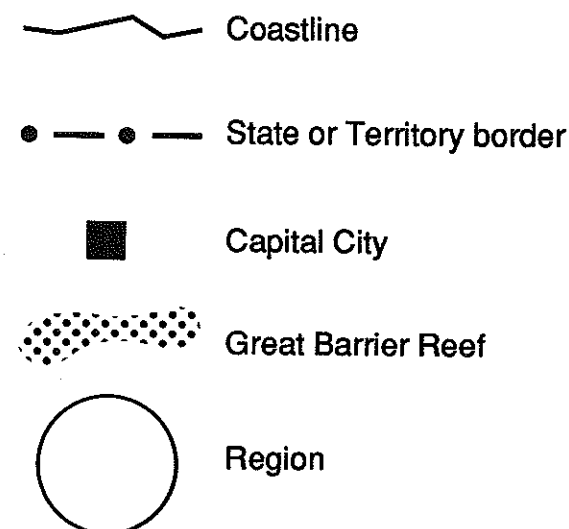
- (12) Joseph Bonaparte Gulf, past
- (13) Yampi Sound and
- (14) North West Cape.

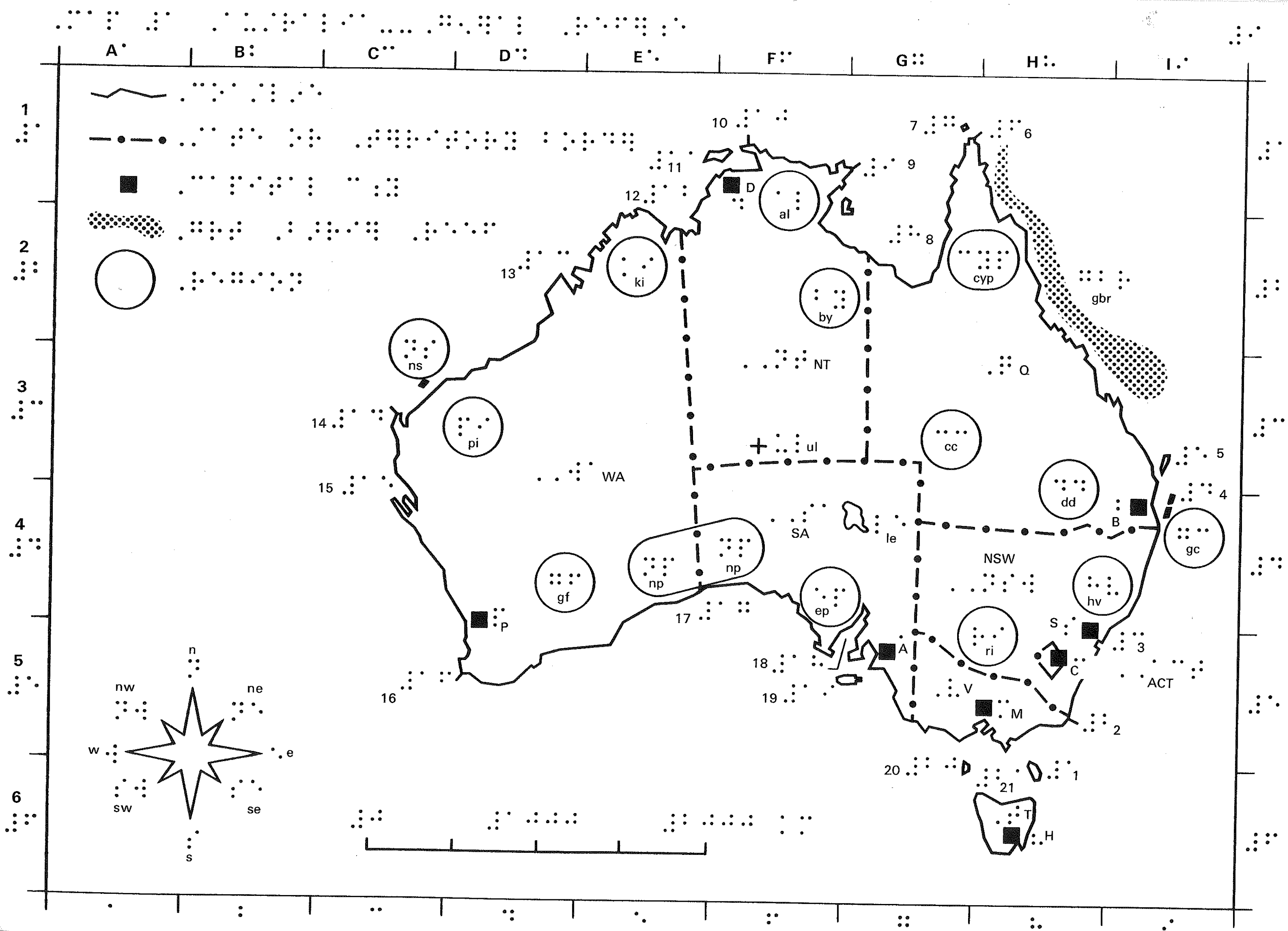
Further south locate:

- (15) Shark Bay and then
- (16) Cape Leeuwin, at the extreme SW corner of Western Australia.

From Cape Leeuwin the coastline turns NE along:

- (17) the Great Australian Bight, and then SE around
- (18) Spencer Gulf (a leadline from the number points to the Gulf), then SE past
- (19) Kangaroo Island and





(20) King Island in

(21) Bass Strait, between Tasmania and the mainland.

You should now have an idea of Australia's shape. In the next exercise you will trace the outlines of the States and Territories.

Step 7: Refer again to the legend and note the line symbol used for State borders.

Note that the States and Territories are referred to on the map by the following letters, which are generally located centrally within the State borders:

ACT Australian Capital Territory

NSW New South Wales

NT Northern Territory

Q Queensland

SA South Australia

T Tasmania

V Victoria

WA Western Australia

Step 8: Trace the outline of Tasmania.

Tasmania is the only island State in Australia. You have already traced Tasmania in the SE corner of the map. Trace it again to increase your familiarity with its shape.

Step 9: Trace the outline of Victoria.

On the mainland, again locate Cape Howe (2). This is the point where the Victorian-New South Wales border joins the coast. Trace this border, which for most of its length follows the Murray River, in a NW direction until it finishes at the South Australian border. From here follow the South Australian border south to the coast. Then follow the coast in a generally eastern direction past Port Phillip Bay (on which Melbourne is situated) and back to your starting point at Cape Howe (2).

Step 10: Trace the outline of New South Wales.

Also beginning at Cape Howe (2), follow the coast north, passing Port Jackson (3), to where it intersects the New South Wales-Queensland border in the vicinity of the Gold Coast (gc). Follow this border west (initially via coastal rivers and ranges, and inland rivers) to its intersection with the South Australian border. Then follow this border south to where the Victorian border joins it from the east. Now follow the Victorian border generally SE back to Cape Howe (2).

Step 11: Locate the Australian Capital Territory.

In the SE of New South Wales locate the small area bounded by the border symbol. This is the Australian Capital Territory. The border may be difficult to locate because of overlap with the square symbol representing Canberra. The letters **ACT**, denoting the Australian Capital Territory, have been placed just off the coast to the east.

Step 12: Trace the outline of Queensland.

Queensland is Australia's second largest State. Locate the junction of the Queensland-New South Wales border with the east coast, in the vicinity of the Gold Coast (gc). Follow the coastline north past North Stradbroke and Moreton islands (4), Fraser Island (5) and then continue NW to the tip of Cape York (6). Now follow the coastline south and then NW along the Gulf of Carpentaria (8) to where the Northern Territory border intersects the coast. Follow this border south to its intersection with the South Australian border. Trace the South Australian border east, then south to where the New South Wales border joins it from the east. Follow this border east, back to the coast where you started.

Step 13: Trace the outline of the Northern Territory.

Locate the Gulf of Carpentaria (8) and, on its southern shoreline, find the intersection of the Queensland border with the coast. From there trace the coast NW and then NE to Gove Peninsula (9), and west to Cobourg Peninsula (10). Now continue SW to where the Western Australian border meets the coast in Joseph Bonaparte Gulf (12). Follow this border south to where the South Australian border joins it from the east. Trace this border east to where the Queensland border joins it from the north. Turn north at this intersection and trace the Queensland border back to your starting point on the Gulf of Carpentaria.

Step 14: Trace the outline of Western Australia.

Western Australia is the largest of all the States. Beginning at Joseph Bonaparte Gulf (12) in the north, follow the coast in a SW direction to Shark Bay (15), and then SE to Cape Leeuwin (16). From here follow the coast around the Great Australian Bight to where the South Australian border joins it from the north. Follow this border north (past where the Northern Territory border joins it from the east) back to your starting point in Joseph Bonaparte Gulf (12).

Step 15: Trace the outline of South Australia.

Begin at the border between Western Australia and South Australia, on the coast of the Great Australian Bight (17), and follow the coast SE past Spencer Gulf (18) and Kangaroo Island (19) to where the Victorian border meets the coast. Follow this border north, noting the points where the New South Wales and the Queensland borders join from the east. Continue north to where the border turns west. Continue tracing this, noting where the Northern Territory border joins from the north. Continue west to the intersection with the border of Western Australia, then south to where you commenced on the Great Australian Bight.

Step 16: Locate the capital cities as follows:

Canberra (C): The national capital, in the Australian Capital Territory situated in SE New South Wales. Note that the C denoting Canberra has been placed to the east.

Brisbane (B): The capital of Queensland in the extreme SE of the State, on the Brisbane River opposite North Stradbroke Island (4).

Sydney (S): The State capital of New South Wales, on Port Jackson (3), about halfway along the coast between the Queensland and Victorian borders.

Melbourne (M): The State capital of Victoria, on Port Phillip Bay.

Hobart (H): The State capital of Tasmania, in the SE of the State on the Derwent River.

Adelaide (A): The State capital of South Australia, towards the SE corner of the State on Gulf St Vincent.

Perth (P): The State capital of Western Australia, in the SW corner of the State on the Swan River.

Darwin (D): The capital city of the Northern Territory on the NW coast, opposite Melville Island (11).

Step 17: Locate the regions and other features shown on the map. The regions, which usually extend over fairly large areas, are shown on the map by letters within circles. Other features such as Lake Eyre are shown by delineating the feature, or by a cross as with Uluru (Ayers Rock).

In Queensland locate:

dd Darling Downs, west of Brisbane, in the SE of the State.

cc The Channel Country, in the SW near the South Australian border.

cyp Cape York Peninsula, in the far north.

gc Gold Coast, on the coast south of Brisbane and straddling the Queensland-New South Wales border; note that the circle and letters are positioned just offshore.

In New South Wales locate:

hv Hunter Valley, north of Sydney.

ri Riverina area, in the SW, just north of the New South Wales-Victorian border.

In South Australia locate:

ep Eyre Peninsula, in the south between Spencer Gulf and the Great Australian Bight.

np Nullarbor Plain, in the SW, straddling the South Australian-Western Australian border.

le Lake Eyre (shape outlined), in the NE of the State.

In Western Australia locate:

kl Kimberley region, in the far north.

pi Pilbara region, in the central west.

ns North West Shelf, offshore NW of the Pilbara.

gf Goldfields, NE of Perth.

np Nullarbor Plain, in the SE straddling the Western Australian-South Australian border.

In the Northern Territory locate:

al Arnhem Land, in the north.

by Barkly Tableland, in the NE towards the Gulf of Carpentaria.

ul Uluru (Ayers Rock) marked by a cross, in the south close to the Northern Territory-South Australian border.

You should now be familiar with the shape of Australia and its States as well as the locations of other major features.

Abbreviations

Coastal Features

- 1 Flinders Island
- 2 Cape Howe
- 3 Port Jackson
- 4 North Stradbroke and Moreton islands
- 5 Fraser Island
- 6 Cape York
- 7 Thursday Island
- 8 Gulf of Carpentaria
- 9 Gove Peninsula
- 10 Cobourg Peninsula
- 11 Melville and Bathurst islands
- 12 Joseph Bonaparte Gulf
- 13 Yampi Sound
- 14 North West Cape
- 15 Shark Bay
- 16 Cape Leeuwin
- 17 Great Australian Bight
- 18 Spencer Gulf
- 19 Kangaroo Island
- 20 King Island
- 21 Bass Strait

States and Territories

- ACT** Australian Capital Territory
NSW New South Wales
NT Northern Territory
Q Queensland
SA South Australia
T Tasmania
V Victoria
WA Western Australia

Capital Cities

- A** Adelaide
B Brisbane
C Canberra
D Darwin
H Hobart
M Melbourne
P Perth
S Sydney

Other Geographic Features

- al** Arnhem Land
by Barkly Tableland
cc The Channel Country
cyp Cape York Peninsula

dd Darling Downs
ep Eyre Peninsula
gbr Great Barrier Reef
gc Gold Coast
gf Goldfields
hv Hunter Valley
ki Kimberley
le Lake Eyre
np Nullarbor Plain
ns North West Shelf
pl Pilbara
rl Riverina
ul Uluru (Ayers Rock)

SECTION B

Discovery and Exploration

The maps and commentaries in this section provide an overview of the European discovery, exploration and settlement of Australia as a prelude to a more detailed picture of today's population distribution presented in Section C: People.

Three map-sheets, 'Maritime Discovery', 'Land Discovery and Exploration' and 'Evolution of the States', each contain four small scale maps illustrating four different periods of activity or development.

The fourth map-sheet, 'Pastoral Occupation', contains a single map of Australia.

The visit by the Dutch ship 'Duyfken' to the west coast of Cape York Peninsula in 1606 is the earliest authenticated landing by Europeans on Australian soil. There is, however, unsubstantiated evidence suggesting that parts of the eastern and northern coasts were explored by Portuguese navigators nearly a century earlier. Moreover, it seems likely that Australian shores were visited in even earlier centuries by seamen and fishermen from lands to the north of Australia. There are clues of this in some Aboriginal artwork, and in early Chinese porcelain fragments uncovered around Darwin.

The four small maps of Australia on the accompanying map-sheet show four periods of discovery, commencing with the Dutch explorations of 1600 onwards and finishing with the charting of the remaining unexplored sections of coastline by English and French expeditions 200 years later. The dates of discovery are placed above each map. The legend, located in the centre of the map-sheet, explains the abbreviations used for the exploring nations and the line types used to represent the different stages of discovery of the Australian coastline.

1600-1630

In the 16th and early 17th centuries, trade brought Portuguese and Dutch explorers south to the Spice Islands. These islands are now part of present-day Indonesia, which is located to the NW of Western Australia. Ships sailed from Europe via the Cape of Good Hope, at the southern tip of Africa, and then east with the prevailing winds. It is known that in the early 1600s some of these ships were blown off course and struck the coast of Australia, resulting in the discovery of various sections of the northern, western and southern coasts.

On the map in the top left of the page, trace the wide band representing these discoveries by Dutch navigators between 1600 and 1630. You will notice that, while there are many as-yet-uncharted sections of coastline (depicted by a broken line), it is possible to recognise the shape of south-western Western Australia and, far to the NE, part of the coast of Cape York Peninsula and Arnhem Land.

1631-1700

On the map in the top right of the page, trace the wide band denoting discoveries by later Dutch navigators. Between 1631 and 1700 these seamen charted some of the undiscovered areas left by earlier Dutch explorations. In addition, far to the SE of these discoveries, southern Tasmania was charted by Abel Tasman during this period.

Note that the coastline charted during previous discoveries is shown on the map by a fine line, while coastline yet-to-be discovered is represented by a broken line.

1770

The discoveries shown on the map in the lower left of the page are entirely those of Captain James Cook on his voyage of 1770. He first sighted land at Point Hicks in Victoria and, sailing north, charted the east coast of Australia except for a short section where he sailed outside the Great Barrier Reef in northern Queensland.

The shrinking length of undiscovered coastline is very noticeable on this map, and by the end of Cook's voyage most of Australia's coastline had been explored. Thereafter only a few short sections, mostly along the southern edge of the continent, remained to be mapped.

1771-1803

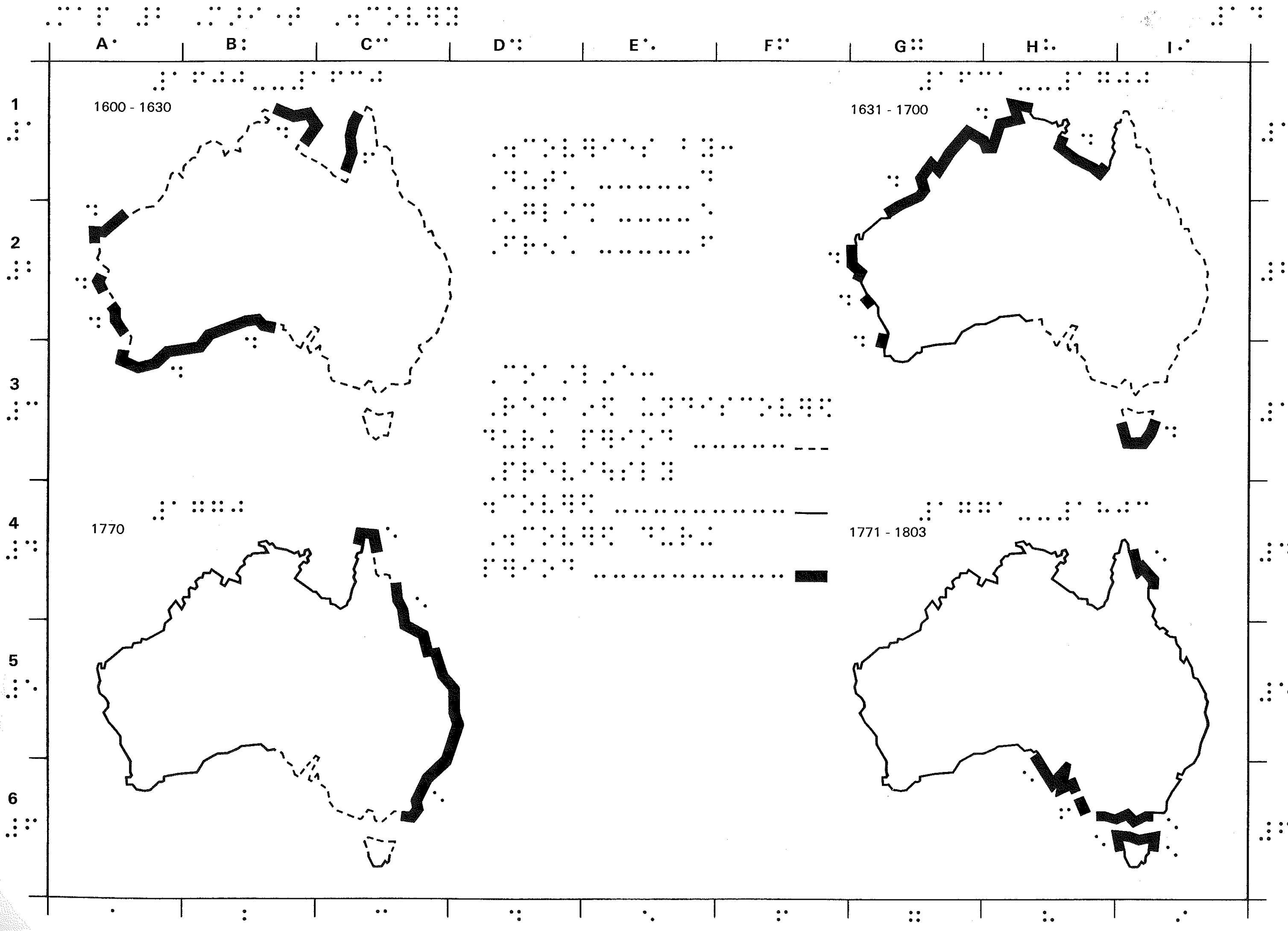
Examine the map in the lower right of the page. In the last years of this period the charting of the Australian coastline was completed. Towards the close of this period Matthew Flinders charted that part of the Queensland coast missed by Cook in 1770. Then the remaining unknown sections of the Victorian, Tasmanian and South Australian coasts were variously charted by Flinders, who partially circumnavigated the continent between 1801 and 1803, by the English navigators George Bass, James Grant and John Murray, and by the French explorer Nicolas Baudin.

Discoveries by :

Dutch ::
English
French ::

Coastline :

Remained undiscovered during period
Previously discovered
Discovered during period



Land exploration began shortly after the first settlers arrived at Port Jackson in 1788. The earliest explorers went in search of good farming land to support an expanding population. Later explorers, curious about what lay beyond the confines of the immediate colony initiated more ambitious exploration. Once a route through the Blue Mountains was established in 1813, exploration proceeded rapidly.

Each of the accompanying 4 small maps shows the routes of 2 major journeys of exploration. Areas previously explored at the time of each map are indicated by a line pattern. The legend above each map gives the names of the explorers and the dates of their journeys. To appreciate the scope of the journeys, scan each map, trace the routes and relate them to the outline of Australia.

The first map, in the upper left of the page, features exploration of the interior of south-eastern Australia.

In 1824 Hamilton Hume and William Hovell travelled SW from Sydney with the aim of reaching the southern coast of Australia where Western Port was marked on existing marine charts. They crossed the Murray and Murrumbidgee rivers and recorded numerous other rivers flowing westwards from snow-covered mountains - the Australian Alps. They ended their journey on the coast near today's Geelong, having discovered abundant, rich grazing lands along the way.

Hume and Hovell erroneously believed that they had arrived at Western Port and, when settlement was attempted in 1826, their miscalculated longitude was relied upon. Consequently, instead of the Port Phillip district, the settlers found themselves in the swampy, difficult country around Western Port which they soon abandoned. The result was a delay in the settlement of Port Phillip for nearly a decade.

Hume and Hovell's journey was followed several years later by the explorations of Charles Sturt, who set out to trace the unknown westward-flowing rivers inland of the Great Dividing Range. In 1829-30 he led an expedition by boat down the Murrumbidgee River from Jugiong (upstream from Wagga Wagga), into the Murray River and downstream to the mouth of the Murray on the South Australian coast. His journey paved the way for settlers pushing south into southern New South Wales and northern Victoria, and by 1838 livestock were being driven overland to Adelaide following this route.

Map 2 in the upper right of the page traces major exploration routes westward in both the south and north of the continent.

In 1841 Edward Eyre, after an attempt to penetrate the inland of Australia from the south the previous year (not mapped), journeyed westwards along the coast from Port Lincoln in South Australia. He finally reached Albany on the SW coast of Western Australia after an extraordinarily difficult crossing of the dry, barren Nullarbor Plain. He proved that there were no major south-flowing rivers issuing from the long stretch of coast between Port Lincoln and Albany.

The second expedition shown on this map was made by Ludwig Leichhardt. He explored north-eastern Australia in 1844-45, travelling NW from the Darling Downs in Queensland to the military establishment of Port Essington on Cobourg Peninsula in the Northern Territory. The expedition made significant discoveries of rivers, ranges and pastoral lands. Several years

later Leichhardt was to perish without trace while attempting to cross from the east to the west coast. His expedition was not seen again after setting out from a point just NW of Roma.

Map 3, in the lower left of the page, traces two notable expeditions, the first undertaken by Charles Sturt and the second by Robert Burke and William Wills. Both aimed to cross Australia from south to north.

Sturt left Adelaide in 1844, travelled to Menindee on the Darling River and then NW to the Barrier Range near Broken Hill. The expedition continued NW, crossing Strzelecki Creek, Cooper Creek, the Diamantina River and Eyre Creek, but diminishing supplies and extreme heat forced Sturt to turn back from an area now known as the Simpson Desert. Many of these features are shown on maps in Volume 1 of the Tactual Atlas.

In 1860-61 Burke and Wills' ill-fated expedition travelled north from Melbourne to the Gulf of Carpentaria, via the Darling River and Cooper Creek. On the return journey both explorers perished near Cooper Creek. Although they discovered little of value, the parties which were sent in search of them passed through good grazing land and through country subsequently found to be rich in minerals.

In 1861-62, after 2 earlier attempts, John McDouall Stuart crossed the continent from Adelaide to what is now Point Stuart (near Darwin). His journey is depicted on map 4 in the lower right of the page. His favourable account of this northern area encouraged South Australia to seek control over it, which was granted in 1863. Palmerston, later renamed Darwin, was chosen as the site of a permanent settlement on the north coast and was surveyed in 1869. The Overland Telegraph Line, constructed in the period 1870-72 between Port Augusta and Port Darwin, essentially follows Stuart's route.

The other journey featured on this map is one of several made by John Forrest who, in 1870, was the first European to cross the continent eastwards. In 1874, using the route shown on the map, he trekked inland from Geraldton on the west coast. He soon penetrated desert country, and relying on several lifesaving freshwater springs, he finally reached the Overland Telegraph Line in northern South Australia.

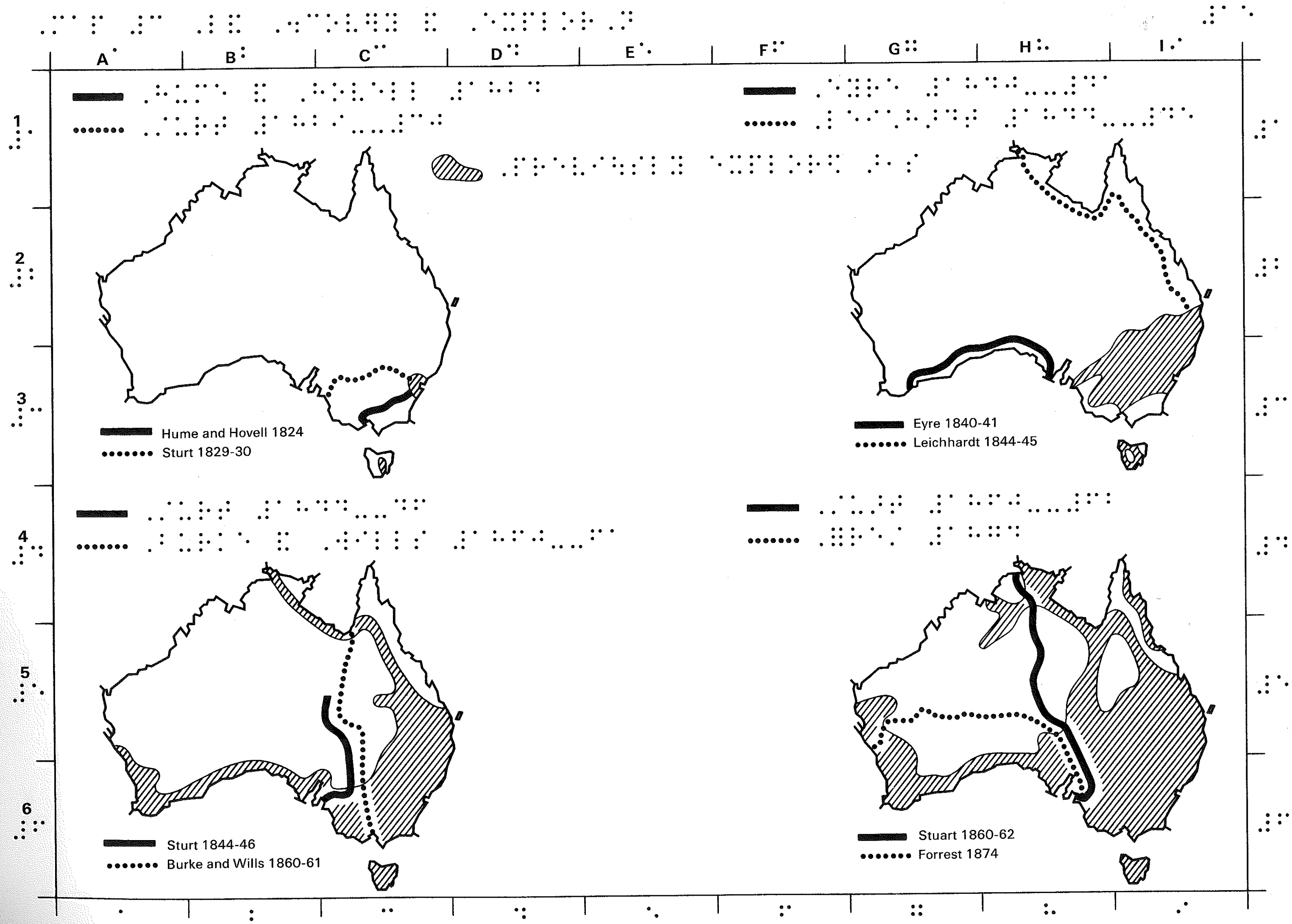
The main contribution of Forrest, like that of the other desert explorers, was to shatter the early visions of a well-watered inland with the truth about the harsh, arid nature of Australia's interior.

There were many more exploratory journeys than those outlined here; in all they amounted to narrow threads of knowledge criss-crossing a vast landscape. As the country was developed, pastoralists, surveyors, missionaries, prospectors and stockmen alike contributed to filling in the details, and by 1900 the exploration of Australia was virtually complete.

Exploration in the 20th century has been primarily to fill in the few remaining gaps in extremely remote areas, or for biological, anthropological and mineral exploration. However, it was not until 1968 that the first topographic map coverage of Australia, using systematic aerial photography, was completed, at 1:250 000 scale. Since then, remote sensing by satellite has played an increasing role in mapping the continent. Such surveys have reduced the need for, or at least preceded, overland exploration.



Previously explored areas



Australia's earliest pastoral activity was primarily to provide the first settlers with meat from sheep and cattle brought out with the First Fleet. The successful introduction of the Merino sheep around 1800 meant that pastoral occupation quickly became synonymous with sheep grazing to produce wool. With regular shipments of wool to Britain and elsewhere from the 1820s onwards, this sector of the pastoral industry quickly became a keystone of the Australian export economy. Wool is still one of the country's most valuable exports.

The profitability of the pastoral industry in the early years of settlement encouraged exploration for suitable pastures beyond the immediate settled area. Once the Blue Mountains were crossed in 1813, flocks spread rapidly into the newly explored country. This pattern of occupation was maintained throughout the 19th and into the 20th century so that today the area of land devoted to livestock grazing is high, although carrying capacity in the arid inland is very low.

The accompanying map traces the opening up of pastoral land across Australia from the earliest European settlement up to 1980. Scan the legend in the top left corner of the map-sheet. The 3 symbols shown in the legend indicate the areas occupied for pastoral use in the 3 successive periods shown on the map: from settlement up to 1850, 1851-1890 and 1891-1980. The unpatterned areas have never been occupied for pastoral use. Where possible, parts of State borders have been included on the map. This is to assist you in gauging the extent of pastoral occupation and in locating areas mentioned in the text.

Study the map and locate the pastoral areas of the earliest period. Expansion took place around the original colonial settlements and closely followed the first journeys of exploration. Thus, south-eastern Australia (including the Murray River valley), eastern Queensland, the Swan River area (in Western Australia), the strip of land between Launceston and Hobart (in Tasmania), and much of the land adjacent to St Vincent and Spencer gulfs in South Australia were all occupied for pastoral use during the first 60 or so years of settlement. Unoccupied pockets along the east coast in this period included the scrub country in north-eastern New South Wales and southern Queensland, where dense vegetation and rugged terrain delayed clearing and pasture establishment until the following period.

As shown on the map, by far the largest area of country was settled in the next period. 1851-1890 saw a rapid expansion of pastoral activity to keep pace with the increasing overseas demand for wool. Expansion depended not only upon the further discovery of suitable new land but also upon the availability of transport routes to markets. Of great importance at this time were the paddle steamers which plied the Murray-Darling waterways in south-eastern Australia, moving wool, skins and tallow down river to ports and markets.

You will find that by the end of this period more than half of Australia was occupied pastorally. Expansion had occurred outwards from previously settled areas to include all of Queensland except Cape York Peninsula, much of northern Australia, the land north of Spencer Gulf to central Northern Territory and an area along the coastal strip of the Nullarbor Plain. Expansion in Western Australia was mainly into the sw corner and northward towards the Kimberley region.

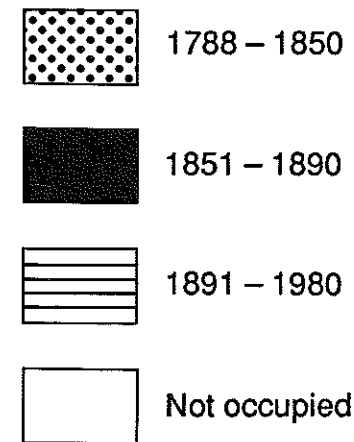
From the time of initial settlement up until the first decade of this period, sheep grazing for wool was the main pastoral activity, especially in the south. However, the establishment of freezing works in Sydney in 1861 and the first successful overseas shipment of frozen meat in 1880 led to the development of a meat export industry. As a result, the area used for beef cattle grazing expanded rapidly, especially in newly opened areas of Queensland, as well as in central and northern Australia.

Further study of the map will show that in the third period, between 1891 and 1980, the major new areas of pastoral occupation were in Western Australia (the Kimberley region) and in northern Australia (around the Gulf of Carpentaria and on Cape York Peninsula). Much of the new land opened up in Western Australia was for wool production, while expansion in central and northern Australia was mainly for beef.

In recent years the cross breeding of European and tropical cattle has improved the beef cattle industry in the Australian tropics. Indeed, the number of beef cattle in Australia increased by nearly 80% between 1950 and 1980. Pasture improvement, through the introduction of grasses and subterranean clover and the use of superphosphate, as well as the application of trace elements to correct specific soil deficiencies, have enhanced the expansion of the pastoral industry.

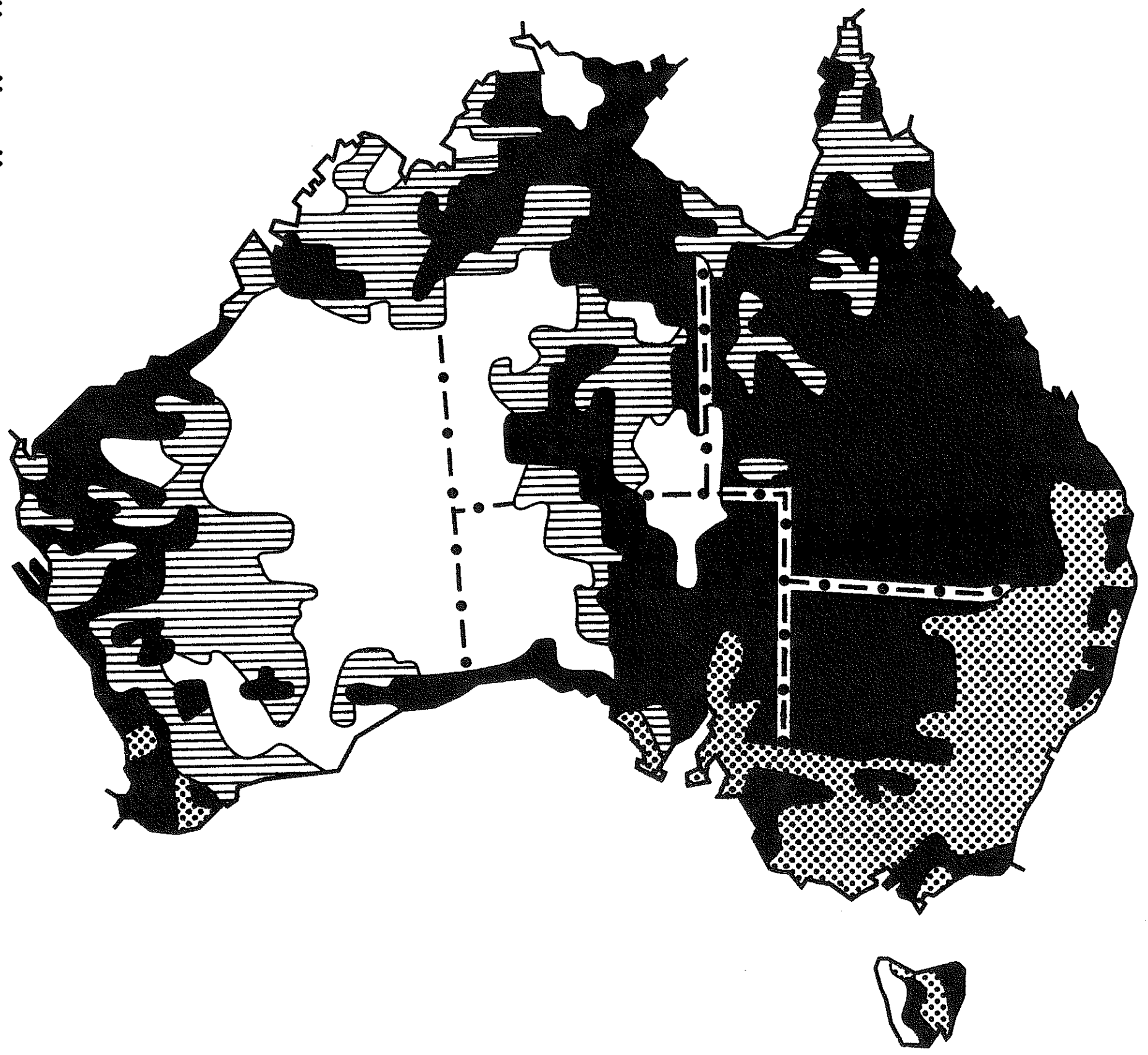
From early this century many areas of high fertility, high rainfall, and in proximity to urban markets have shifted from pastoral use to more intensive forms of agriculture. In other areas livestock grazing has been combined with cereal growing, in a rotation system designed to increase productivity.

The main areas which continue to remain unoccupied for pastoral use are the desert regions of central Australia, the most rugged parts of the Pilbara and Kimberley regions of Western Australia, and the west coast of Tasmania. It is likely that pastoral activity has now expanded to the limits of the Australian environment, and is even in areas where the land may not be able to support it in the long term.



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Proclamations of colonial boundaries were made as successive colonies were established around Australia. The great distances between the original settlements, the uncertainty of what lay in between and difficulties in communication meant that each colony developed separately. Their boundaries changed over time as more colonies were created, and the major changes are featured on the 4 accompanying small maps. When Federation took place in 1901 the boundaries existing then were adopted as the State borders.

Initially, the whole continent was referred to as Terra Australis. Then, following the visit by the Dutch seaman Abel Tasman in 1644, the country became known as New Holland. In 1770 Cook claimed the east coast of New Holland for Great Britain, calling it New South Wales. The name New Holland was retained until Matthew Flinders suggested the name 'Australia' in 1814 and it was promoted to the British Government in 1817 by Governor Macquarie. Within a few years it became the accepted name.

Scan the whole map-sheet, noting the dates associated with each map as well as the symbol for State borders shown near the centre of the sheet.

The map in the top left shows the earliest boundaries of New South Wales. Governor Phillip's commissions from the British Crown defined the Colony as lying between Cape York (in present day Queensland) and South Cape (in Tasmania) with a western boundary at 135°E (the broken line). Two major changes occurred in 1825: the western limit of New South Wales was moved further west to the longitude 129°E (the present border of Western Australia) to include a new settlement on Melville Island (mv); and Van Diemen's Land (vdl) was officially separated from New South Wales and defined by lines of longitude and latitude.

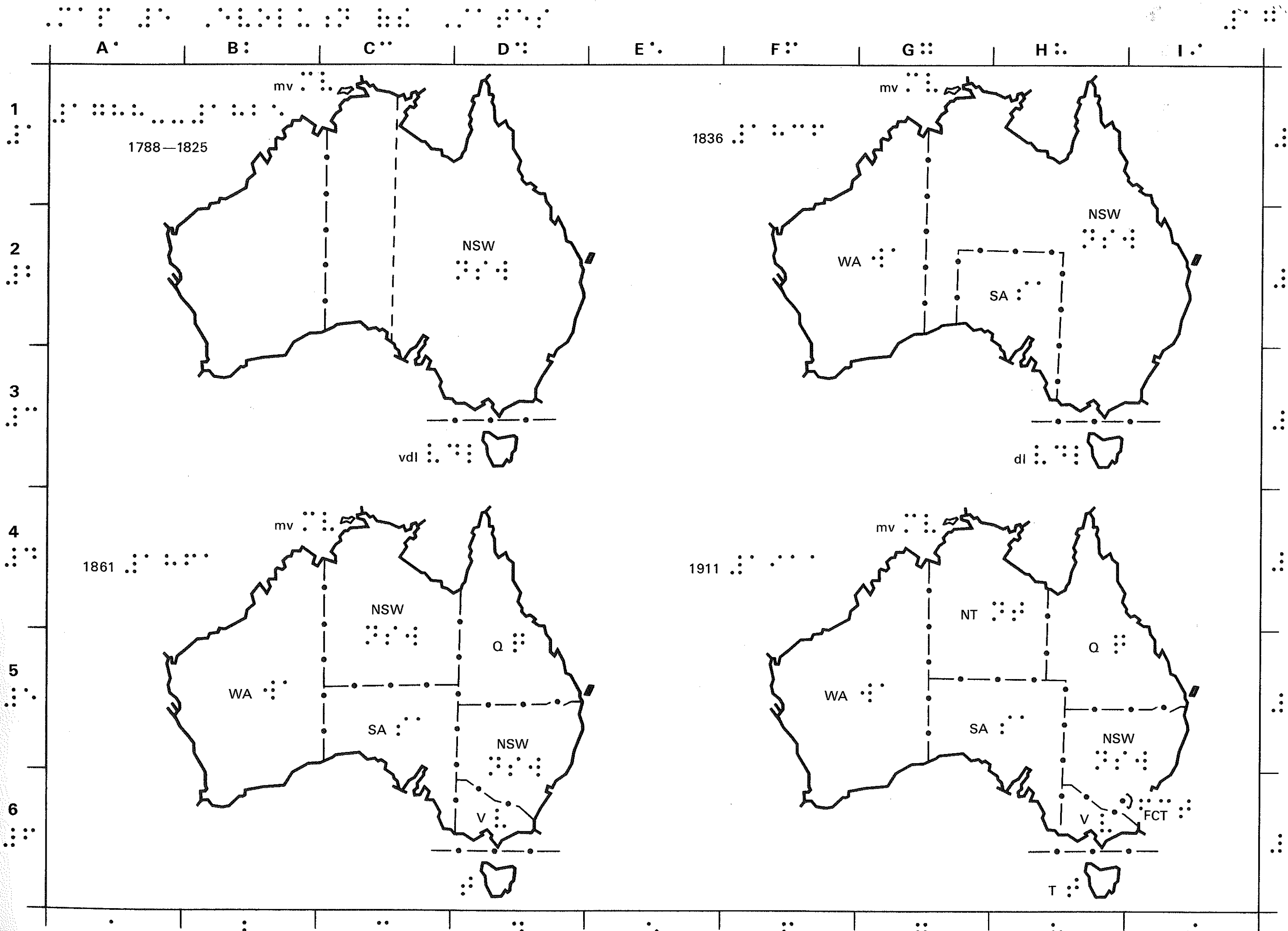
The map in the top right of the sheet reflects the next phase of boundary changes up until 1836. In 1829 Perth was established on the Swan River, and in 1831 the eastern boundary of Western Australia was fixed as the western boundary of New South Wales. Then, in 1836, the Colony of South Australia was proclaimed, and the boundaries depicted on the map were adopted. An examination of these boundaries shows that New South Wales then surrounded South Australia to the west, north and east.

The map in the lower left of the sheet depicts the next group of boundary changes up to 1861. These boundaries closely follow their present location. The boundaries of Victoria were proclaimed in 1851, separating that Colony from New South Wales along a line connecting Cape Howe to the nearest source of the Murray River and then along the river to the South Australian border.

The Colony of Queensland was declared in 1859, with its western boundary at first a continuation of the eastern border of South Australia. In the same year, Van Diemen's Land was renamed Tasmania. The final change during this phase was the absorption, in 1861, of that part of New South Wales between South Australia and Western Australia into South Australia.

The map in the lower right shows the boundaries of the States and mainland Territories in place by 1911 and since unchanged. In 1862 Queensland's western boundary was moved west to its present position. In 1863 there was a minor adjustment eastward (too small to show on the map) of the New South Wales/South Australia border. Also in 1863, following John McDouall Stuart's epic journey from the south to the north coast of Australia, the Colony of South Australia sought and gained control of the area to its north, which was then named the Northern Territory.

Control over the Northern Territory and the Federal Capital Territory was surrendered to the Commonwealth Government in 1911. The latter was renamed the Australian Capital Territory in 1938. In 1926 the Northern Territory was split into two separate Territories, along the latitude 20° south. Alice Springs, then known as Stuart, became the administrative centre of the southern Territory. It was reunited 5 years later.



SECTION C

People

The maps and commentaries in this section provide a picture of the distribution of Australia's population. In addition, related subjects such as immigration and federal elections have been included.

The amount of data which can be shown is very much limited by the space available on the maps. The map of Australia gives an overview of the nation's population density, while separate maps of each State at larger scales enable cities and major towns to be shown.

Even on the State maps, space permits only the larger centres to be depicted and named. In the more populous States, for example, only places with more than 5000 people are shown and only those above 10 000 are named. For the less populous States the corresponding limits are 2000 and 5000 respectively (500 and 1000 in the case of the Northern Territory). Broad population density zones are also shown on the State maps.

To maximise space, the State maps have been designed to fit the page size. As a consequence, map scale varies from map to map. To avoid confusion about the comparative sizes of States and distances between places, it is recommended that readers compare the size of the State on the State map to its size on the General Reference Map.

Map 18 'Federal Elections' employs 'pie graphs' to show election results in the capital cities. For those who are not familiar with these diagrams, or have not used them recently, the following explanation will help.

A pie graph is a circle divided into segments, each segment representing a proportion of the total (a 90 degree segment represents a quarter). When they are used to compare different totals, the size of the circles varies accordingly. On the 'Federal Elections' map, for example, the different sized circle associated with each capital city represents the number of seats in that city. Segments within each circle show the proportion of seats won by each major political party.

It was not practicable to depict the data on immigration in map form so 'bar graphs' have been used instead. Bar graphs represent relative quantities by the lengths of a series of columns. They are read in two directions from a single origin. The horizontal direction is referred to as the 'X' axis and the vertical direction as the 'Y' axis. Bars may originate from either axis, that is, they may be vertical or horizontal.

There are two sets of bar graphs depicting immigration data. The first set shows the numbers of Australian-born and overseas-born people in each State and Territory from the 1986 Census. The graphs are at two different vertical scales because of the large differences in total populations. Note that the origin is at the lower left, and that the bars for each State originate along the X axis, while the numbers of people are shown along the Y axis. Use the heights of the bars to measure or compare the numbers of Australian-born and overseas-born people in the various States.

The second set of bar graphs shows Australia's migrant intake in 1977 and 1987 by particular birth-place groupings. Two bars (representing 1977 and 1987) for each birthplace group originate along the X axis, while the numbers of people are shown along the Y axis.

Australia's population of just over 16 million is small by world standards. Despite being the seventh largest country by area, Australia ranks 45th in terms of population. By contrast, the Netherlands has a similar level of population in a land area of less than 1% of Australia's.

This map indicates Australia's population density in 4 density ranges: dense, moderate, sparse and uninhabited. Scan the entire map-sheet. Locate the legend in the top left corner and familiarise yourself with the different patterns used to depict the 4 density ranges on the map.

Australia's average population density is only 2.1 persons per square km, lower than that of any other country with a population of over 5 million. But the population is overwhelmingly clustered into large urban agglomerations, making Australia one of the world's most highly urbanised countries. Within Australia's cities, however, the density of population is low by international standards. Nuclear families in detached dwellings on individual blocks of land have traditionally been the most common form of residence.

Examine the map carefully. It shows the concentration of population in the east, SE and SW of the continent and the vast area that is sparsely populated or uninhabited. The areas of dense population are in part historically determined and are restricted by the need for reliable water supplies. The zone of moderate population density shows a clear correspondence to the area of cropping and intensive farming.

Densely settled area (greater than 5 persons per square km)

Dense settlement is largely confined to the discontinuous band of coastal lowlands in the east, SE and SW of the continent and to nearby areas of intensive agriculture. In total, these areas cover around 3% of Australia but contain over 80% of the population.

Explore the extent of the densely settled areas along the Queensland coast, in the east of New South Wales, in Victoria, in Tasmania, in the SE part of South Australia and around Perth and Darwin.

The strips of urban development along the coast include all but one of Australia's 12 major urban areas of over 100 000 people. Canberra, located well inland, is the only exception. Almost two-thirds of the entire population lives in these 12 areas.

Besides the major urban areas the densely settled zone includes other large cities and towns. It also covers pockets of dense rural settlement, both on the coast and inland along major rivers or near regional centres. These are associated with irrigated horticulture, intensive mixed farming and, in the north, sugar cane growing.

Moderately settled area (0.3 to 5 persons per square km)

If you explore the areas of moderate population density you will find that they extend inland from the densely settled coastal areas: along the NE coast of Queensland; from central Queensland down through New South Wales and much of Victoria, to the south-eastern part of South Australia; eastern Tasmania; and the SW corner of Western Australia.

About 60% of the people in this zone live in urban areas, primarily service towns for farm-based communities. These centres range from small district towns to regional cities, some of which (for

example Toowoomba in Queensland, Tamworth and Orange in New South Wales, Albury-Wodonga on the New South Wales-Victorian border and Mount Gambier in the SE region of South Australia) show up as small pockets of dense settlement within the moderately settled area. The national capital Canberra, a densely settled pocket with a population of over 250 000, is also located in this zone.

Sparsely settled area (less than 0.3 persons per square km)

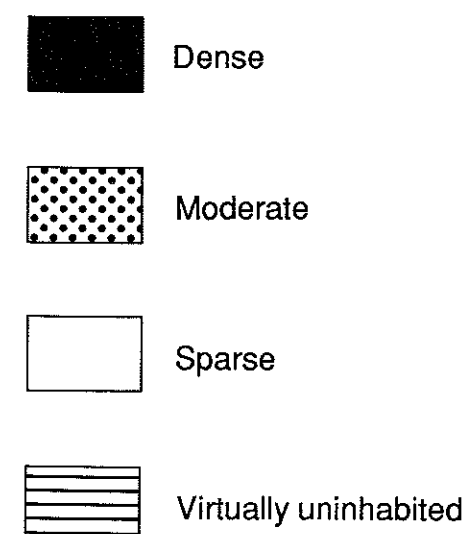
Examine the map and note the very large area of sparse settlement covering part of the west and NW of Western Australia, most of the Northern Territory and Queensland, western New South Wales and northern South Australia. As in the area of moderate density, 60% of the population lives in urban centres. The principal land use within this zone is extensive cattle or sheep grazing. Demand for services is therefore limited and service centres are few, generally small and isolated.

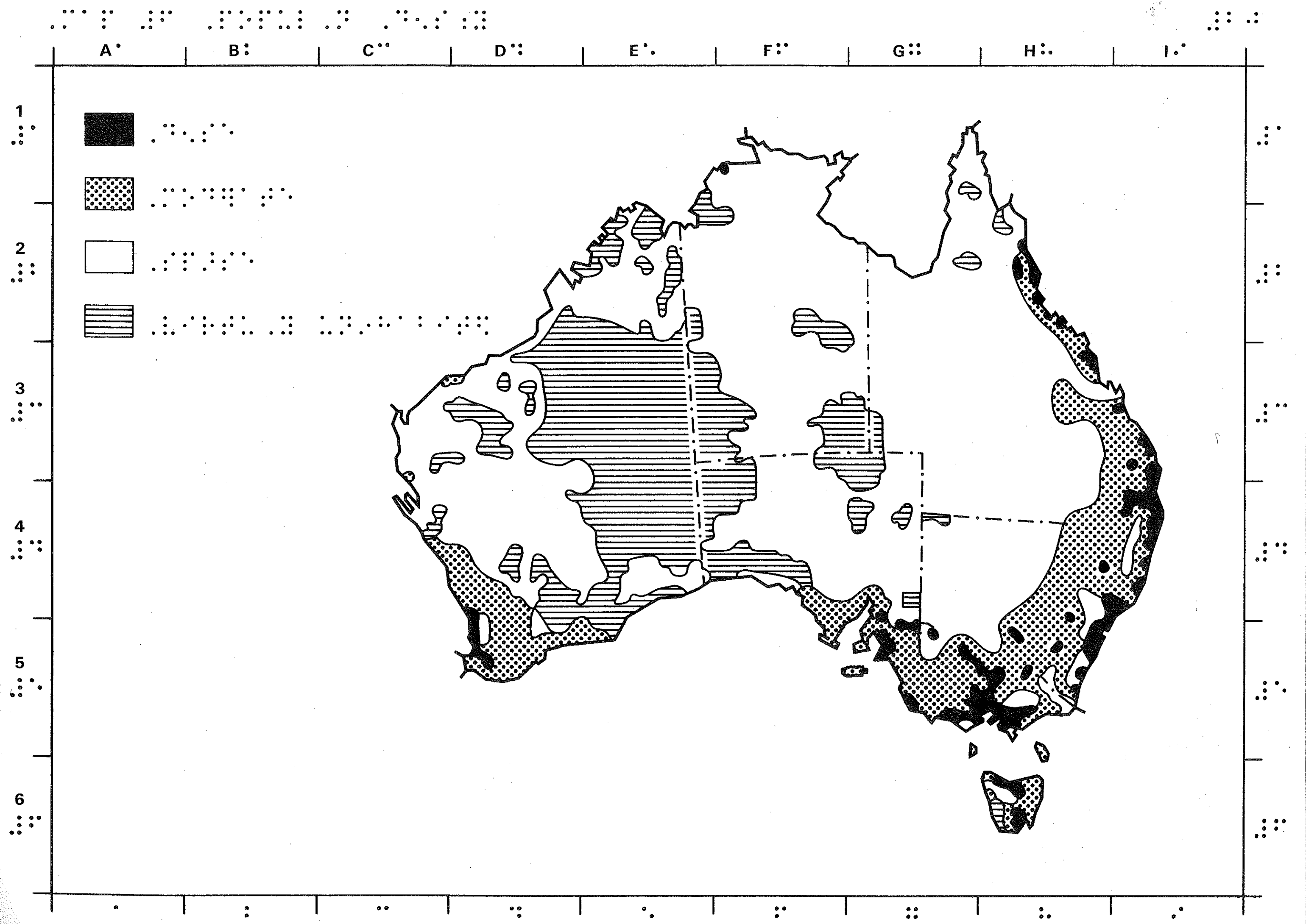
Mining has attracted a significant labour force to the sparsely settled area. More than half of the urban population lives in mining or associated centres, with over a quarter in the cities of Mount Isa, Broken Hill, Kalgoorlie-Boulder and Port Hedland. The only other large urban centres are Darwin and Alice Springs, both important tourist and administrative centres in the Northern Territory.

The small, detached, sparsely settled areas close to the densely settled areas in the SE of Australia are all rugged mountainous areas.

Uninhabited area

Identify and examine the extent of this zone. Most of the western half of the Australian inland is virtually uninhabited. The largest area covers much of Western Australia and part of South Australia and the Northern Territory, and there are other smaller uninhabited areas scattered widely around it. The remaining uninhabited areas are found on Cape Yorke Peninsula and in SW Tasmania. The aridity and/or inhospitable nature of this country impose severe constraints on human activity. Much of the zone consists of Aboriginal land, with a sparse and fluctuating population, vacant Crown land or nature conservation reserves.





Queensland is the nation's second largest State, and third largest in terms of population. Brisbane, the State capital, is Australia's third city with over a million people, but is the only mainland capital containing less than half the State's population (which amounted to 2.6 million in 1986).

The first Europeans known to have sighted Queensland were on the Dutch ship 'Duyfken' in 1606 when it sailed along the NW coast of Cape York Peninsula.

In 1824 a penal settlement was established near where Brisbane is today but a year later it was moved to the present site of the city. By 1829 it was mainland Australia's largest penal settlement.

Transportation to Brisbane ceased in 1839. The first free settlers arrived in 1842 and by 1845 some 1600 colonists had settled in Queensland. Meanwhile, squatters were eagerly taking up land and timber cutters were pushing north along the coast from New South Wales. By the end of the decade pastoral land had been opened up as far north as Maryborough.

During the 1850s and 1860s the settled area continued to expand rapidly to the north and west. Many ports, such as Rockhampton, Cairns and Townsville, were built to export wool or timber. Sugar and cotton were first grown around Brisbane in the 1860s and sugar was later established along the coast further north.

Like other Australian States, the discovery of minerals, particularly gold, accelerated Queensland's development. Major gold rushes from the 1860s to the turn of the century attracted many thousands of people. Most rushes were only shortlived but a few, such as at Charters Towers SW of Townsville, were longer-lasting. By 1890 Charters Towers was the second most populous town in Queensland. Supplies for the goldfields flowed largely through the coastal ports.

The most significant mineral discovery since the turn of the century has been that of silver, lead, zinc and copper at Mount Isa in 1923. Today, Mount Isa is the site of the world's largest producing lead-silver mine and is Queensland's ninth largest city.

Between 1860 and 1880 the population of Queensland grew eightfold, and it more than doubled again by the time of Federation in 1901 to nearly 500 000. Although there have been fewer overseas immigrants to Queensland since World War 2 than to some other States, population growth has remained steady while the national rate has fallen over that same period. This is largely the result of internal migration from other States for employment or lifestyle.

The map shows three broad population zones and the major cities and towns of Queensland. Scan the map-sheet, and note the map scale and the population size classes represented by the symbols in the legend. Compare the size of Queensland on this map to its size on Map 1 'Australia: General Reference'.

Queensland's highest population density is in the SE corner, stretching northwards from the border with New South Wales to just north of Bundaberg. Surrounding this zone is a moderately dense zone that extends as far north as Rockhampton. There is a second area of moderately dense population along the coast further north, from Mackay to Cairns. The large area of Queensland outside these zones is only sparsely populated.

Locate Brisbane (**B** 1 040 000) on the coast near the southern margin of the map. The city is the hub of the densely populated SE corner of Queensland and is the State's administrative and commercial centre. Brisbane exports locally mined coal as well as much of the produce of the Darling Downs to the west. Major industries include the manufacture of fertiliser (from natural gas), cement, paint and electrical goods, and vehicle and machine assembly. Brisbane also has rapidly growing financial and tourist industries.

Just to the south of Brisbane is the Gold Coast-Tweed Heads urban complex. The Gold Coast (**gh** 163 300) is Queensland's second most populous city, having been created in 1959 from a string of growing coastal towns. The city, which stretches for more than 30 km along the coast to the New South Wales border, has long been a popular tourist resort. Tourism and recreation are still the most important industries.

Just to the west of Brisbane locate the large provincial centre of Toowoomba (**to** 71 400), which is on the eastern edge of the agriculturally rich Darling Downs. This region is the State's leading producer of wheat, sorghum and pigs, and is also important for cotton and beef. Much of the regional output is processed in Toowoomba. The city is also a major educational centre.

Along the coast, just north of Brisbane, there are several towns which cater for recreation and tourism. These include Mooloolaba-Maroochydore (**mm** 20 600) and nearby Caloundra (16 200), Tewantin-Noosa (11 300) and, just inland, Gympie (10 800). The last three are not shown on the map because of space limitations. Sawmilling, prawning, pineapple and sugar cane growing, and beef and dairy cattle raising are also important local industries.

To the north, and slightly inland, is Maryborough (**mr** 20 200). Timber milling, sugar processing and railway engineering are important industries here. Nearby on the coast is Hervey Bay (**hb** 14 400), a growing tourist resort.

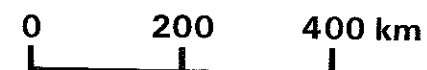
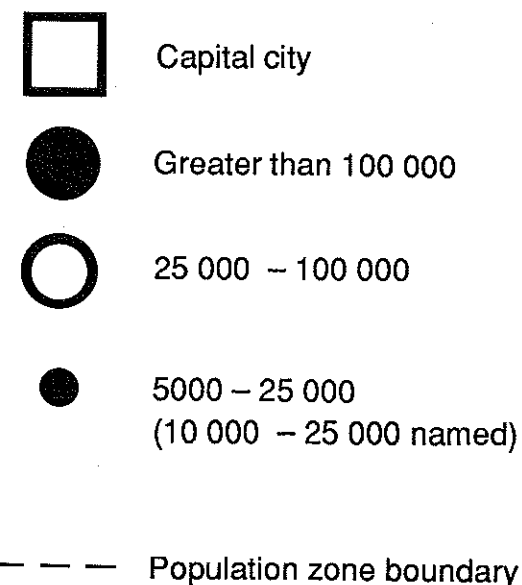
Next along the coast is Bundaberg (**bg** 33 400), the largest urban centre between Brisbane and Rockhampton. Bundaberg is the centre of an important sugar growing and horticultural area.

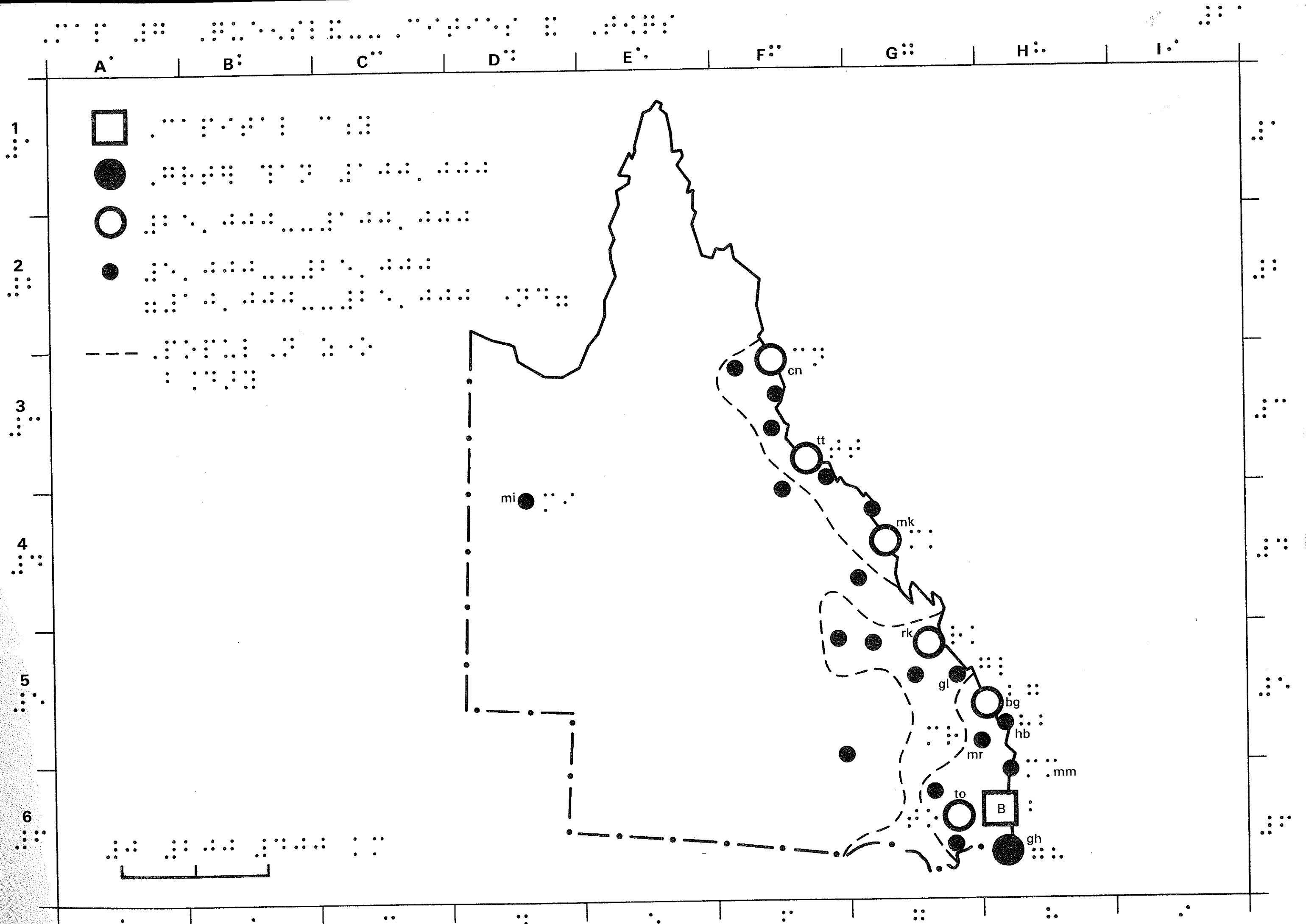
Continue NW along the coast from Bundaberg and locate Gladstone (**gl** 22 000), just inside the zone of moderate population density. A large aluminium refinery was established here in 1964, processing bauxite shipped from Weipa. An aluminium smelter was added in 1982. Gladstone is also the major export port for much of the coal mined in central Queensland.

Rockhampton (**rk** 54 400), further to the NW, is situated 50 km inland on the Fitzroy River. Australia's largest export abattoir is situated here in the midst of one of the nation's leading beef cattle producing regions.

Continue along the coast from Rockhampton and locate Mackay (**mk** 38 600), Australia's leading sugar producing centre. Nearby are two of the world's largest coal terminals, which export coal from mines up to 200 km inland.

Further NW along the coast find Townsville-Thuringowa (**tt** 96 200), the administrative centre of north Queensland and third largest urban area in the State. The large copper refinery





here produces about 70% of Australia's output from blister copper railed in from Mount Isa. Sugar and rice from the nearby Burdekin River area are exported through Townsville. Townsville has a university, large army and airforce bases, and is the headquarters of the Great Barrier Reef Marine Park Authority.

From Townsville continue further north along the coast to Cairns (**cn** 54 900), the northernmost coastal city mapped and centre of a large sugar producing region. An international airport opened in 1984 and Cairns is now a rapidly growing tourist centre, serving the Great Barrier Reef and Cape York Peninsula. Cairns is the port and regional centre for the rich Atherton Tableland, which supplies milk for Townsville and Mount Isa as well as timber products, vegetables and tobacco.

Far to the SW near the Northern Territory border is the mining city of Mount Isa (**mi** 23 300), the only large urban centre in the sparsely populated zone. Apart from the enormous copper and silver-lead-zinc mines, Mount Isa has large copper and lead smelters. Its location in the north-west has made it a centre of outback tourism and for beef cattle transport.

List of abbreviations

B	Brisbane
bg	Bundaberg
cn	Cairns
gh	Gold Coast-Tweed Heads
gl	Gladstone
hb	Hervey Bay
mi	Mount Isa
mk	Mackay
mm	Mooloolaba-Maroochydore
mr	Maryborough
rk	Rockhampton
to	Toowoomba
tt	Townsville-Thuringowa

New South Wales is the most populous and heavily industrialised State in Australia and, with 5.5 million people, accounts for around 35% of the total population. Sydney, its capital, is the nation's largest city and one of the world's great seaports.

Captain James Cook discovered and named New South Wales in 1770. It became the first British colony in Australia when, in January 1788, over 1000 seamen, marines and convicts arrived at Port Jackson on the First Fleet. Settlement around Sydney quickly followed exploration for good grazing land, while many coastal areas were first settled by timber-cutters.

By 1830 much of eastern New South Wales had been settled, including the Hunter Valley, the southern tablelands and the inland plains from Dubbo to Gundagai. By 1840, settlement extended from beyond the New England area in the north to the Riverina in the south. Grazing land was opened up as far as the Darling River in the 1850s and the arid NW was taken up for extensive grazing in the 1880s.

The accompanying map shows the major cities and towns of New South Wales. Scan the map-sheet and locate the legend in the lower left corner. The cities and towns are shown by symbols representing different population size classes. Places with a population of over 10 000 are named on the map and their abbreviations are closest to the map symbol. Note the compass rose in the NW corner of the sheet and the map scale in the bottom right corner, and compare the size of New South Wales on this map to that on Map 1 'Australia: General Reference'.

Over 80% of the people live in a narrow, largely urbanised belt along the coast. A zone of moderate population density extends parallel to this about 300-400 km inland. Beyond this is the sparsely settled western zone.

The boundaries of the three population zones, shown as broken lines, have been included on the map. Locate the start of these boundary lines along the New South Wales-Queensland border and trace them south to where they terminate or cross into Victoria. Then study the overall extent of the separate zones from north to south.

Commence your examination of the map by locating Tweed Heads (**gh** 22 300), the most northerly coastal centre in New South Wales. It is indeed a southward extension of the Queensland city of Gold Coast, hence the abbreviation **gh**. The densely populated area along the north coast of New South Wales is growing rapidly, largely as a result of the migration of people from metropolitan areas. Follow the coastline a short distance south to the fast-growing resort town of Ballina (**bl** 12 400), then immediately to the west locate Lismore (**ll** 24 900), an administrative and commercial centre for northern New South Wales, and nearby Casino (**cs** 10 100) to the SW. The district surrounding Lismore is a major dairying region and one of the most densely populated rural areas in Australia.

South of Casino is Grafton (**gn** 16 600). It is in the centre of the Clarence River district, where dairying, sugar cane growing and mixed farming are major rural activities. South from Grafton and back on the coast find Coffs Harbour (**ch** 18 000), the centre of a banana-growing district, and then Port Macquarie (**pm** 22 900). Taree (**te** 16 000), a major regional centre for the lower north coast, is further south again and slightly inland. Moving south to the coast again, locate Forster-Tuncurry (**ft** 11 200).

Continue southward and locate the large symbol representing Newcastle (**nc** 256 000), the State's second largest city and gateway to the Hunter Valley, first settled in the 1820s. Newcastle is the site of a major steelworks, much heavy engineering and a major export port for coal and grain.

By examining the area to the west and NW of Newcastle, you will notice that the densely populated zone bulges inland to accommodate the closely settled Hunter region, where some of the most varied and productive agriculture in New South Wales is found. Large centres here include Maitland (**ml** 43 200), Cessnock (**ck** 17 500), Singleton (**sg** 11 000) and Kurri Kurri (13 400), which is not named on the map. The recent growth of these centres owes much to large-scale coal mining, massive power generation and aluminium smelting.

Return to Newcastle and follow the coast south to Gosford-Central Coast (**gc** 163 000), a rapidly growing retirement and tourist area and popular dormitory area for people working in Sydney. Continue southward to Sydney (**S** 2 990 000), Australia's oldest and largest city. With its various satellite centres to the west, including Camden (10 100), Richmond-Windsor (17 100) and Katoomba-Wentworth Falls (15 600), none of which are named, the Sydney region contains around 55% of the population of New South Wales.

Sydney is the major point of entry for international tourists to Australia; its airport is the busiest in the nation. Sydney's twin ports of Port Jackson and Botany Bay together handle more cargo than any of the other capital city ports. By the 1980s almost two-thirds of the city's work force were engaged in tertiary activities, mostly wholesale and retail trade, financial administration and community services.

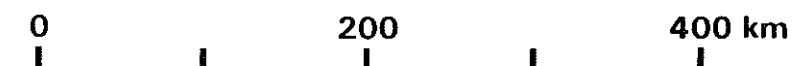
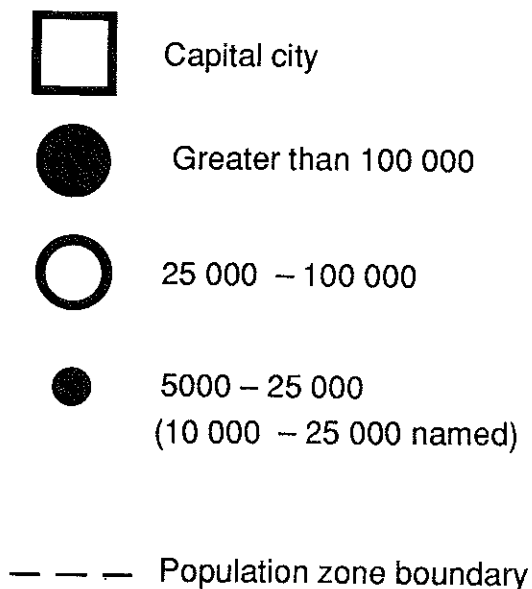
Immediately south of Sydney lies the narrow Illawarra coastal plain, first settled in the 1820s. Wollongong (**wl** 207 000), the State's third largest city, is located here. It is Australia's top steel-producing centre and an important export port for coal from nearby mines and wheat from the south and west of the State. The Illawarra region supports a dense rural population, mostly engaged in dairying, and has a close network of small service centres.

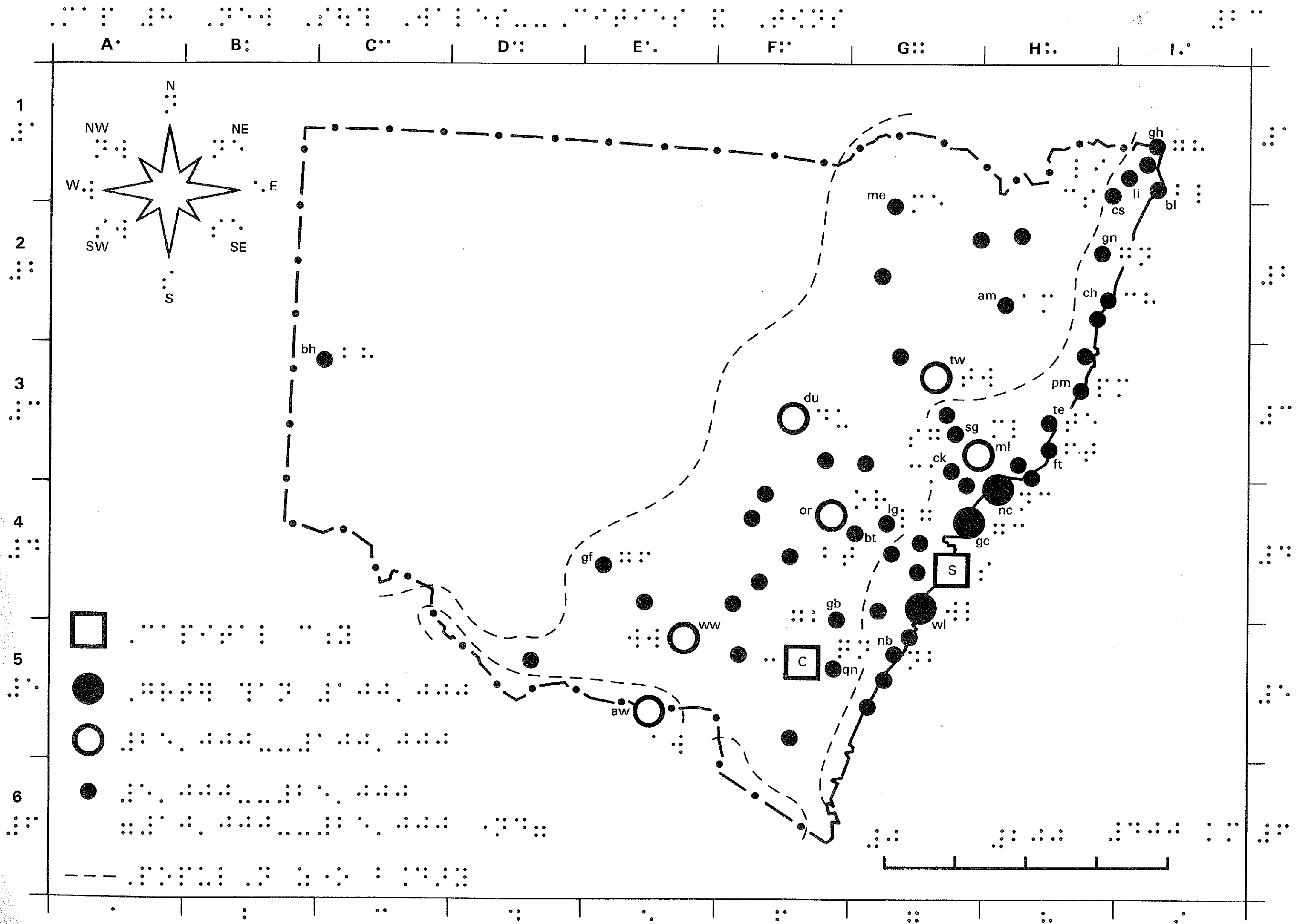
Just to the west of Wollongong, on the southern highlands, is the town of Bowral which, together with nearby Mittagong, is experiencing considerable population growth because of its proximity to Sydney.

The coastal region to the south of Wollongong was first settled in the 1840s but remained sparsely populated until holiday resorts began to develop after World War 2. The population is currently growing rapidly, with increasing numbers of people retiring here from Sydney, Canberra and surrounding areas.

Locate the largest centre, Nowra-Bomaderry (**nb** 19 600), virtually on the coast a short distance south of Wollongong. Nowra and Bomaderry are twin towns on the Shoalhaven River at the centre of a rich dairying area. Major industries here include a paper mill and milk processing. Note that there are no towns of over 5000 people along the far south coast, yet overall this area is quite closely populated.

Now examine the extent of the much wider zone of moderate population. The wheat belt, which runs from north to south in New South Wales, lies on the plains in the western half of this zone. Starting in the north, the first town mapped on the western side of





this zone is Moree (**me** 10 200). Moree has large storage facilities for wheat and cotton and is an important junction on the inland highway from Brisbane to Melbourne.

To the SE of Moree, and directly inland from Coffs Harbour, locate Armidale (**am** 19 500), an important service and educational centre in the middle of the New England area. The slopes to the west and SW of the New England tablelands support a moderate rural population but the only large urban settlement is the city of Tamworth (**tw** 30 700), to the SW of Armidale. It is the largest city in northern New South Wales and the commercial centre of an wide area noted for wool, wheat, livestock and dairy production.

From Tamworth, move SW and locate the large regional service city of Dubbo (**du** 25 800). It is a major rail and road junction in the centre of an extensive wheat and wool growing area and, while many of the towns in the region are declining in population, Dubbo has grown in recent years.

To the SE of Dubbo the first large population centre is the city of Orange (**or** 28 900), and just east of this are Bathurst (**bt** 22 200) and the nearby coal mining town of Lithgow (**lg** 12 400) on the western edge of the Blue Mountains. Orange is the administrative and commercial centre for much of the central tablelands of New South Wales. The surrounding area is noted for its apple, pear and cherry orchards. The manufacture of electrical appliances is a major secondary industry in Orange. Bathurst is an important educational centre.

To the south of Orange the southern tablelands have supported sheep grazing from around the 1820s. The scattered rural population of the area is dominated by the cities of Goulburn (**gb** 21 600) and Queanbeyan (**qn** 21 900), due south from Orange. Goulburn is one of Australia's major wool-selling centres. These two cities are in turn overshadowed by Canberra (**C** 247 000), the national capital and major regional centre for much of southern New South Wales. Much of Queanbeyan's recent growth can be attributed to the role it plays in servicing the light industrial needs of neighbouring Canberra.

West of Canberra, on the edge of the SW slopes, is the fast growing city of Wagga Wagga (**ww** 37 600), regional centre for much of the southern part of the wheat belt and the riverine plains further west. Wagga Wagga is also an important educational centre and site of a large RAAF base.

NW of Wagga Wagga, and just inside the western boundary of the moderately settled zone is Griffith (**gf** 13 600), a thriving town with many wineries close by, which is located in the Murrumbidgee Irrigation Area. Just west of Griffith, follow the inland boundary of this zone southwards. It curves in and then out before crossing the border into Victoria. The southern portion of this zone encloses a narrow band of dense settlement along the Murray River, which here forms the State border. The high rural population is a reflection of the intensive irrigated agriculture practised along the Murray River.

Follow the State border to the east and locate Albury-Wodonga (**aw** 37 200), which is SW of Wagga Wagga. Albury, on the New South Wales side of the Murray River, is the major urban centre in this part of southern New South Wales. It is a major highway junction, a regional administration and education centre, and has been the focus of government decentralisation policies in recent decades. A large paper mill is situated just to the north of Albury.

The zone classed as sparsely populated occupies the entire western part of the State, an area almost as great as the other population zones combined. It is occupied by large pastoral properties and characterised by a thinly scattered rural population. The only large urban settlement is the isolated mining city of Broken Hill (**bh** 24 500), close to the South Australian border, where large silver-lead-zinc deposits have been mined for over a century.

List of abbreviations

am	Armidale
aw	Albury-Wodonga
bh	Broken Hill
bl	Ballina
bt	Bathurst
C	Canberra
ch	Coffs Harbour
ck	Cessnock
cs	Casino
du	Dubbo
ft	Forster-Tuncurry
gb	Goulburn
gc	Gosford-Central Coast
gf	Griffith
gh	Gold Coast-Tweed Heads
gn	Grafton
li	Lismore
lg	Lithgow
me	Moree
ml	Maitland
nb	Nowra-Bomaderry
nc	Newcastle
or	Orange
pm	Port Macquarie
qn	Queanbeyan
S	Sydney
sg	Singleton
te	Taree
tw	Tamworth
wl	Wollongong
ww	Wagga Wagga

Victoria is the most densely populated Australian State, containing 26% of the nation's population in just 3% of its area. The capital, Melbourne, is Australia's second most populous city, though it was the most populous for 40 years before 1911. From 1901 to 1927 Melbourne was the seat of the national parliament.

In 1835 an unofficial settlement was established on the site of Melbourne by sheep graziers from Van Diemen's Land. Its population in 1840 had grown to 4000. By this time squatters from New South Wales had moved into the north of Victoria, and by 1850 the only large unoccupied areas were in the NW and SE.

In 1851 Victoria became a separate Colony and the discovery of gold in the same year led to a dramatic population increase over that decade. During the 1860s many who had laboured on the goldfields turned to farming, or found work on railway construction or in the factories of growing towns. An economic boom during the 1880s saw a rapid increase in Melbourne's population, but in the severe economic depression of the following decade over 100 000 people left Victoria.

By the early part of the 20th century an extensive rail network, large irrigation schemes and government settlement schemes encouraged an intensification of agriculture and an increase in rural population density. Many immigrants to Australia after World War 2 settled in Victoria, but since then the State has grown comparatively slowly.

The map shows the major cities and towns of Victoria. They have been separated into three population size classes, represented by different symbols. Scan the map-sheet and locate the legend in the top right corner and the scale bar in the bottom right corner. Compare the size of Victoria on this map to its size on Map 1 'Australia: General Reference'.

The approximate boundaries of three zones of population density are shown on the map as broken lines. The cities and major towns are concentrated in two areas which form the zone of high population density. Much of the rest of Victoria is moderately populated, except for two pockets of sparsely populated land - one in the far NW corner, labelled 'Mallee', and the other in the east, labelled 'Victorian Alps'.

Locate the start of the boundary between the dense and moderate population zones on the coast just east of the border with South Australia. Trace this line generally eastwards as it encloses the major area of dense population, and swings northward into central Victoria before rejoining the coast further east. Examine this area of dense population and note the central location of Melbourne (M).

The other area of dense population forms a narrow band along the Murray River in the central section of the northern border of the State. The broken line bounding this zone crosses into New South Wales at each end of the area.

In the extreme NW of the State locate the sparsely populated area referred to as the 'Mallee'. It is bounded on the map by the South Australian border, by the Murray River in the north and the population zone boundary in the south. Similarly, in the east of the State, beginning on the New South Wales border near the coast, trace the broken line surrounding the other area of sparse population, labelled the 'Victorian Alps'.

Between all of these areas is a large zone of moderately populated land extending right across the State. Beginning in the west, explore this area and note that it covers most of western Victoria, except for the Mallee in the NW. It narrows between the two densely populated areas and then divides into two bands which run either side of the sparsely populated Victorian alps.

The following text describes the major urban centres within each of the population density zones. Places which have a population of over 10 000 are named on the map, with the abbreviations placed close to their location symbol.

Return to where the South Australian border meets the coast and commence a detailed examination of the map by locating Portland (pd 10 900), slightly to the SE and just within the boundary of the densely settled zone. Portland is the only deep-sea port between Port Phillip Bay and Adelaide and is also the site of a large aluminium smelter.

On the coast to the east of Portland find Warrnambool (wr 22 700), the centre of a rich agricultural area. The city has a large milk processing plant and woollen mill. East of Warrnambool is Colac (cl 10 500), a rural service centre in the very productive dairy, beef cattle and sheep grazing country which extends east to Port Phillip Bay.

NE of Colac, on the western extremity of Port Phillip Bay, is Geelong (ge 125 800), Victoria's second and Australia's twelfth largest city. Geelong is a centre for textile, automobile and fertiliser manufacture, oil refining and aluminium smelting. Much of Victoria's wheat crop is exported through the port of Geelong.

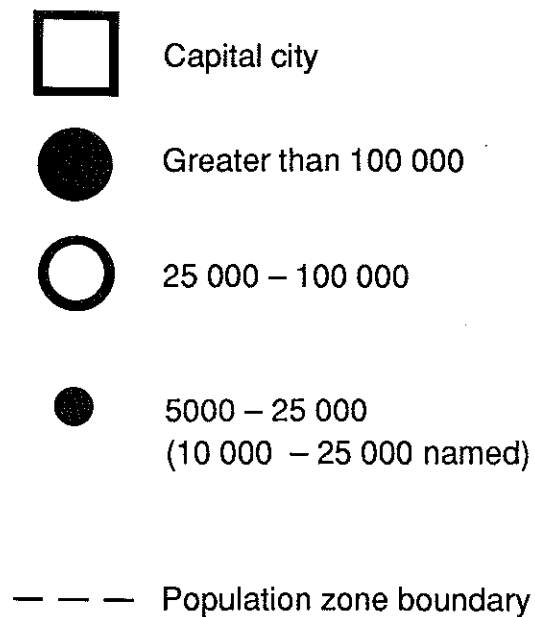
NE of Geelong, at the head of Port Phillip Bay, locate the square representing Melbourne (M 2 650 000). With its rapidly growing satellite centres such as Melton (mt 24 400) and Sunbury (sb 15 300), just to the NW, and Cranbourne (cb 14 000), just to the SE, Melbourne contains around 65% of Victoria's population.

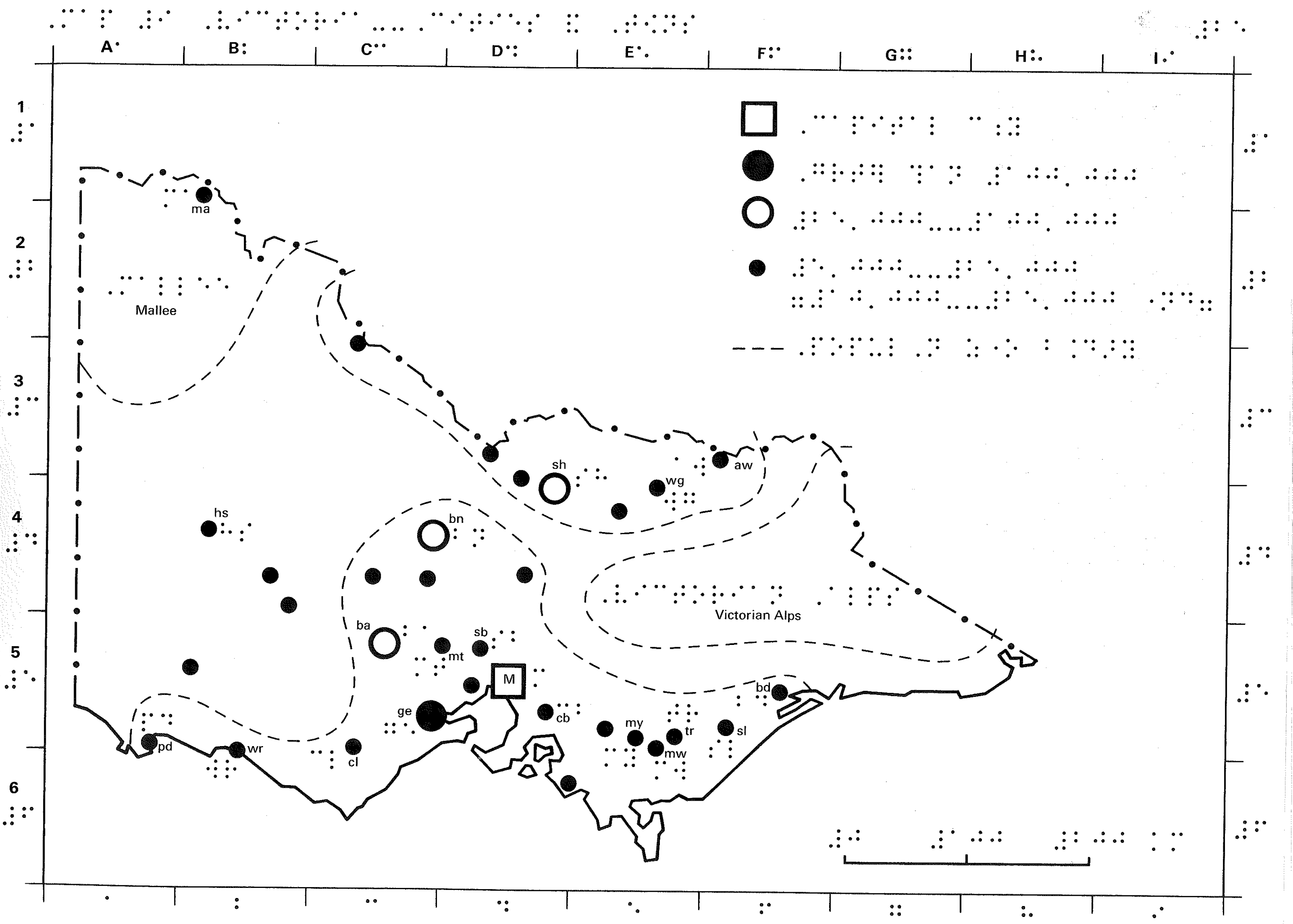
The headquarters of many Australian mining companies and commercial enterprises are located in Melbourne. Employment in the textile, automotive, clothing and footwear industries is particularly high. Petrochemical and paper manufacture are important industries to the city, which has the busiest container port in Australia.

To the west of Melton (mt) is the city of Ballarat (ba 63 800), site of the famous Eureka Stockade in 1864. Gold mining contributed to the agricultural expansion of the region and the industrial development of the town. Ballarat became a major rail junction linking wheat farms to the NW with Melbourne and Geelong.

To the north and a little east of Ballarat, locate Bendigo (bn 54 000). Gold was found around Bendigo in 1851 and the field has been the State's most productive. Today, the city has woollen mills and Australia's oldest pottery works. The surrounding district produces around half of Victoria's egg supply, as well as livestock and vegetables.

Return to Melbourne and, to the SE beyond Cranbourne, locate Moe-Yallourn (my 18 400), Morwell (mw 16 400) and Traralgon (tr 19 300), the three main urban centres in the Latrobe Valley. This was primarily an agricultural and pastoral area until the 1920s, when mining of the enormous brown coal deposits of the Valley encouraged industrial development. Today, most of





Victoria's electricity is generated in power stations sited close to the coal mines. All three towns service the mining and power generation industries, as well as the surrounding rural area in which dairying and potato growing are important.

Further east, in the Gippsland region of eastern Victoria, is Sale (**sl** 13 600). Oil and gas from offshore fields in Bass Strait pass through a gas processing and crude oil stabilisation plant near Sale. NE of Sale, and almost on the coast at the eastern end of the densely populated zone, is Bairnsdale (**bd** 10 300). Fishing and timber production are important industries in this area.

Continue eastwards along the coast to the border with New South Wales and then trace the border to the NW to locate the other area of dense population, along the Murray River. On the river is Wodonga (**aw** 20 900), part of the Albury-Wodonga complex which was promoted jointly by the federal and State governments to encourage regional development and population decentralisation. Beef and dairy cattle are raised in the region, and the livestock saleyards at Wodonga are among the largest in the nation.

SW of Albury-Wodonga is Wangaratta (**wg** 16 600) and, further west, Shepparton-Mooroopna (**sh** 30 200), which services an extensive area of irrigated agriculture. Large quantities of pome and stone fruit are produced in this area and are processed in the Shepparton cannery. Milk processing is also an important local industry.

Follow the Murray River NW past two unnamed towns to Mildura (**ma** 20 500), in the far NW corner of the State. This rapidly growing centre serves an irrigation district that produces most of Australia's dried grapes and 20% of its citrus fruit. The region is also a major producer of wine grapes.

Far to the south of Mildura, beyond the boundary of the sparsely populated Mallee, is Horsham (**hs** 12 200), the only large urban centre in the moderately populated zone. Horsham services much of western Victoria, a predominantly wheat and sheep growing region.

List of abbreviations

aw	Albury-Wodonga
ba	Ballarat
bd	Bairnsdale
bn	Bendigo
cb	Cranbourne
cl	Colac
ge	Geelong
hs	Horsham
M	Melbourne
ma	Mildura
mt	Melton
mw	Morwel
my	Moe-Yallourn
pd	Portland
sb	Sunbury
sh	Shepparton -Mooroopna
sl	Sale
tr	Traralgon
wg	Wangaratta
wr	Warrnambool

The island of Tasmania is the least populous State in Australia. Around 445 000 people, or less than 3% of the nation, live here. Hobart is the country's second oldest State capital and in the early part of last century was the second largest city, although now it is the eleventh largest.

The Dutch explorer Abel Tasman was the first known European to visit Tasmania. He landed on the SE coast in 1642 and named it Van Diemen's Land. 1803 a group of 49 settlers from Sydney, including convicts, established a settlement on the Derwent River in the south. In part, this was to assert British sovereignty over an area recently explored by the French. A year later other colonists settled on the River Tamar in the north.

At first, wheat and livestock were produced on suitable land close to market and port. Settlement gradually expanded around Hobart and Launceston. Several penal settlements were established in rugged, isolated coastal areas of Tasmania.

By about 1830 most of the land in a strip between Hobart and Launceston was being farmed, but it was not until the 1850s that settlement began to expand rapidly again. This expansion was primarily to the south of Hobart and to the west of Launceston, encouraged by increased demand for goods from the mainland and export markets.

The 1870s and 1880s saw further major expansion of the settled areas. Demand for timber, coal and land led settlers into NE Tasmania. The discovery of minerals on the west coast and improvements in the techniques for their extraction, along with better transport, created several boom towns in the area. Hydro-electric schemes were begun early in this century, establishing isolated settlements in central Tasmania.

Tasmania's population increased rapidly while convicts were being transported to the island. It grew fourfold in the decade before 1830 to around 24 000. In the early 1850s the Victorian gold rushes encouraged the opening up of new areas of Tasmania to supply timber, potatoes and other products, but also lured many Tasmanians to the mainland. This, combined with the end of convict transportation in 1853, caused a dramatic fall in Tasmania's growth rate, which did not recover until the mining boom of the 1880s.

The accompanying map shows the major cities and towns of Tasmania. They have been separated into two population size classes represented by different symbols. Places with a population of over 5000 are named on the map, with the abbreviation close to the location symbol. Scan the map-sheet and locate the legend in the top left corner and the map scale in the bottom left corner. Compare the size of Tasmania on this map with that on Map 1 'Australia: General Reference'.

The approximate boundaries of three population density zones (dense, moderate and sparse) are shown on the map as broken lines. Examine the whole island and note the concentrations of urban centres in the north and the SE. These form two areas of dense population. One is in the SE around Hobart and the other stretches along the north coast from Launceston to just west of Burnie.

Begin your examination of the cities and towns within each population zone by locating the hollow square symbol for Hobart in the SE of the island at map reference H5. Hobart (H 127 000) has several major industries, including mineral processing and a major confectionery factory.

Within the boundary of the area of dense population around Hobart are several other urban centres. Nearby Kingston (kg 10 900) to the south and Bridgewater (bw 8700) to the NW now serve as dormitory suburbs for Hobart. Near New Norfolk (nn 6200), just west of Bridgewater, is the largest newsprint mill in Australia. The town is also a service centre for people living in the upper Derwent Valley.

Now move to the north coast and examine the extent of the northern densely populated zone. Launceston (la 66 300), situated on the eastern edge of this zone and at the head of the River Tamar estuary, is the second largest city in Tasmania and the major commercial centre for the north of the State. Launceston has traditionally had a significant proportion of its workforce engaged in textiles and engineering.

To the north of Launceston is George Town (gt 5300), where Australia's first aluminium smelter, established in 1955, still operates. Metal products are also manufactured nearby, but reduced employment opportunities in these industries have led to a decline in population in recent years.

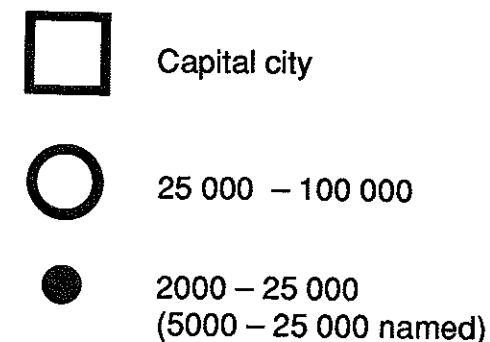
To the west, stretching along the north coast from Devonport to beyond Burnie, is a very fertile area supporting dairying and vegetable production. Devonport (de 22 600) is a rapidly growing city and has a wide range of light industries, notably textiles and the freezing and canning of local vegetables. It is also Tasmania's main passenger port.

Immediately to the west of Devonport is Ulverstone (uv 10 100), which caters for tourists visiting the coast and inland wilderness areas. Next along the coast is Burnie (bu 20 700), noted for the manufacture of paper and titanium pigments and for its dairy products. It is also the major port for the west and NW of Tasmania.

There are five areas of moderate population density. In the NW corner of the island, further west along the coast from Burnie, is a small area of moderate population centred on Smithton, the unnamed town symbol on the map in this area.

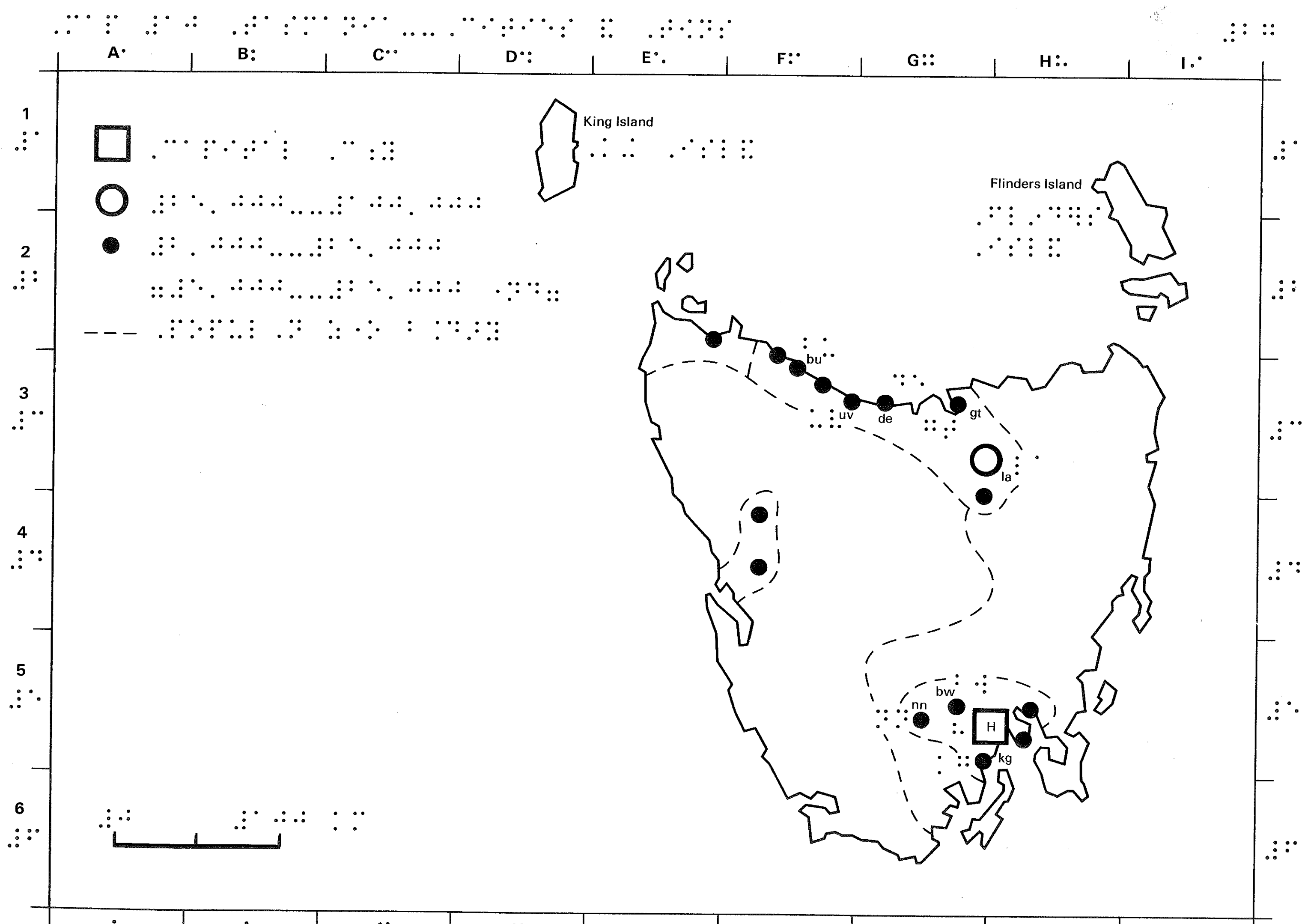
To the south, down the west coast, locate the small area of moderate population density containing two town symbols. The more northerly symbol represents Rosebery (2100), which serves nearby lead, zinc and tin mines and south of this is Queenstown (3600), where copper and gold are mined. Even though the population of the area has declined greatly since the mining boom of late last century, recent hydro-electricity projects have helped slow the outflow.

With the exception of the densely populated area surrounding Hobart, all of eastern Tasmania is moderately populated. Explore this area and note that it is bounded on the north and east by the ocean and on the west by the broken boundary line extending from near Launceston in the north to the southern coast.



— — — Population zone boundary





The region to the south of Hobart is known for its apple orchards and berry farms. In the moderately populated zone just to the NW of Hobart, sheep grazing, hop growing and forestry are dominant, while the area between Hobart and Launceston produces some of the finest wool in Australia. In the NE and along the eastern side of Tasmania are large uncleared areas where forestry and mining are the major land uses. There is a string of small fishing ports on the east coast, some of which are used to export minerals, timber and woodchips.

The remaining two moderately populated areas are the two large islands in Bass Strait, the water body to the north of Tasmania. They are King Island to the NW and Flinders Island to the NE, both of which are named on the map. King Island has large dairy herds and a tungsten mine. Although beef cattle are raised on both islands, Flinders Island is better suited for sheep grazing. Fishing is also locally important.

With the exception of the NW coastal area and the small moderately populated area around Queenstown, the western part of Tasmania consists of one large zone of sparse population. Trace its boundary from the northern part of the west coast and follow it SE, south, west and then south again to where it meets the coast, to the south of Hobart.

Much of this area is covered by State forests and national parks and most people living here are involved with either the generation of electricity, forestry or tourism.

List of abbreviations

bu	Burnie
bw	Bridgewater
de	Devonport
gt	George Town
H	Hobart
kg	Kingston
la	Launceston
nn	New Norfolk
uv	Ulverstone

South Australia is the fourth largest State and occupies nearly 13% of Australia's land area. In 1986 South Australia had around 1.4 million people, nearly 75% of them residing in Adelaide, the State capital.

The first European settlements were established on Kangaroo Island from 1803 onwards by visiting sealers. In 1834 the South Australian Colonisation Act was proclaimed in the British parliament, following an enthusiastic account of land along the lower River Murray by the explorer Charles Sturt. The Act determined that settlement was to be without convict transportation. Captain William Light, Surveyor General of the new Colony, decided on the Adelaide plains as the settlement site and the Colony was proclaimed in December 1836.

From 1840, pastoralists took up land north of Adelaide and in the SE of the Colony. In 1841 miners began extracting silver and lead ore from a mine at Glen Osmond near Adelaide. In 1845 extensive copper deposits were found near Burra to the north and by 1850 the Colony was a major world producer of copper.

The Victorian gold discoveries of the 1850s led to an exodus of people, but also created a demand for agricultural produce from South Australia. Growth was helped in the 1860s by the development of roads and railways and by steam navigation on the River Murray. Rich copper deposits were found on Yorke Peninsula and by 1865 the main South Australian exports were grain, flour, wool, metals and mineral ores.

In the 1870s, during a succession of good seasons, there was a northward expansion of wheat farming, but the return of drier, more typical seasons in the 1880s led to the abandonment of many farms on the northern margins of cultivated land. Despite this contraction, the area under crop continued to expand through to the 1920s, particularly on Yorke Peninsula.

Subsequent government encouragement of manufacturing and other industry aimed to broaden the economic base of the State. Industrial development was accentuated during World War 2 by the demand for such products as munitions, explosives and steel.

The 1950s and 60s was a period of economic prosperity and South Australia gained many of the post-war immigrants and industries attracted to Australia. Between 1947 and 1954 the population rose by 23% to nearly 800 000. Nevertheless, by the mid-1970s the boom had faded and the State's industry suffered from greater international competition.

The accompanying map shows the major cities and towns of South Australia. They have been separated into two population size classes, represented by different symbols. Scan the map-sheet and locate the legend in the top left corner and the scale bar in the bottom left corner. Compare the size of South Australia on this map to that on Map 1 'Australia: General Reference'.

By scanning the map you will notice that almost all cities and major towns are concentrated in the SE of the State. The approximate boundaries of three zones of population density are shown on the map as broken lines. There are three relatively small areas of high population density. The main one surrounds metropolitan Adelaide. Another is in the agriculturally productive area in the far SE and the third is a small area along the River Murray, NE of Adelaide. The zone of moderate population density corresponds

with the main area of South Australian cropping and grazing. The remainder, and by far the greater part of South Australia, lies to the north and west of this zone and is only very sparsely populated.

To identify the separate population zones, start at the hollow square denoting Adelaide (map reference H5) on the eastern side of the Gulf of St Vincent. Follow the broken line encircling this area of dense population from the coast just to the north of Adelaide to where it rejoins the coast further south.

Adelaide (A 1 010 000) lies in the centre of this densely populated zone and, as the State capital, has always been the dominant South Australian city. Urban expansion since World War 2 has almost completely covered the Adelaide plains and the adjacent Mount Lofty Range foothills. It includes the satellite centres of Gawler (11 400), Crafers-Bridgewater (11 200) and Mount Barker (5400), which are not shown on the map because of space limitations.

South of Adelaide find Victor Harbor (vh 5300), a popular resort and retirement centre. Just east of Victor Harbour and near the mouth of the River Murray is the town of Goolwa, a major river port in the days of paddle steamers. To the NE is Murray Bridge (mb 11 900), situated on the River Murray. As a service centre for the surrounding agricultural district and a major transport link, its population has grown in recent decades. The highly productive horticultural area of the Barossa Valley lies to the NW of Murray Bridge and includes the town of Nuriootpa, represented by the northernmost symbol in this area of dense population.

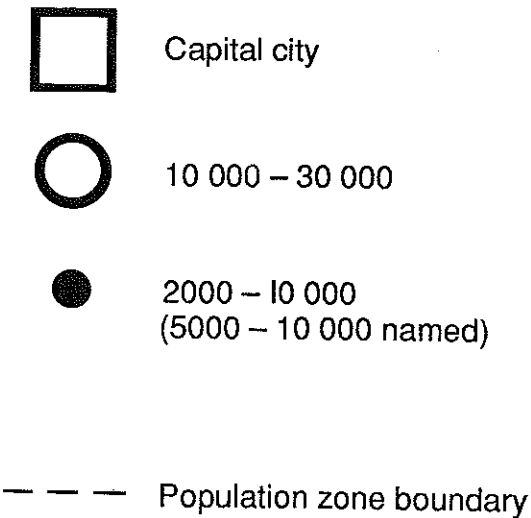
The second area of dense population is in the extreme SE corner of the State, bounded by the Victorian border to the east and the coast to the SW. Unlike most of South Australia, this small area has reliable rainfall and is a productive agricultural region. The regional centre of Mount Gambier (mg 20 800) supports the largest softwood sawmilling establishment in Australia, utilising the extensive local pine plantations. Nearby Millicent (mc 5100), just to the NW, is an important centre for forestry, wood processing and intensive farming in the region.

Now follow the State border north, past the symbols for Naracoorte and Bordertown to the third densely populated area, just NE of Murray Bridge. Centred on the towns of Renmark, Berri and Loxton, it reflects the intensive farming systems of the Riverland Irrigation Area.

The boundary of the moderately settled zone begins on the western side of the Riverland Irrigation Area. Trace this boundary NW around the top of Spencer Gulf where it swings around to the SW and then NW again before joining the coast near Ceduna (in the far west of this zone). The area around Ceduna was first cleared for agriculture between 1900 and 1910.

SE along the coast from Ceduna is Port Lincoln (pl 11 600), the largest urban centre on Eyre Peninsula. Port Lincoln has an excellent natural harbour and contains the State's largest grain terminal. It is home to most of the State's fishing fleet and is a centre for seafood processing.

On the coast to the NE, around the top of Spencer Gulf, lie the industrial centres of Whyalla, Port Augusta and Port Pirie. Iron ore was first mined in the Middleback Ranges near Whyalla (wy 26 900) in 1900, and in 1941 a blast furnace started operation in Whyalla. Steel and shipbuilding industries were subsequently



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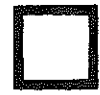
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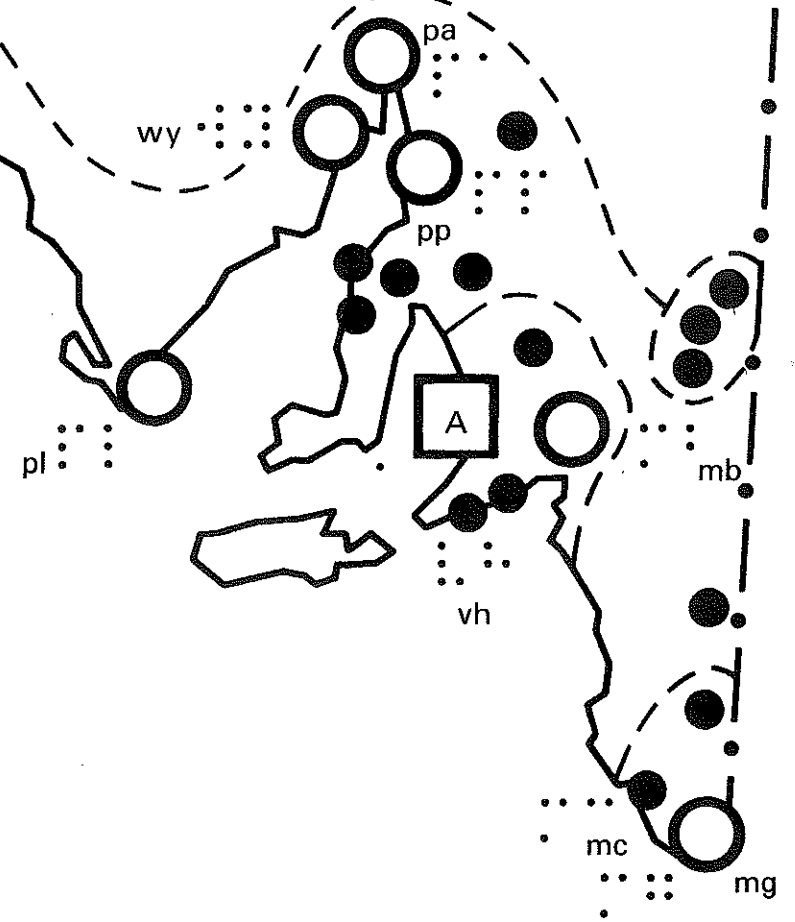
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developed here and Whyalla's population grew from 13 700 to 33 400 between 1961 and 1976. Although falling demand for steel and the closure of the shipyards in 1976 contributed to a population decline, Whyalla remains the second largest city in South Australia.

Nearby Port Augusta (**pa** 15 300) was established in the 1860s to export wool and, later, grain and copper. It is the location of a large thermal power station generating electricity from Leigh Creek coal for the Adelaide region and is an important service centre for much of outback South Australia.

Port Pirie (**pp** 14 000) was settled in about 1871 and grew rapidly as a grain port with the wheat boom of the 1870s. The town began to smelt silver-lead ores from Broken Hill in the 1880s and now operates the world's largest lead smelter/refinery. From Port Pirie, follow the coastline south to Adelaide, passing the small former copper mining towns of Kadina and Moonta, and the port town of Wallaroo.

In the north is the sparsely populated zone covering most of South Australia. This vast, dry area contains less than 1% of the State's population. The main land use is extensive grazing, though the zone has seen important mining developments in recent decades. Notable among these has been natural gas from the Cooper Basin in the far NE and the mining of the enormous uranium, copper and gold deposit at Olympic Dam to the NW of Port Augusta. The only sizeable town in this zone is the opal mining centre of Coober Pedy, the symbol for which can be found at map reference 3F, to the north of Ceduna.

List of abbreviations

A	Adelaide
mb	Murray Bridge
mc	Millicent
mg	Mount Gambier
pa	Port Augusta
pl	Port Lincoln
pp	Port Pirie
vh	Victor Harbour
wy	Whyalla

Western Australia is the nation's largest and fastest growing State. It has around 1.5 million people and during the 1980s overtook South Australia to become the fourth most populous State. Perth, the State capital, is currently growing at a greater rate than any of the other six State capitals and is fast approaching a population of one million.

Dirk Hartog's landing in 1616 near Shark Bay was the first undisputed European visit to Western Australia. Just over two centuries later, in 1826, a short-lived British penal colony was established at Albany to forestall French annexation of the west and south of Australia.

In 1829 about 300 free settlers established the Swan River Colony, with Perth as its centre. With a desperate shortage of agricultural land in Perth's immediate vicinity, settlement spread rapidly to the south and east, although population growth was slow. Wool was one of the few early export commodities.

Transportation of convicts to the Colony began in 1850 to ease the labour shortage and continued for 18 years. By 1870 the population had increased fourfold and there was a huge increase in the area under crop. During this period the area around the Ashburton and Fortescue rivers, in the western part of the Pilbara, was developed for pastoral use, and timber, including jarrah and sandalwood, was exported in large quantities from the SW of the Colony. In the following decade, pockets of grazing land were opened up along the SE coast and pearling became an important industry off the north coast.

In the 1880s pastoralists settled around the Fitzroy and Ord rivers in the north. Copper and lead mining commenced near Geraldton. By the end of the decade there was a string of whaling and other settlements along virtually the whole length of the coastline.

By Federation in 1901, Western Australia's population had climbed to around 5% of the national total. The discovery of gold had much to do with this increase. The largest finds were made in the Kalgoorlie area early in the 1890s. The ensuing gold rush increased the domestic market for Western Australia's agricultural produce, while rail lines to the goldfields opened up new land to farmers.

When the mining boom faded in the early 1900s, Western Australia's population growth rate slumped and it was not until after World War 2 that it picked up again. Australia's overall population growth rate fell in the 1960s, but in Western Australia it remained high.

A second mining boom was stimulated by the removal of Australia's iron ore export embargo in 1960 and huge mines opened in the sparsely settled areas of the Pilbara region in the NW of the State. Towns such as Newman and Tom Price were created near the mines, while new coastal towns were established to handle the enormous iron ore exports. The discovery and development of further gold deposits, nickel, natural gas, bauxite and more recently diamonds have sustained the boom in Western Australia.

The accompanying map shows the major cities and towns of Western Australia. They have been separated into three population size classes represented by different symbols. Places with a population of over 5000 are named on the map, with the abbreviation close to the location symbol. Scan the map-sheet

and locate the legend in the top left corner and the scale bar in the bottom left corner. Compare the size of Western Australia on this map to its size on Map 1 'Australia General Reference'.

The approximate boundaries of three zones of population density (dense, moderate and sparse) are included on the map as broken lines. By scanning the entire map you will notice that most cities and towns are concentrated in the SW of the State. The one small area of high population density extends from Perth south to Bunbury. Surrounding this area is a zone of moderate population density which covers most of the SW corner of the State, from north of Geraldton on the west coast to east of Albany on the south coast. The rest of the State is sparsely populated, with only a few isolated large settlements.

Begin an investigation of the cities and towns in each population zone at the square symbol for Perth (P 896 000), at map reference 5F. The population of Perth includes those living in Fremantle, the State's busiest port. Perth is not a highly industrialised capital city by Australian standards, with cement works, and food and clothing factories the major industries.

On the coast just south of Perth are three centres not indicated on the map because of lack of space. In order of proximity to Perth these are Kwinana (11 800), Rockingham (30 600) and Mandurah (18 000).

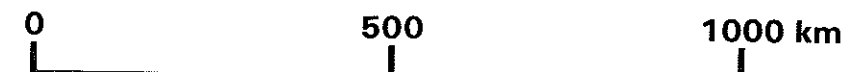
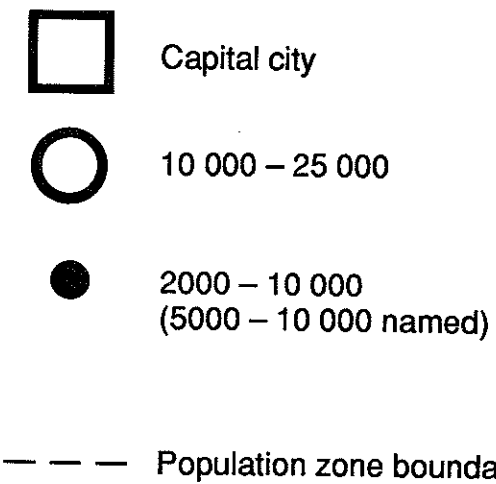
Kwinana is the State's major industrial centre. Its manufacturing plants include alumina, nickel and oil refineries, a steel rolling mill, and fertiliser and cement works. It also has specialised port facilities. The rapidly growing towns of Rockingham and Mandurah are becoming dormitory suburbs for Perth. Dairying, fishing and poultry farming are important around Mandurah and a large alumina refinery is located close by.

Slightly further to the south is Bunbury (by 23 000), one of Western Australia's major ports. It handles large exports of alumina and titanium dioxide from nearby treatment plants. Timber and woodchips are also important local industries.

On the coast immediately south of Bunbury, within the zone of moderate population density, locate Busselton (bs 7800). This town lies at the centre of a region producing mineral sands, potatoes, milk, timber and honey. To the east of Busselton, past the symbol for Manjimup, is Albany (ay 16 300) on the southern coast. It is a major regional centre and export port for wheat grown in the far south of the State. Orchards and beef cattle are also important in the Albany area.

Moving inland to the north and slightly west of Albany, past the symbol for Merredin, locate Collie (co 7800), at the centre of Western Australia's only coal mining area. A nearby power station generates much of the electricity used in the SW of the State. Forestry is an important local industry. Just to the north of this is the symbol for Narrogin and further north again, Northam (nt 6400), a major town in the moderately populated zone and only a short distance inland from Perth. The town lies on the western edge of the wheat belt and is a major junction for railways and roads leading to the State capital.

Return to the coast to the NW of Northam, to locate Geraldton (gr 21 700) just within the boundary of the moderately populated zone. Geraldton is an important regional centre and port at the northern end of the State's wheat belt. Its industries include fish, meat and mineral sands processing.



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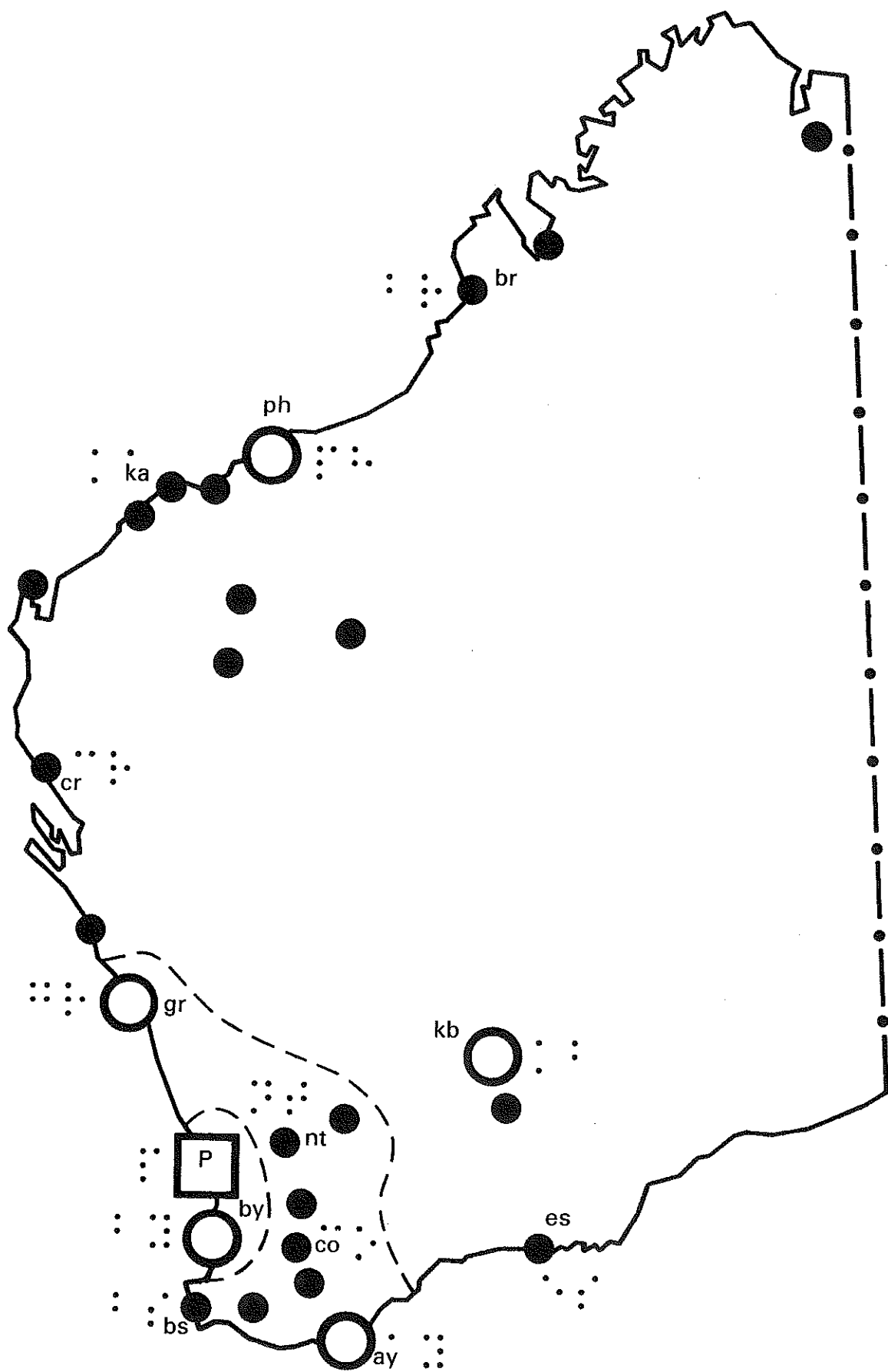
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Continue along the coast into the sparsely settled zone, past the symbol for Kalbarri, and just north of notches in the coastline formed by Shark Bay, locate Carnarvon (**cr** 6800). Irrigated fruit and vegetable crops are grown in the Gascoyne valley around Carnarvon. Fish processing, prawning, and salt production through solar evaporation at nearby Lake Macleod are also important local industries.

Further north along the coast is the symbol for Exmouth on North West Cape, and to the NE of this is a cluster of symbols representing towns associated with the iron ore industry. These are Dampier, Karratha, Wickham and, further east, Port Hedland.

Karratha (**ka** 9500) was established in 1969 as a residential and administrative centre for several of the region's iron ore mines. Gas from the massive offshore North West Shelf fields is piped ashore at nearby Withnell Bay. A gas liquefaction plant processes natural gas for export to Japan and gas is also piped to the SW of the State for domestic and industrial use.

Port Hedland (**ph** 13 100) is the largest town in the State's north. Much of the enormous quantity of iron ore produced annually in the Pilbara region is exported through Port Hedland. Another major export is salt, which is produced by solar evaporation. To the south of Port Hedland are three town symbols, representing the remote mining centres of Tom Price, Newman and Paraburdoo, established in the 1960s to service nearby iron ore mines.

On the coast to the NW of Port Hedland find Broome (**br** 5800) and, beyond this, the symbol for Derby. An export abattoir at Broome processes Kimberley cattle. The town's recent growth owes much to tourism in this remote corner of the continent. In the far NE corner of the State is the symbol for Kununurra, the town serving Lake Argyle and the Ord River Scheme.

Follow the State border to the south and then trace the southern coast westwards to reach Esperance (**es** 6400), the most easterly export port in the State and a regional centre for the southern part of the wheatbelt.

North of Esperance are the isolated joint towns of Kalgoorlie-Boulder (**kb** 22 200), at the centre of Australia's richest goldfield. Mining is the predominant activity in the surrounding region and, apart from gold, nickel is also produced, notably at Kambalda, just south of Kalgoorlie. A nickel smelter is situated near Kalgoorlie.

List of abbreviations

ay	Albany
br	Broome
bs	Busselton
by	Bunbury
co	Collie
cr	Carnarvon
es	Esperance
gr	Geraldton
ka	Karratha
kb	Kalgoorlie-Boulder
nt	Northam
P	Perth
ph	Port Hedland

The Northern Territory, with a total of only 154 400 people in 1986, is the least populous but fastest growing of Australia's States and mainland Territories. Darwin, the Territory's capital, enjoys a similar status amongst Australia's capital cities.

The Dutch explorer Jan Carstensz, who sailed along the Arnhem Land coast in 1623, was the first European to visit what is now the Northern Territory. The first of several attempts by the British to settle northern Australia began in 1824 on Melville Island. This settlement was abandoned 5 years later because of disease and Aboriginal attacks.

The settlement of Palmerston, as Darwin was then known, was established in 1870 and selected as the site for the international submarine telegraph cable from Java to meet the Overland Telegraph Line crossing Australia. Many towns to the south of Darwin were established in the early 1870s along the route of the Line. At the same time gold attracted miners to Pine Creek, between Darwin and Katherine, and cattle were introduced in several areas.

By 1881 Darwin's population had reached 3500, swelled by large numbers of Chinese arriving to search for gold. Pearling, and copper finds to the south, contributed to Darwin's population growth over the next decade, while large cattle properties were established on the Barkly Tableland.

For more than 40 years after 1890, Darwin's population remained relatively stable. Then, in the five years following 1929, events crucial to the Northern Territory's development occurred: Alice Springs became the railhead for the line to Adelaide, gold was found at Tennant Creek, and Darwin became an important link in the Australia-United Kingdom air route.

After World War 2, uranium was discovered just south of Darwin. Between the 1950s and the 1970s the mining of bauxite on Gove Peninsula, manganese on Groote Eylandt, iron ore between Darwin and Katherine and uranium in Arnhem Land brought many people to the Territory. In the same period 'beef' roads were constructed and abattoirs opened in several centres. Road improvements also encouraged tourism. Between the end of the war and 1971 the Northern Territory's population increased more than sevenfold.

Despite the massive destruction caused in December 1974 by Cyclone Tracy, which temporarily reduced Darwin's population by 90%, the city was fully reconstructed by the time the Northern Territory gained self government in 1978. By 1986 Darwin's population was nearly double its pre-cyclone level.

Scan the map-sheet, and note the map scale and the population size classes represented by the symbols in the legend. Compare the size of the Northern Territory on this map to its size on Map 1 'Australia: General Reference'.

A feature of population distribution in the Northern Territory is the isolation of most settlements. The entire Territory is only sparsely populated and some parts are virtually uninhabited.

All Northern Territory settlements with more than 500 people are shown on the map and those with more than 1000 are named. The unnamed symbols are all Aboriginal communities of over 500 people. The following text describes the major population centres of the Territory.

By tracing the coastline NE from the border with Western Australia and past the symbol representing Port Keats, locate the hollow square representing Darwin (**D** 73 000), the Territory's administrative and commercial centre and major port. Darwin has a large civil airport and RAAF base and is the stepping-off point for many of the tourists visiting the 'Top End' of the Territory.

Off the coast to the NW of Darwin, Nguu (**ng** 1100) is Bathurst Island's main port and only airport. It is the major service centre for Aborigines on the island and on neighbouring Melville Island.

Return to Darwin and to the east locate Jabiru (**jb** 1400), which is home for the workers at two nearby uranium mines and the associated processing plant. The mines and the town are surrounded by Kakadu National Park.

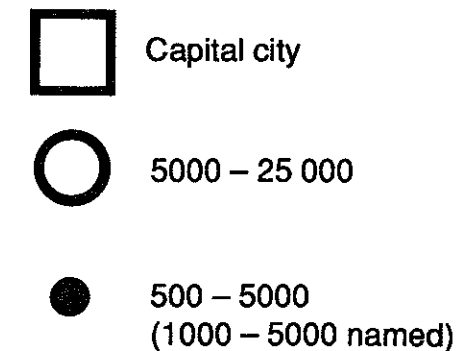
Further to the east, past the symbols for the Aboriginal communities of Maningrida and Milingimbi and off the northern coast, find the island settlement of Galiwinku (**gk** 1000), the major port and only airport for a chain of islands to the north of Arnhem Land. Missionaries were active here from the 1920s and the town of Galiwinku began growing in the 1940s. It is now the largest Aboriginal settlement in Arnhem Land and supplies around 20 mainland and island outstations by air.

Slightly further east, on Gove Peninsula at the NE tip of the Arnhem Land coastline, is Nhulunbuy (**ny** 3500), established in 1969 when bauxite mining began in the area. A large alumina refinery has been constructed nearby. To the south, on the island of Groote Eylandt, is the settlement of Alyangula (**al** 1200). The large mine nearby produces around 10% of the world's annual production of manganese ore.

Return again to Darwin and to the SE locate the growing regional centre of Katherine (**kt** 5700), which has an export abattoir and the large Tindall RAAF base. Tennant Creek (**tc** 3500) is well to the south and slightly east of Katherine. It is the regional service centre for a large part of the Northern Territory, as well as the many nearby mines, and also has an export abattoir.

Far to the south of Tennant Creek find Alice Springs (**as** 22 800); the commercial, administrative and tourist centre for the southern part of the Territory. There are oil and gas fields to the west of Alice Springs and much of the Northern Territory's electricity is generated from gas piped to Darwin from these fields.

To the SW of Alice Springs, near the Northern Territory-South Australian border, is the tourist resort of Yulara (**yl** 1200). This settlement was established in 1985 to cater for the growing number of tourists visiting the nearby Uluru (Ayers Rock) and Mount Olga areas. Tourism in this area has risen by 15 times since the 1960s.



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List of abbreviations

- al Alyangula
- as Alice Springs
- D Darwin
- gk Galiwinku
- jb Jabiru
- kt Katherine
- ng Nguiu
- ny Nhulunbuy
- tc Tennant Creek
- yl Yulara

In 1986, it was estimated that there were 228 000 people of Aboriginal or Torres Strait Islander descent in Australia. Queensland had the highest number of any State or Territory (61 000), followed closely by New South Wales (60 000). Just over 25% of the Aboriginal and Torres Strait Islander population resided in the 7 State capital cities. Sydney, with almost 18 000, had the most.

The table which follows gives the Aboriginal population of each State and capital city. It also indicates the percentage of each State's Aboriginal population within its capital city.

Aboriginal and Torres Strait Islander Population, 1986

State		Capital City		% of State's Aboriginal Population in Capital City
Queensland	61 000	Brisbane	11 170	18.3
New South Wales	60 000	Sydney	17 990	30.0
Victoria	13 000	Melbourne	6 235	48.0
Tasmania	7 000	Hobart	2 055	29.4
South Australia	14 000	Adelaide	5 825	41.6
Western Australia	38 000	Perth	10 080	26.5
Northern Territory	35 000	Darwin	5 500	15.7
Australia	228 000		58 855	25.8

As indicated in the table, Victoria and South Australia have the highest proportion of their Aboriginal and Torres Strait Islander population residing in the capital city. Almost half of the Aboriginal population of Victoria, for instance, lives in Melbourne.

The Aboriginal Population map shows the distribution of the 60 communities that include at least 500 people of Aboriginal or Torres Strait Islander descent. There are, of course, many communities with less than 500 Aboriginal people but they cannot be shown on the map.

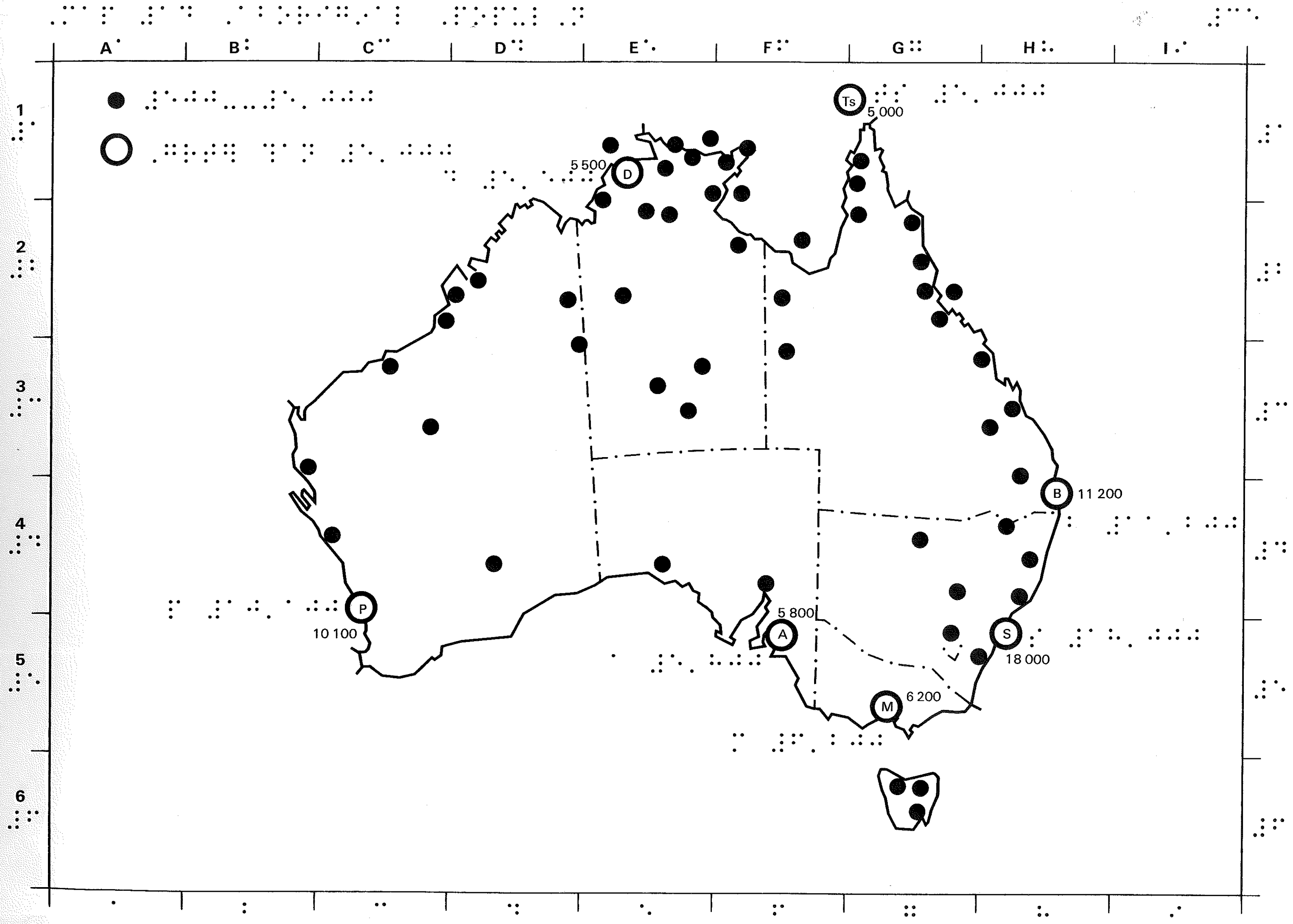
In many cases the Aboriginal people represented are part of the wider general population in towns and cities. In others, especially those communities situated on Aboriginal land in northern and central Australia, the population is almost entirely Aboriginal.

Scan the map carefully and locate the legend in the top left corner of the map-sheet. Communities have been divided into two classes: those with 500 to 5000 Aboriginal people (represented by a solid circle) and those with 5000 or more (represented by a larger open circle). The abbreviated name and Aboriginal population is given beside each open circle symbol.

Most communities with more than 500 Aboriginals or Torres Strait Islanders are found in coastal northern Australia, especially in the Northern Territory and Queensland. The symbol for a population of 5000 people in Torres Strait (Ts), off the northern tip of Cape York Peninsula, actually represents an aggregation of many smaller communities living on separate islands in the Strait.

It is difficult to make generalisations about Aboriginal population trends because of uncertainties in the collection of data arising from problems of definition and reporting. National census information records a steady increase in the Aboriginal and Torres Strait Islander population in this century from a minimum of about 70 000 in the early 1930s. The 1981 census showed an Aboriginal and Torres Strait Islander population of 160 000 and by 1986 it had risen further to 228 000. The large increase since 1981 is due in part to an increasing willingness by respondents at recent censuses to acknowledge their Aboriginal descent.

- 500 – 5000
- Greater than 5000



In 1988, about one million square kilometres of land, or about 12% of the total land area of Australia, was held by or on behalf of Aboriginals and Torres Strait Islanders. More than two-thirds of this was freehold land, mostly in the Northern Territory and South Australia, one quarter was Aboriginal reserve land in Western Australia and the remainder was largely leasehold land in various States.

Prior to the 1970s each State had a system of reserves set aside for the use of Aboriginal people. Since then, with the emergence of the land rights movement and the political recognition of their prior possession of the continent, Aborigines have regained ownership to large areas of land. Several States (and under Commonwealth legislation, the Northern Territory) have moved to grant freehold title to former reserves and other land areas to which Aboriginal groups have demonstrated traditional links or present needs.

It is not possible to show all areas of Aboriginal and Torres Strait Islander land on a map at this scale. It shows areas of 1000 hectares or more held as freehold, leasehold and reserve land by Aboriginal land trusts or incorporated Aboriginal groups. It does not show land owned privately by individuals.

All areas of Aboriginal land exceeding 50 000 hectares are shown to scale, whereas areas of 1000 to 50 000 hectares are depicted by dot symbols (refer to the map legend).

The largest areas of Aboriginal land occur as an unbroken block in central Australia, straddling parts of South Australia, Western Australia and the Northern Territory. There are also extensive areas of Aboriginal land in Arnhem land (the NE corner of the Northern Territory), the Kimberley region in the NW of Western Australia and on Cape York Peninsula. This pattern in part reflects the distribution of the more traditionally-oriented Aboriginal population. It also covers those areas least affected by European settlement.

Much of the large block of central Australian Aboriginal land was former reserve land. That part in Western Australia is still largely Aboriginal reserve, while large portions in South Australia and the Northern Territory were previously vacant Crown land or leased pastoral land which have been granted under land rights acts in recent years.

Commencing with Queensland, examine the map State by State. There are a few small areas of Aboriginal land along or near the eastern coast and in the SE of Queensland but areas exceeding 50 000 hectares are confined to Cape York Peninsula.

In New South Wales there is a scattering of areas less than 50 000 hectares in the north and west of the State. In Victoria there are only two such areas, both located near the coast. There are no areas of Aboriginal land over 1000 hectares in Tasmania.

In South Australia there are a number of smaller areas mapped in the east and SE. Apart from one large area at Yalata on the Great Australian Bight, all of the remaining areas of over 50 000 hectares are part of the unbroken block already mentioned as covering central Australia.

There are numerous dots in the SW of Western Australia indicating Aboriginal reserves between 1 000 and 50 000 hectares. The larger areas in this State are found in the inland and along the northern coastline.

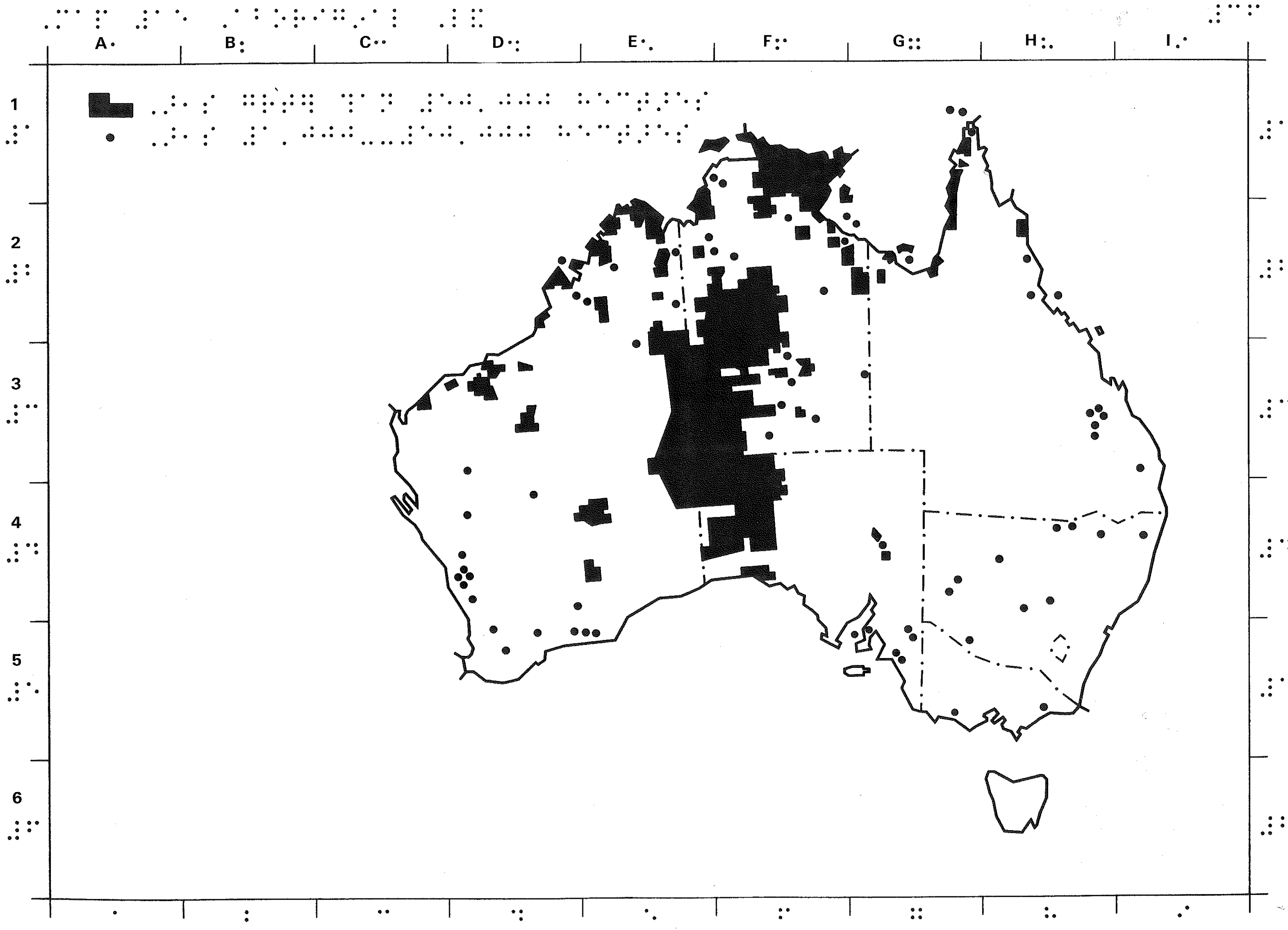
About 35% of the Northern Territory is mapped as Aboriginal land. Although most of this is freehold, there are several areas of Aboriginal-held pastoral lease.



Areas greater than 50 000 hectares



Areas 1000 – 50 000 hectares



The first immigrants to Australia arrived more than 40 000 years ago. Known as Australia's Aborigines, these people are thought to have numbered around 400 000 in 1788, when European settlers first arrived.

Over the past 200 years more than 6 million people have come to Australia. Initially they came unwillingly as convicts, who eventually numbered 160 000 by the time transportation ceased in 1868. But from 1793 onwards gradually increasing numbers of free immigrants arrived, at first almost entirely from the British Isles.

Many of the free settlers were driven to emigrate from Britain by poverty and social upheavals in the wake of the Industrial Revolution. Social reformers of the time promoted emigration and the British Government appointed emigration commissioners. This saw the first assisted immigrants arrive in 1832, their passage partly financed by the sale of land in Australia.

The early decades of the 19th century also saw the first substantial non Anglo-Saxon immigration. The first refugees to arrive in Australia were German Lutherans escaping from religious persecution in Prussia. Several hundred of them arrived in Adelaide in 1838.

The next stage in Australia's immigration history resulted from the discovery of gold in New South Wales and Victoria in the 1850s. The ensuing gold rushes led to Australia's non-Aboriginal population more than doubling from 400 000 to over 1 million in the decade 1851-61. This dramatic increase had enormous social, political and demographic implications. The immigrants were predominantly young and many were well-educated.

The gold rushes attracted immigrants from all over the world. They included people from the British Isles, Europe, North America and New Zealand as well as Australia's first Asian immigrants, from China. In the second half of the 19th century Pacific Islanders were brought to Queensland to work on sugarcane farms, and Afghans came to central Australia with their camel trains. In the 1880s Japanese arrived in northern Australia to work as divers in the pearling industry, especially around Darwin and Broome.

At the time of Federation in 1901, Australia's population had grown to 3.8 million, of whom 77% were born in Australia and 18% in Britain. Immigration continued, although it virtually ceased during both world wars and the Depression of the 1930s.

In 1945, at the end of World War 2, Australia's population was 7.3 million people. By 1988 it had more than doubled to over 16 million. Immigration played a very significant role in this growth. After World War 2 it was actively encouraged by the Commonwealth Government as a way of increasing the rate of Australia's population growth. It is now seen as a means of introducing work skills which are in short supply, and also includes a refugee program.

Since 1978 'family migration', which allows family members to follow the original settler to Australia, has increased in importance. Preference is given to those with immediate family here. Such immigration now accounts annually for half of all new settlers.

After World War 2 large numbers of Europeans emigrated to Australia. During the 1950s and 1960s nearly half of all immigrants came from the British Isles, but by 1985 that proportion had dropped to one quarter. From the early 1960s, southern Europe became an important source of immigrants. The number of people arriving from the Middle East and India also increased. In the late 1970s large numbers of settlers were accepted from South-East Asia and Hong Kong, many of whom were refugees from Vietnam. The Philippines is currently the dominant source of Asian settlers. In 1986 it was estimated that almost one quarter of the Australian population was overseas-born.

Graphs have been used rather than maps to depict the data on immigration because of the large differences between States in the numbers of immigrants and their very high concentration in the few largest cities.

On page 37, bar graphs at two different scales have been used to depict the numbers of Australian-born and overseas-born people in each State and Territory which were recorded at the 1986 Census. The graphs on the left show this information for the 5 States which each have total populations exceeding one million. The graphs on the right show the same information, but at a larger scale, for Tasmania, the Australian Capital Territory and the Northern Territory, each of which have total populations below one million.

Study the legend in the top right corner of the sheet. For each State and Territory there is a set of 4 bars identified by abbreviated State names positioned beneath the horizontal axis. The first bar represents the number of Australian-born people and is by far the largest. The next 3 bars represent immigrants born in the United Kingdom/Europe, Asia/Middle East, and other areas respectively. Single code letters distinguishing each of these groups have been placed immediately under each bar. They are identified in the legend.

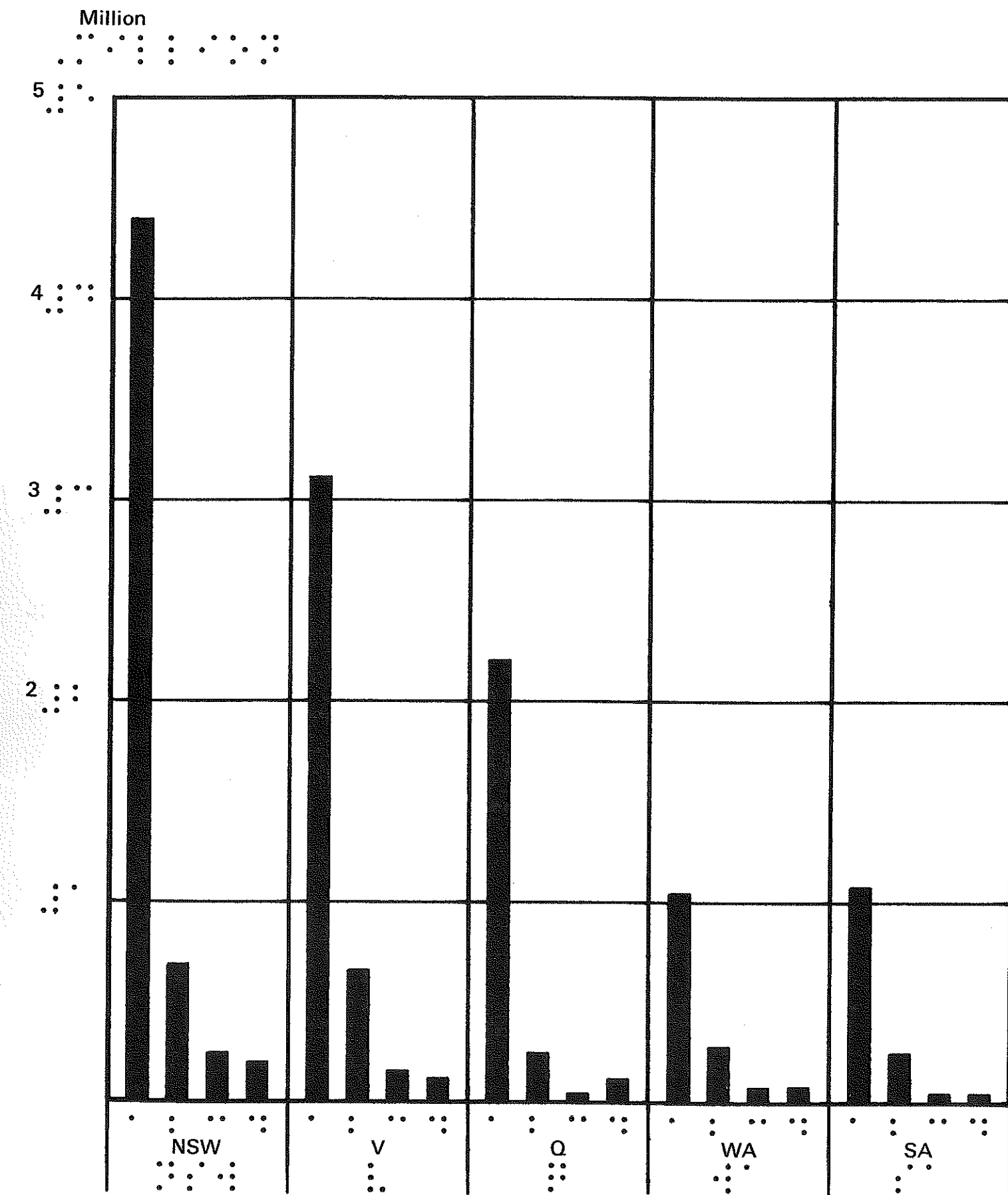
At the time of the 1986 Census at least 70% of the population of every State and Territory was Australian-born. Tasmania had the highest percentage (89%), followed by Queensland (84%) and New South Wales (78%). Western Australia had the lowest (71%). The national average was 78%.

The graphs show that the dominant group of overseas-born in every State and Territory was the United Kingdom/Europe group. South Australia had the highest proportion (84%), followed by Tasmania (80%). Only in the Northern Territory (54%), New South Wales (62%) and Queensland (65%) was the proportion of people born in the United Kingdom/Europe less than two thirds of the total of all overseas-born. The national average was 69%.

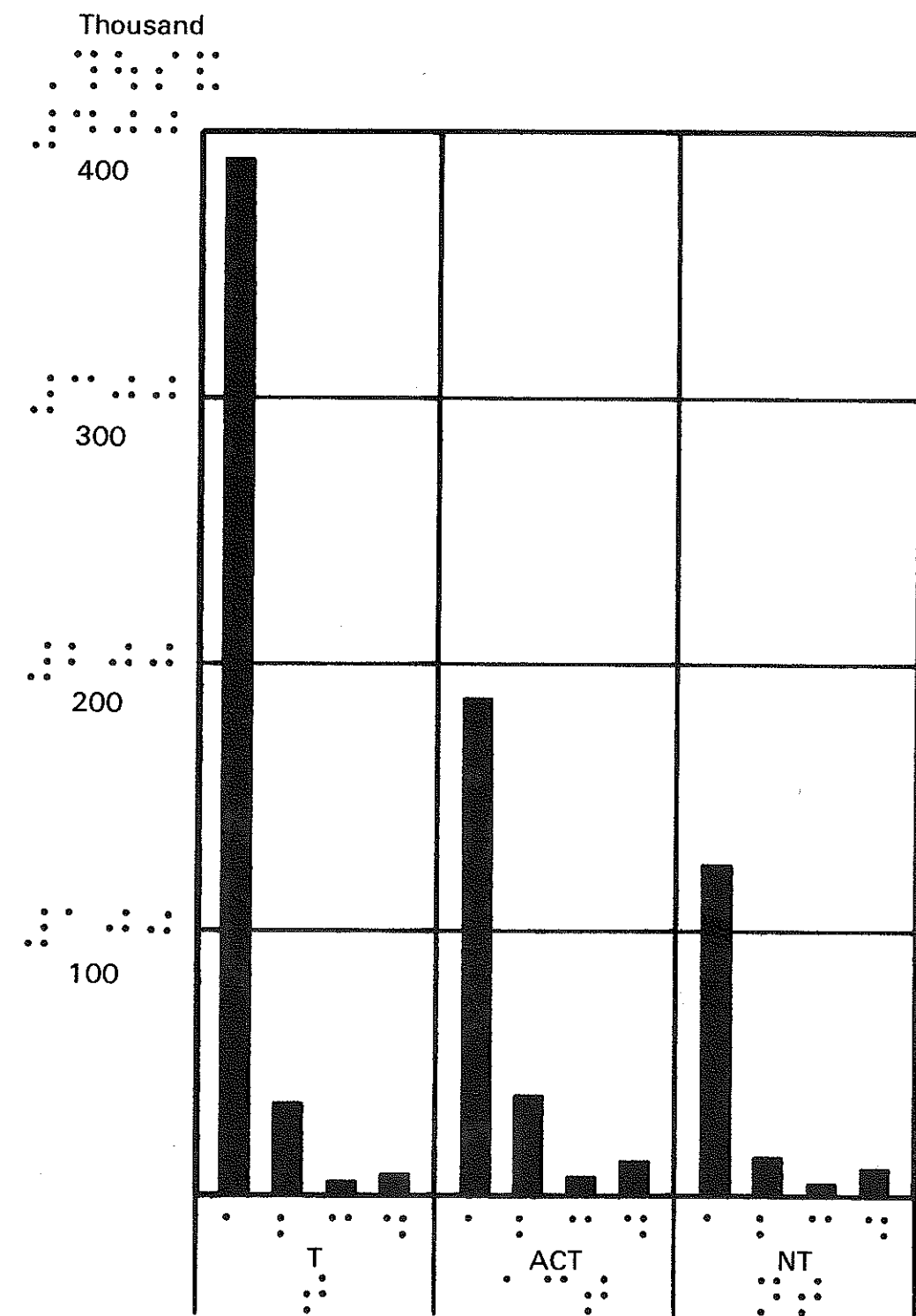
Now turn to the bar graphs on page 38, which show Australia's immigrant intake in 1977 and 1987. Scan the entire page. You will find 6 pairs of bars, each pair consisting of a solid bar for 1977 and a patterned bar for 1987 showing the number of immigrants arriving in each of these years from a defined source area. Single code letters distinguishing each of these areas have been placed immediately beneath each pair of bars. The six areas are identified in the legend on the right hand side of the page and are: the United Kingdom/Ireland, other Europe, the Middle East, Asia, New Zealand and other.

- a Australia
- b United Kingdom and Europe
- c Asia and Middle East
- d Other

Birthplace of Australia's Population

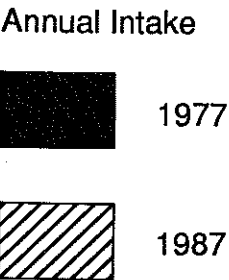


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- b.
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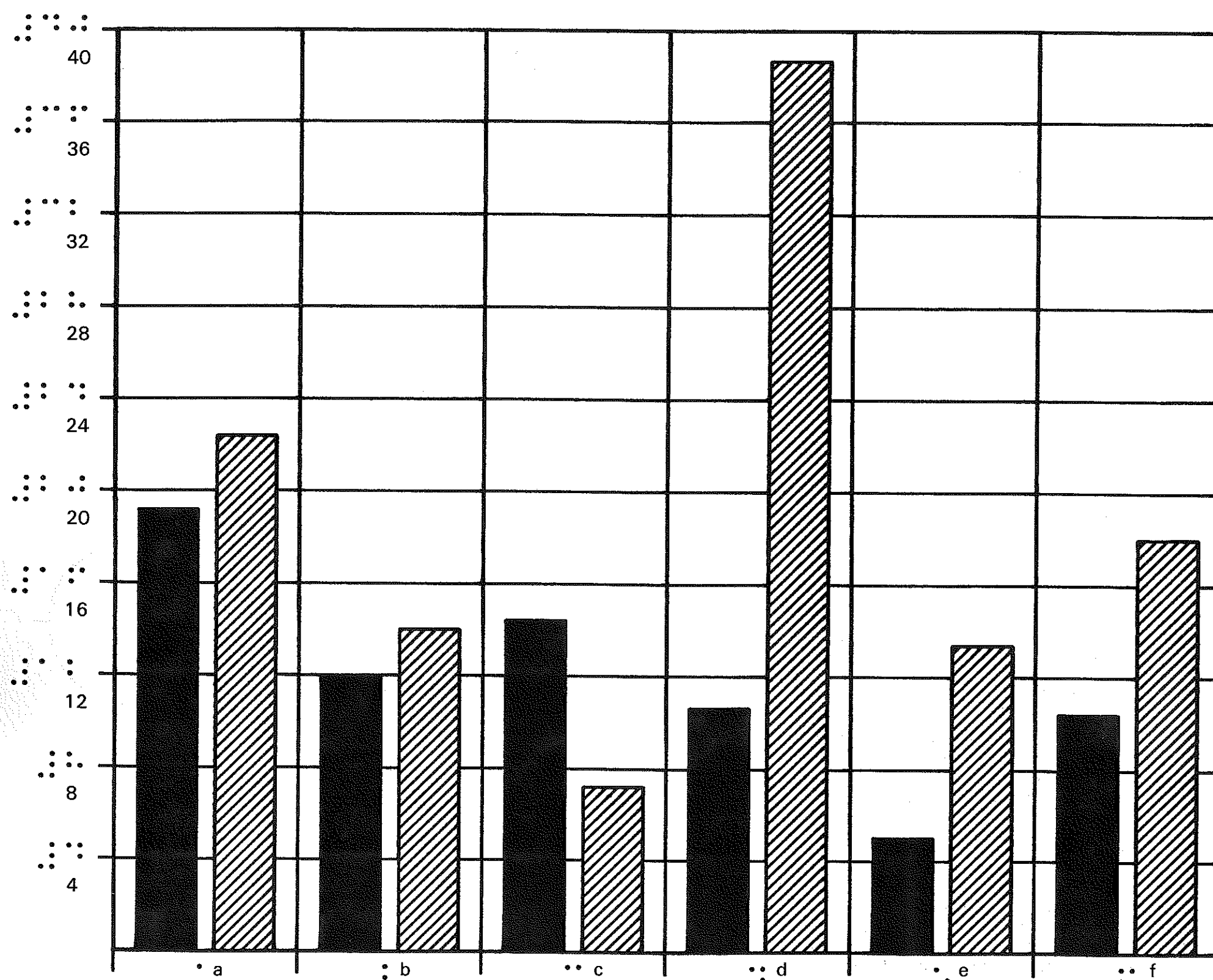
A comparison of the two graphs for each birthplace will show that the most dramatic change was in the number of immigrants born in Asia. The intake in 1987 was more than triple that of 1977. The only decline revealed by the graphs was in the intake from the Middle East, which in 1987 had dropped to just over one half that of 1977. The number of New Zealand-born immigrants more than doubled, whereas United Kingdom/Ireland and other European-born immigrants increased only slightly.

- Birthplace
- a UK and Ireland
 - b Other Europe
 - c Middle East
 - d Asia
 - e New Zealand
 - f Other

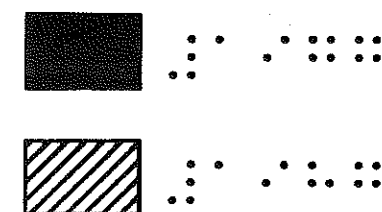


Thousand immigrants

Thousand immigrants



Birthplace



The Australian Constitution, which established Australia as a nation on 1 January 1901, provided for a federal legislature consisting of a People's House (the House of Representatives or Lower House) and a States' House (the Senate or Upper House). Members of Parliament are elected on a population basis for the Lower House. Consequently, the boundaries of the electoral divisions are periodically redistributed to ensure that each division contains, as nearly as possible, equal numbers of electors. In the Senate, the 6 States and 2 Territories are equally represented, each State returning 12 Senators and each Territory 2 senators.

The party, or parties in coalition, winning a majority (more than 74) of the seats in the Lower House of Parliament wins the right to form a government. Votes are counted under a preferential system. When a candidate polls only a small proportion of primary votes, the second and third preferences from those ballot papers are distributed between the two leading candidates in a final count.

On 24 March 1990 a general election was held to elect 148 Members to the House of Representatives and 40 Senators to the 76 seat Senate. Voting is compulsory and on polling day more than 10 million electors voted at over 8000 polling booths throughout Australia. The 1990 election was conducted on boundaries established at the last redistribution, in 1988.

At the close of counting a Labor Government was re-elected for a fourth consecutive term, though with a much reduced majority from that received in the 1987 election. The final result of the election remained unclear for several weeks because vote counting for many seats involved the time-consuming distribution of preferences from independent and minor party candidates. The Labor party gained 78 (or 53%) of the seats. The Liberal Party won 55 (or 37%) of the seats and the National Party 14 (or 9%), bringing their total, in coalition, to 69 (or 47%) of the seats. For the first time in many years an independent Member was elected to the House of Representatives, in the seat of North Sydney.

The map provides a generalised picture of the 1990 election results for the House of Representatives. Distinctive patterns have been used to depict the non-metropolitan areas won by the 3 main political parties. Pie graphs have been used to depict the election results within each of the capital cities because the large number of metropolitan electoral divisions prevents mapping them to scale.

Begin by scanning the whole page; locate both parts of the legend in the upper and lower left corners and identify the different patterns used to depict seats won by each major party. Note that the State borders and capital city locations have been included on the map.

Where adjoining electoral divisions have been won by the same party, they have been aggregated so that the patterns on the map show the broad extent of the country won by each party. For example, the area shown as having been won by the National Party in New South Wales covers 8 electoral divisions.

The same patterns are used within the pie graphs to show the proportion of seats won by each party in the capital cities. The size of the circle broadly indicates the number of electoral divisions within each metropolitan area.

The legend in the lower left corner shows the number of divisions represented by each of the 3 different sized pie graphs. Each pie graph is connected to its actual city location on the map by a lead line. Ticks at 3, 6, 9 and 12 o'clock on the pie graphs will help in estimating the proportion of seats won by each party.

Across Australia, the Labor Party won the majority of seats in all metropolitan areas, and, with the exception of North Sydney, the Liberal Party won the remainder. In 'outback' areas the National Party was predominant in New South Wales, Victoria and southern Queensland, while the 3 electoral divisions which cover most of South Australia, Western Australia and the whole of the Northern Territory were won by Labor.

Now examine the election results for each State.

In Queensland (24 seats) most of the southern inland and some coastal areas were won by the National Party (3 seats), while the 8 non-metropolitan seats won by the Labor Party cover northern and central Queensland and extend south along the coast. The Liberal Party won 4 non-metropolitan seats, all located in the SE corner of the State. The pie graph for Brisbane shows that Labor won 7 out of the 9 seats, and the Liberals the 2 remaining seats.

In New South Wales (51 seats) a large area inland was won by the National Party (8 seats), with smaller areas on the north coast, around Sydney and in the SE won by the Labor Party (15 seats). The Liberal Party won 2 seats to the west of Sydney. In metropolitan Sydney the pie graph shows Labor winning 15 seats and the Liberals winning 10 seats. The metropolitan seat of North Sydney was won by an independent candidate, although is too small to be effectively shown on the pie graph.

The small pie graph representing the Australian Capital Territory (2 seats) shows that Labor won both seats.

In Victoria (38 seats), the NW and SE areas shown as having been won by the National Party represent 3 divisions. The areas to the east, north and west of Melbourne won by the Liberal Party cover 12 divisions, with the Labor Party winning the remaining 3 seats. In metropolitan Melbourne, Labor won 11 seats and the Liberal Party won the remaining 9 seats.

In Tasmania (5 seats) the Liberal Party won all 4 non-metropolitan seats, while Labor won the only metropolitan seat.

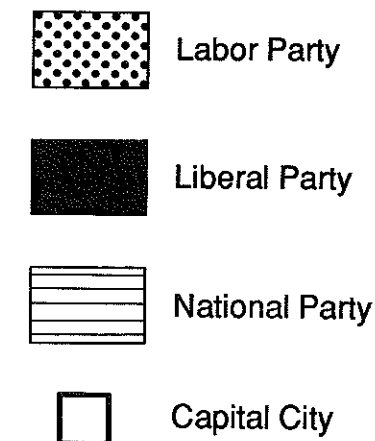
In South Australia (13 seats) the large single non-metropolitan division covering all of northern South Australia was won by Labor, while the 3 seats in the SE were won by the Liberals. In metropolitan Adelaide the Labor Party won 6 seats and the Liberal Party won 3 seats.

The voting pattern in Western Australia (14 seats) was almost identical to that in South Australia. The Labor Party won the single huge non-metropolitan division covering all but the SW corner of the State and the 2 seats south of Perth. The Liberal Party won 2 seats to the north of Perth and the area in the SW which encompasses 2 divisions. In metropolitan Perth 5 seats were won by the Labor Party and 2 by the Liberal Party.

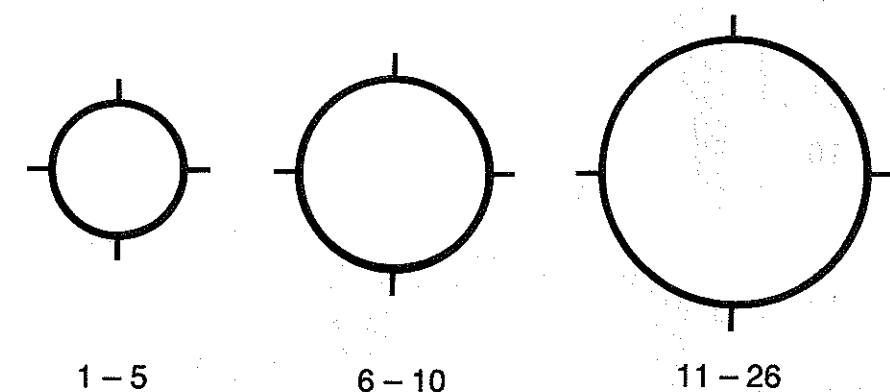
The entire Northern Territory is represented by a single electoral division which was won by Labor.

House of Representatives, 1990

Seats won by



Number of capital city seats



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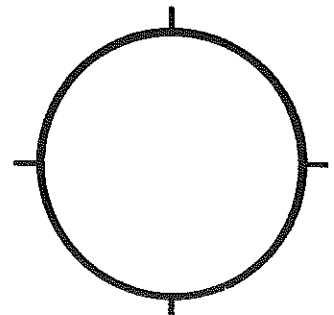
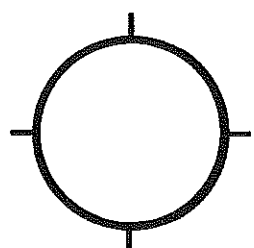
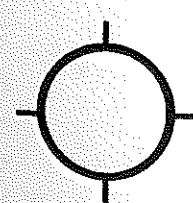
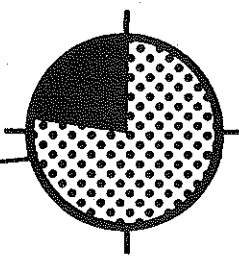
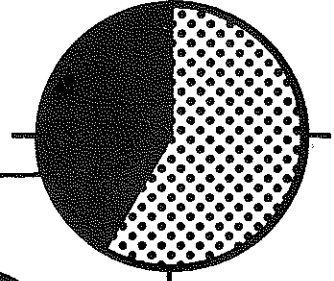
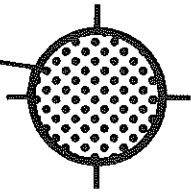
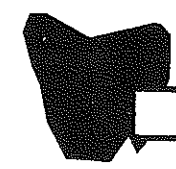
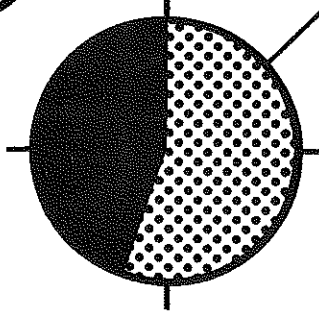
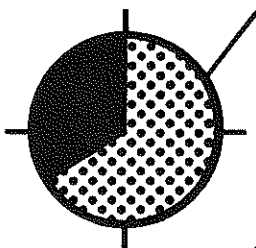
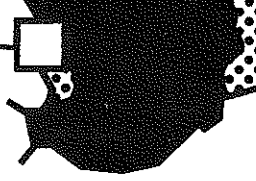
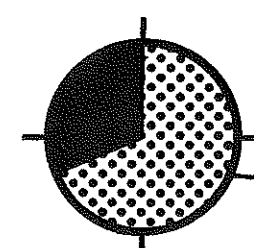
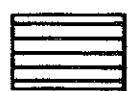
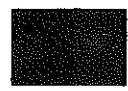
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SECTION D

Land Use and Agriculture

The topics covered in this section provide an overview of agricultural production and land use in Australia. Separate maps showing the areas devoted to forestry and to nature conservation are also included. Australia's major sources of surface water supply, as well as the location of large irrigation areas, are shown on the 'Dams and Storages' map.

The map 'Land Use' shows agricultural land, separated into the broad zones of arable and pastoral country, compared with non-agricultural land. The principal agricultural industries: wheat, cattle and sheep are depicted on 'dot' maps, where each symbol represents a given number or quantity. The variation in the density of dots gives a picture of the relative intensity of land use associated with particular crop or livestock types, rather than providing absolute numbers. For this, bar graphs are used to show total stock numbers and the area planted to wheat in each State. The annual production of two major agricultural commodities - wool and wheat - in each State are also shown. Other economically important agricultural crops: sugar, rice, cotton and the range of crops grouped under horticulture are dealt with in the topic 'Other Crops'.

The physical environment has an over-riding influence on potential land use in Australia. But historical, economic and political forces have also shaped the present pattern of land use, within the constraints imposed by climate, topography, soils and vegetation.

Agricultural land use occupies around two thirds of Australia. A variety of other land uses such as forestry, mining, nature conservation, industry and urban settlement take up parts of the remaining area.

There have been three broad phases in the history of human land use of this continent. Initially, there was an Aboriginal phase, characterised by a non-agricultural hunting and gathering economy which persisted for many thousands of years. Aboriginals modified the environment mainly through the use of fire, but this influence was of a very different nature to the impact of European settlement. The second phase, which spanned approximately the first 100 years of European colonisation from 1788, saw the pioneering of agricultural land use, namely sheep grazing and wheat farming, and of timber harvesting over large tracts of suitable land.

The third phase, which began in about 1900, has seen a consolidation and intensification of land use. It has been characterised by large increases in agricultural productivity through the application of scientific and technological innovations. During this phase there has been a growth in the government management of forested land and the dedication of land for the protection of scenery, flora and fauna.

By 1870 the broad pattern of pastoral land use, as it exists today, was already established. Only the tropical monsoon north and much of the arid interior remained unused, but in time parts of these came to be used for grazing.

The great increase in productivity in the 20th century, from land already settled agriculturally, was largely the result of discoveries and technological improvements made over the last quarter of the 19th century. The introduction of superphosphate and the breeding of improved varieties of wheat reversed declining yields and enabled wheat to be grown in areas with poorer soils. The discovery of artesian water beneath much of arid and semi-arid eastern Australia encouraged pastoral development, and the advent of refrigeration led to an increase in cattle numbers for the export of meat.

Early experiments with crop irrigation along the Murray River in the 1880s led to the subsequent establishment of large, government-sponsored irrigation schemes. As a result, land use in these areas was intensified and productivity greatly increased. Pasture improvement through the introduction of subterranean clovers and exotic grasses, coupled with the addition of fertilisers, has enabled the carrying capacity of grazing land and therefore livestock numbers to increase substantially.

Promotion by State governments and, from the late 1920s, by the Commonwealth Scientific Industrial and Research Organisation (CSIRO) encouraged the adoption of new practices. Despite severe droughts, two world wars and the economic depression of the 1930s holding back the pace of development, such retarding factors had disappeared by the 1950s and change occurred more rapidly. The use of heavy machinery for clearing natural

vegetation since then has enabled a large expansion in the area sown to pasture and cropped, particularly in southern Queensland and SW Western Australia.

Scan the map sheet and legend, noting the patterns used to distinguish arable, pastoral and non-agricultural land. The pastoral zone occupies most of inland Australia, except the spinifex-covered sandplains of the deserts, while the arable zone runs in a band on the inland side of the ranges in SE and SW Australia. Rainfall is the primary factor in the confinement of dryland cropping to the temperate SE and SW of the continent. In arid central Australia, large areas remain unsuitable for any present agricultural use.

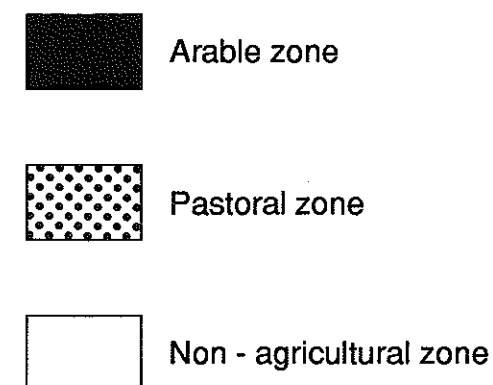
The arable zone is typified by mixed cropping and livestock grazing. While the wheat belt covers the largest part, the zone also includes horticulture, orchards, vineyards and a variety of other, high value crops which are often irrigated and commonly grown close to the large concentrations of population. It extends from SE Queensland down through central New South Wales, central and western Victoria to the southern part of South Australia. It also occurs in the SW of Western Australia.

Smaller pockets of arable land are found along the coast as far north as the sugar cane lands around Cairns in north Queensland. Because of the generally rugged terrain, only rarely does the main body of the arable zone reach the coast in the east. Over much of its length the wetter margin of the arable zone is also separated from the coast by a belt of predominantly livestock grazing on improved pastures.

Inland from the arable zone is the vast area devoted almost exclusively to livestock grazing - the pastoral zone. Here, extensive grazing of native pastures for beef cattle in the north and sheep for wool in the south predominates. Most pastoral land is leased from the Crown and holdings are very large due to the low carrying capacity of the native pastures.

On its arid margins the pastoral zone in turn gives way to the commercially unused land of the interior. Together with the rugged and inaccessible land in the east, in western Tasmania and in the tropical north, the commercially unused land covers about a quarter of the continent.

The remaining non-agricultural land includes areas of mining, water storage and water catchment areas, urban and industrial land, transport corridors, nature conservation and forestry reserves, Aboriginal land and defence areas.



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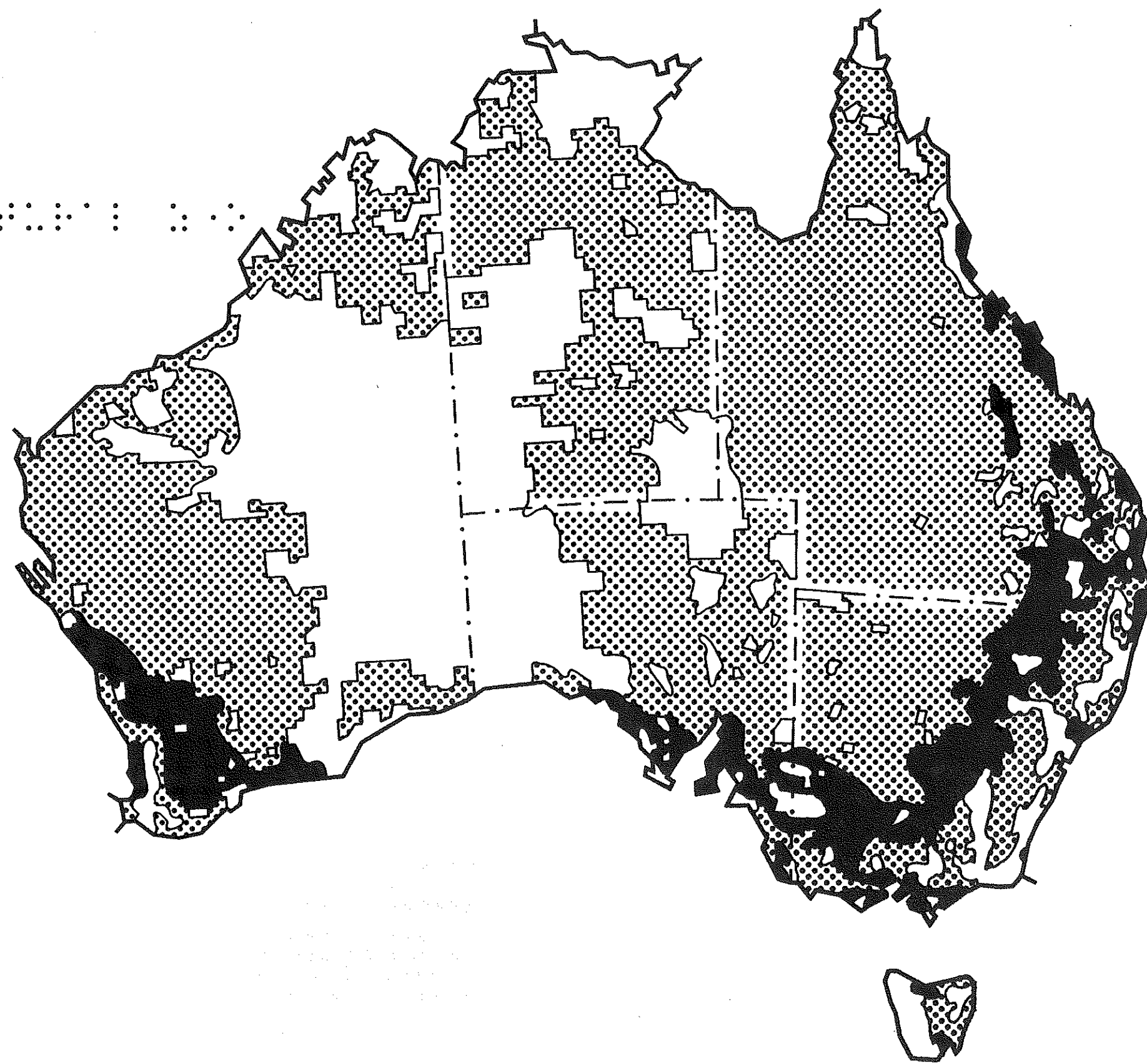
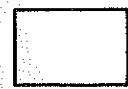
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The cattle industry is one of the most important agricultural industries in Australia and a significant export earner. Cattle were brought to Australia with the first settlers as part of the government herd and, initially, they were not classed as either beef or dairy cattle. Before long, suitable grazing was found for them near Camden just to the SW of Sydney.

Following the crossing of the Great Dividing Range in 1813 and exploration of the area inland of the ranges, those keeping cattle as beef stock soon spread westwards with their herds. Dairy farmers, on the other hand, kept to the more temperate coastal fringes in the SE of the Colony, where the climate was more suitable and the markets for perishable dairy products were close by. In general, dairying in Australia is still an industry of the temperate south and coastal areas.

No. 20, the Cattle map, shows the distribution of all cattle in Australia. Scan the entire map-sheet and read the legend. The map is a 'dot map'. Each dot on the map represents 100 000 cattle and the closeness of the dots indicates the density of cattle.

Examination of the map reveals the very wide climatic distribution of cattle in Australia: from the monsoonal north inland towards the desert fringes, and extending down the east coast into the southern temperate areas, including Tasmania and the sw corner of the continent. In 1987-88 there were almost 22 million cattle in Australia, with cattle raised in every State and Territory.

Most of the cattle are in Queensland, New South Wales and Victoria. Queensland is the leading State, with nearly 9 million head or 41% of the nation's total. The table which follows shows both the number of cattle and the percentage of the national herd in each State.

CATTLE, 1987-88

State	Head of Cattle (million)	% of National Herd
Queensland	8.8	41
New South Wales	5.0	23
Victoria	3.5	16
Tasmania	0.5	2
South Australia	1.0	4
Western Australia	1.7	8
Northern Territory	1.4	6
Australia	21.9	100

No. 21, Cattle (Graphs), has two bar graphs, that on the left of the page showing beef cattle numbers by State for 1987-88, and that on the right showing dairy cattle numbers. The bars each represent a State and the height of each bar represents the number of beef or dairy cattle in millions.

Beef Cattle

The gold rushes of the 1850s in eastern Australia and the accompanying population growth increased the demand for meat and the beef cattle industry prospered. By 1886 cattle were being exported from the Northern Territory to Asia. However, an

outbreak of cattle tick fever in 1897 put the whole of the Northern Territory under quarantine; the trade with Asia ceased and the industry fell on hard times.

During the first half of the 20th century the beef cattle industry recovered, and consolidated in areas that had previously been pioneered. In the decade 1965-75 beef cattle numbers more than doubled, from 15.5 million to 33.4 million, though a slump in beef prices soon after caused the industry to decline.

Today beef cattle make up nearly 88% of the national herd. Scan the graph on the left side of the page and read off the number of beef cattle in each State. Queensland, with 8.5 million head, is by far the largest beef producer. New South Wales is second with just over half the number of beef cattle found in Queensland.

Even though beef cattle are raised throughout Australia, the industry varies greatly from north to south. In the north, cattle properties and herd sizes are very large, pastures are usually unimproved and fodder crops rare. The cattle industry here depends heavily on sub-artesian and artesian water supplies. Generally, beef is the only agricultural output from these areas.

Beef cattle production is more intensive in the south than in the north, because of the more favourable climate and much greater proportion of land under improved pasture in the former. Beef raising here is often combined with cropping as well as with sheep grazing. Beef stock in southern areas of Australia are produced for both domestic consumption and export, while in the north cattle are slaughtered mainly for export.

The wide range of climatic conditions in Australia is reflected in the breeds of beef cattle. In the south the dominant breeds are British, mostly Herefords and Shorthorns. In the north much breeding has been based on Indian Brahman, which are less affected than British breeds by ticks and heat.

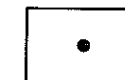
Dairy Cattle

Dairy cattle make up only 12% of the national cattle herd, and by world standards Australia's dairying industry is small.

The first cattle in Australia arrived with the First Fleet as a general purpose herd. Those cattle selected for dairying were soon moved to coastal areas north and south of Sydney. After 1815 settlers moved south to the Illawarra District, which was to develop a very fine dairy industry. Butter and cheese initially dominated here, being shipped to market by coastal vessels. By the 1840s dairying had spread south to Bega and by the 1890s to the Tweed River valley in far northern New South Wales. The industry continued to grow, and in 1957 the number of dairy cows in Australia peaked at 3.45 million. Since then there has been a decline and today the national herd numbers only 2.6 million.

As dairying requires an abundance of good pasture, only a very small proportion of Australia is climatically suitable. Dairy cattle are therefore restricted mainly to southern and coastal districts. Even in these areas, where there is adequate rainfall and soil fertility, the native pastures provide insufficient feed for a high standard of dairy production and improved pasture is necessary.

Read the bar graphs on the right side of the page showing the number of dairy cattle by State for 1987-88. Victoria is Australia's



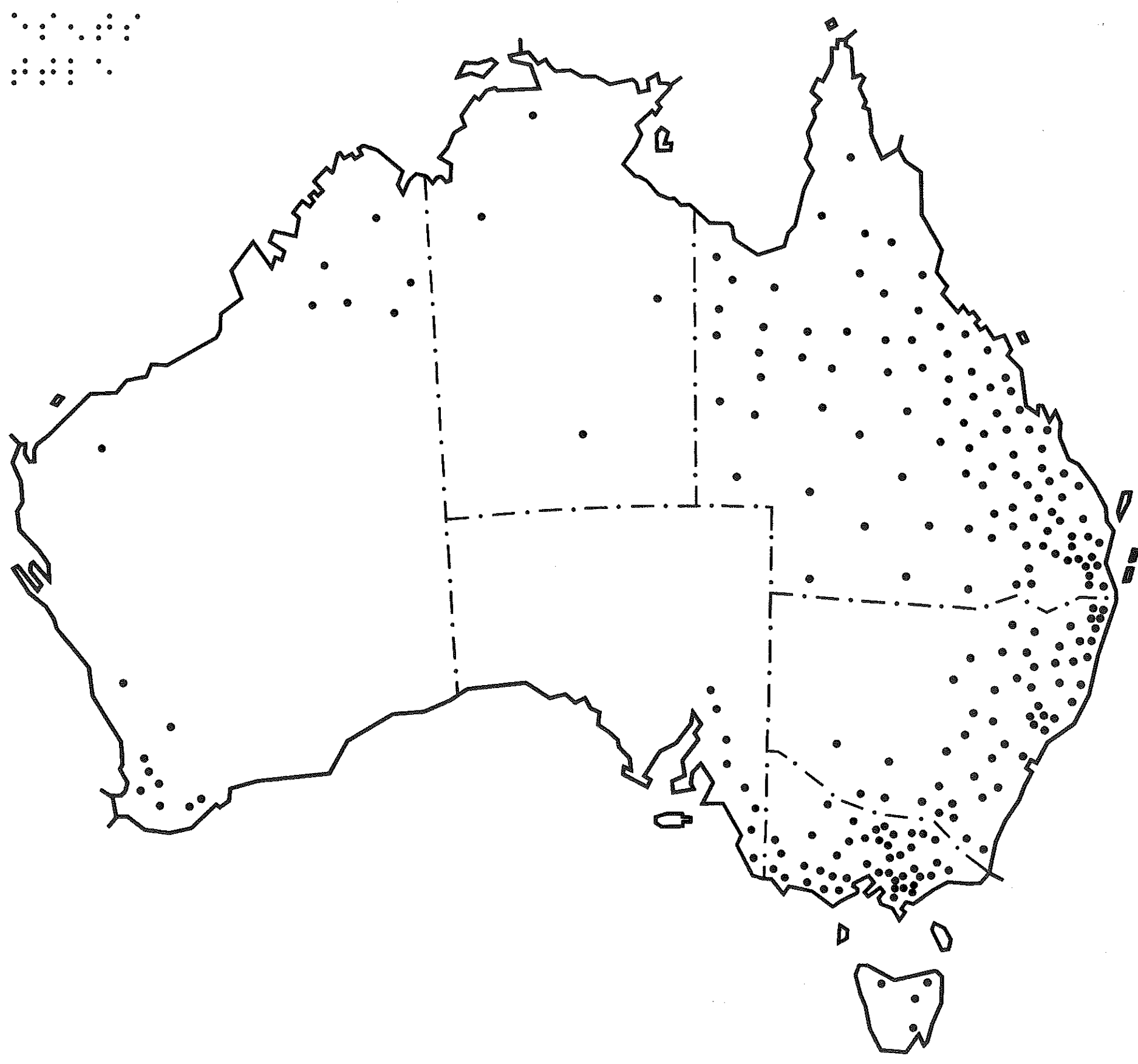
1 dot represents 100 000 cattle

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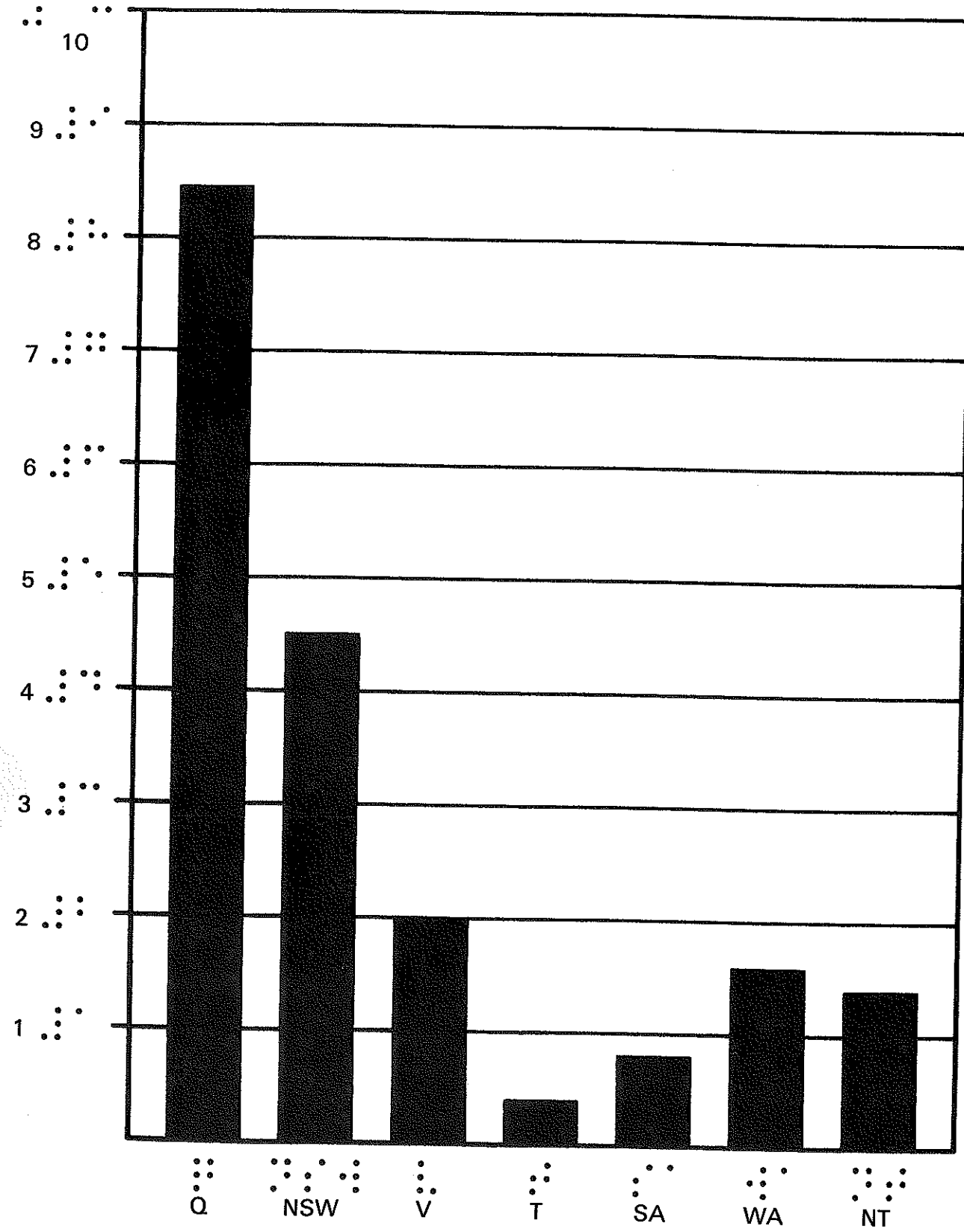
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major dairying State, with 1.4 million head or 56% of the national dairy herd. Victoria's dominance is largely due to its climatic suitability for dairying. The Northern territory has too few dairy cattle to appear on the graph.

The main dairy cattle breeds in Australia are Jersey and Friesian, both of which are European. Red Poll and Dairy Shorthorn are now also widely raised as dual-purpose breeds for milk and meat. The Australian-bred Illawarra Shorthorn is prominent along the New South Wales south coast.

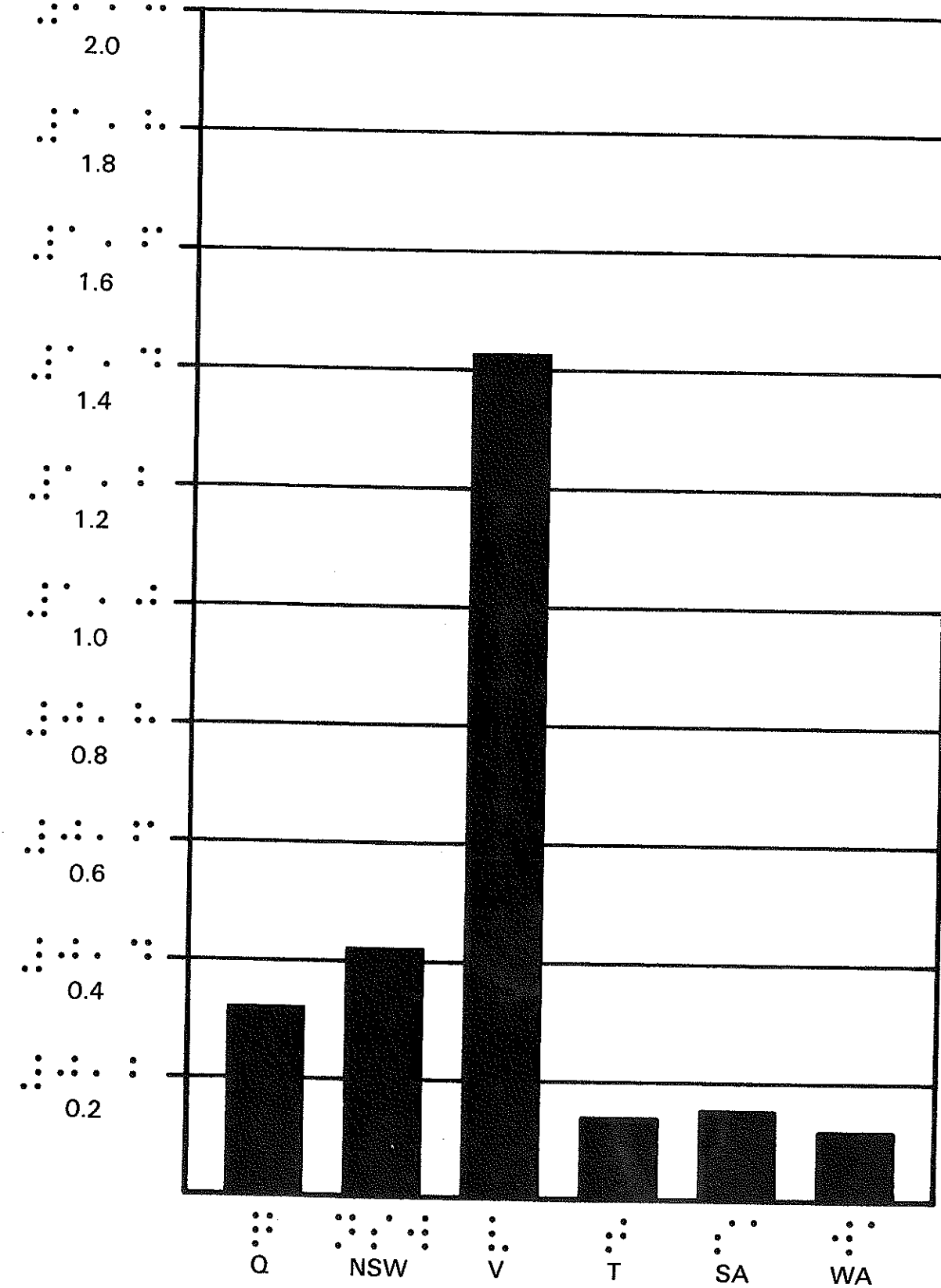
Million

BEEF CATTLE 1987-88



Million

DAIRY CATTLE 1987-88



Currently, Australia has nearly 14% of the world's sheep and accounts for around 30% of annual global wool production. Although no longer the mainstay of the Australian economy, wool continues to be one of the country's principal industries and top export earners.

In 1987-88 Australia grazed over 150 million sheep and produced some 730 000 tonnes of wool. These figures have been rising in recent years as the result of good seasons, increasing world demand and high prices for wool.

Governor Arthur Phillip brought the first sheep, a small flock from the Cape of Good Hope, to Australia in 1788. By the livestock census of 1794 there were over 500 sheep, mostly of the Cape and Bengal breeds as the settlers were more concerned with meat than wool-bearing stock.

The beginning of the Australian wool industry dates from the introduction of the Spanish Merino. A small number of this breed were first imported from the Cape of Good Hope in 1797. Around this time, and contrary to the belief of many in the Colony, Captain John Macarthur saw a promising industry based on fine wool. In 1805 he began sheep farming with Spanish Merinos at Camden and, with a small group of farmers, persisted with their selective breeding. The first parcel of saleable wool was sent to England in 1807 and by 1850 well over 50% of British wool imports were from Australia. Around 80% of sheep in Australia today are pure Merinos.

Up until the crossing of the Blue Mountains in 1813, sheep grazing was confined to the coastal plains. When land west of the ranges became available, flocks spread rapidly and European methods of shepherding gave way to large scale grazing on fenced land. With the establishment of colonies elsewhere in Australia, sheep were soon found over a wide area of the continent.

The 1880s were in many ways the halcyon days of the Australian sheep industry. Sheep breeders had by now developed a Merino strain adapted to the Australian environment and capable of producing a high yield of fine wool. Sheep stations were vast, flocks were large, and squatter and pastoral company alike exerted enormous political and social influence. However, with closer settlement in the late 19th and early 20th centuries, most of the huge pastoral properties gradually gave way to smaller holdings practising mixed farming.

From the late 1960s declining profitability in wool resulted in the expansion of cereal cropping and beef cattle grazing into what traditionally had been sheep-only areas. Today, wool growers in the better rainfall areas generally produce additional commodities such as wheat, other grains, beef, and fat lambs for meat.

No. 22, the Sheep map, shows the distribution of sheep in Australia. Each dot on the map represents 500 000 sheep. Examine the map. In eastern Australia sheep cover a large area extending from central Queensland southwards through New South Wales and Victoria and into South Australia. In Tasmania sheep are largely confined to the central lowlands between Hobart and Launceston. In Western Australia, with the exception of a small number in the Pilbara, virtually all sheep are found within the wheat belt in the SW of the State.

There are three broad sheep grazing zones on the Australian mainland: the wheat-sheep zone, the high rainfall zone and the inland pastoral zone.

Nearly half of Australia's sheep are found in the wheat-sheep zone, where they are grazed on sown pasture in rotation with cereal crops. Over 80% of the sheep here are Merinos.

The high rainfall zone lies along the wetter, coastal side of the wheat belt in eastern Australia, where natural pastures are rich and carry around a third of the national flock. Merinos account for some 60% of the sheep in this zone, with meat production based on British breeds making up the balance.

The inland pastoral zone lies on the drier, inland side of the wheat belt in the eastern half of Australia. Although the largest of the three zones, it carries only 20% of the national flock. Grazing is extensive because of low rainfall and poor native pasture. Virtually all sheep here are Merinos.

In Western Australia sheep are virtually confined to the wheat belt in the SW of the State, an area 100-200 kilometres in width extending from Geraldton, north of Perth, to around Albany on the south coast. It is bounded on the west by a narrow band of wet, forested country unsuitable for sheep raising, and on the east by extremely arid country generally unsuitable for all livestock.

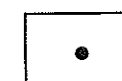
Across Australia, less than 3% of sheep graze north of the Tropic of Capricorn. Those that do are confined to the Mitchell grass plains of Queensland and to the better country of the Pilbara region in Western Australia. Sheep are absent from the coastlands of New South Wales and Queensland, where the high summer humidity is unsuitable for sheep; and much of Tasmania is too wet to carry sheep. At the other extreme, on the arid inland margins of the sheep country where it becomes uneconomic to run sheep, beef cattle are dominant because of their ability to range much further from water.

Study the bar graphs on No. 23 Sheep (Graphs). The graph on the left of the page shows the number of sheep in each State in 1987-88. Each State is represented by a bar while the height of the bars represents the number of sheep. New South Wales, with 55 million, had the most sheep. Western Australia was second with around 34 million, followed by Victoria with nearly 27 million.

The graph on the right side of the page depicts Australian wool production by State for 1987-88 in thousands of tonnes. Each State is represented by a bar while the height of the bars represents the tonnage of wool produced. New South Wales produced the most wool, with some 252 000 tonnes. Western Australia followed, producing 164 000 tonnes, and Victoria was third with 128 000 tonnes. Tasmania had the lowest wool clip, but traditionally produces some of the country's finest wool and obtains record prices in the international market.

Currently, close to 99% of Australian wool production is exported. The principal markets over the past few years have been Japan, USSR, Italy, France and China.

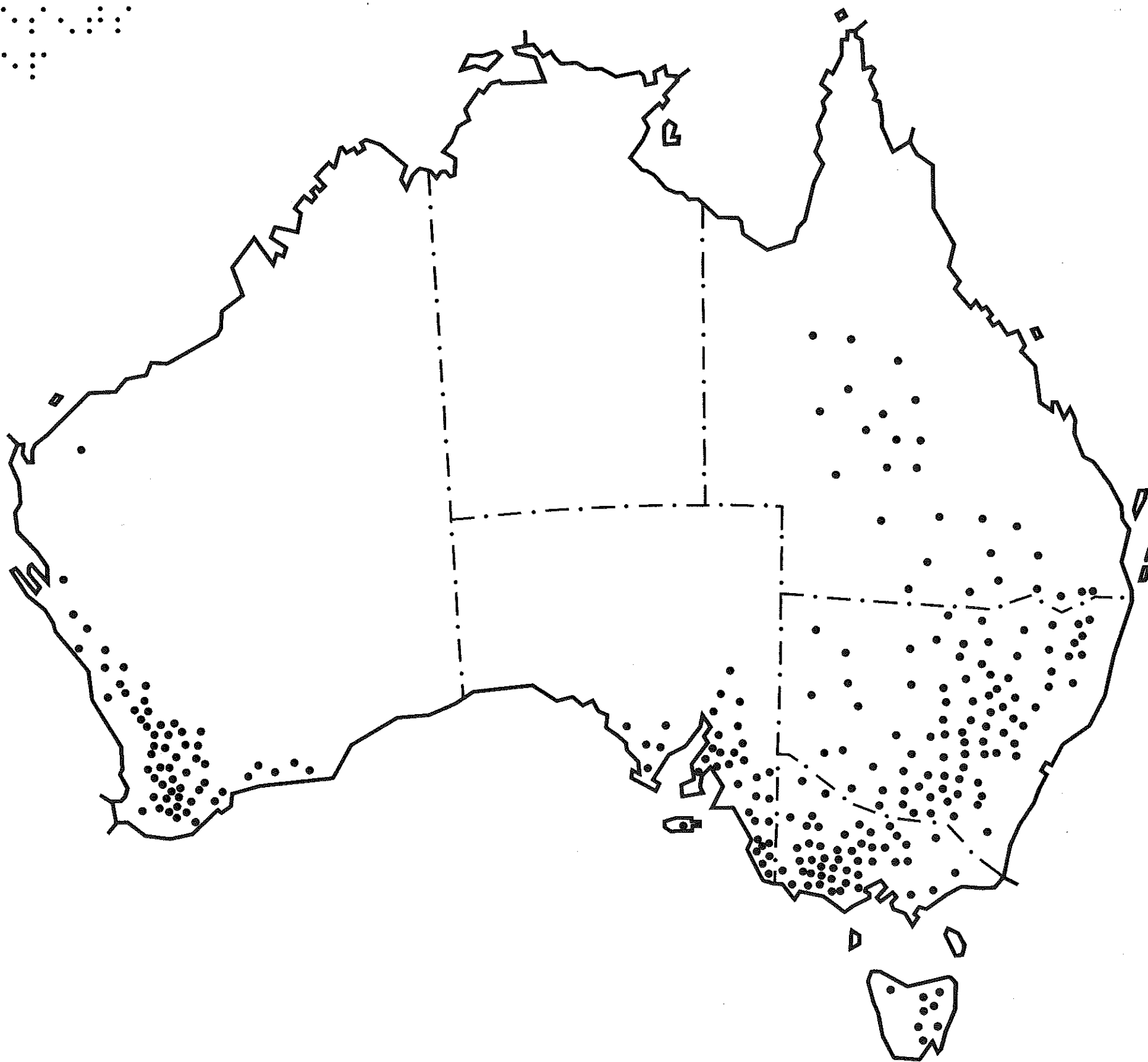
There is a significant export market for sheep meat, with Japan and the Middle East being the main destinations. Live sheep exports for slaughter are also important and in 1988 totalled 7 million head, going mainly to the Middle East.



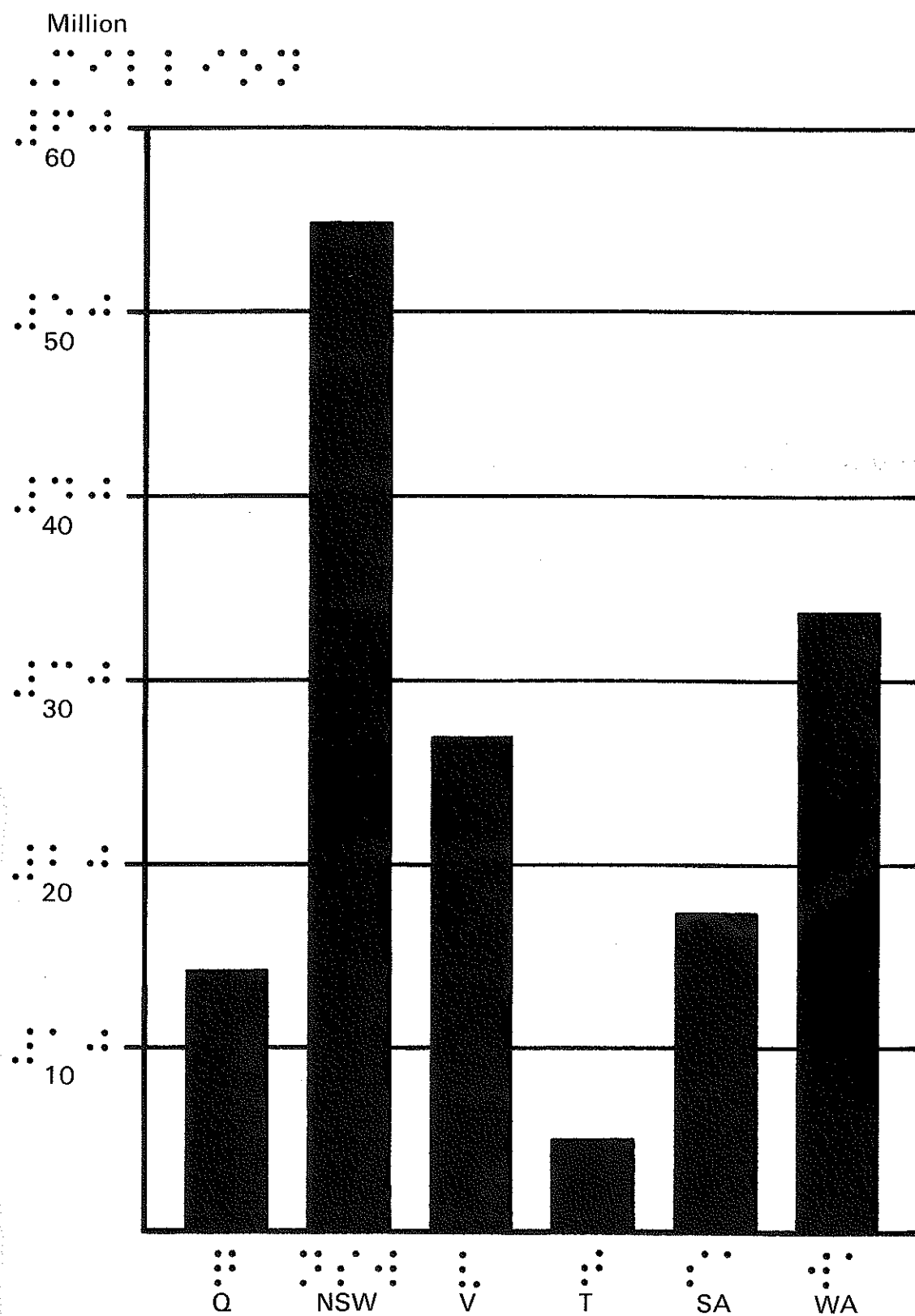
1 dot represents 500 000 sheep



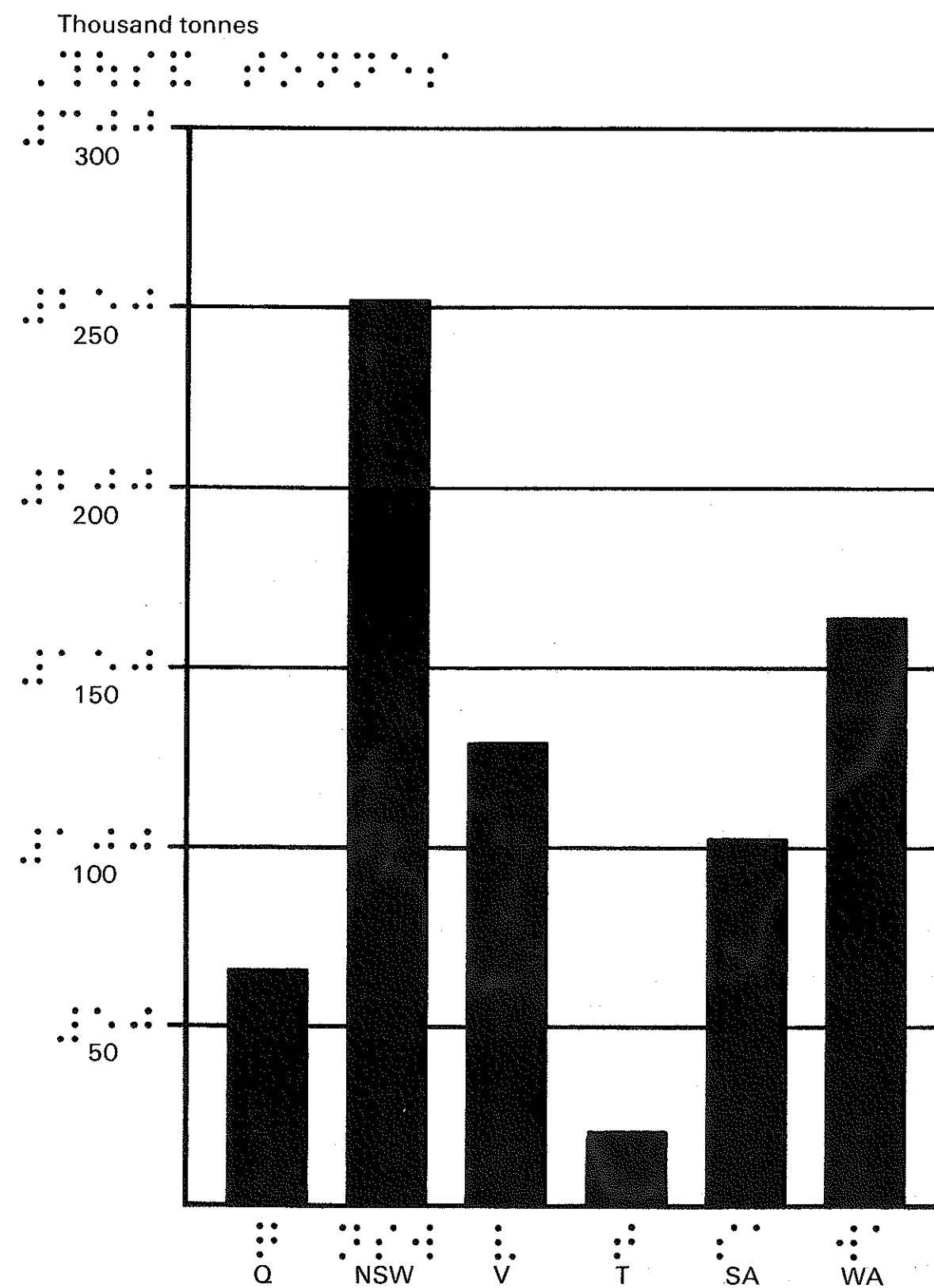
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Number of sheep by state, 1987-88



Production of wool by state, 1987-88



Wheat is Australia's single most important crop. It is grown in all mainland States except the Northern Territory and represents over 60% of the total crop area. Typically, about 11 million hectares are sown to wheat each year. Unlike wheat grown elsewhere, in Australia it is generally produced in association with livestock and sometimes with other crops.

No. 24, the Wheat map, shows the wheat-growing areas in Australia. Scan the whole map-sheet and read the legend. The map is a 'dot' map and each dot represents 50 000 hectares of wheat. In the east the wheat belt extends in an arc from SE Queensland, through New South Wales and Victoria into the southern part of South Australia. In Western Australia it extends across the SW corner of the State. There is not enough wheat grown in Tasmania to plot on the map.

Wheat was sown by the first settlers soon after they arrived at Sydney Cove in 1788. However, the coastal plains were too humid for wheat-growing and for some years the Colony depended heavily on wheat from Van Diemen's Land (Tasmania), which was settled from 1803 onwards. The crossing of the Great Dividing Range in 1813 enabled wheat to be established in more suitable areas inland. The area planted to wheat grew, although initially wheat farming was limited by traditional labour-intensive practices. In addition, the early settlers had to overcome such unfamiliar environmental hazards as droughts and poor soils.

From the 1840s onwards the local invention of labour-saving agricultural machines contributed to the expansion of wheat-growing, as did the gold rushes and the developing railway networks of later decades. The area planted to wheat exceeded 2 million hectares in 1898 and by 1930-31 had grown to over 7 million hectares, a peak unsurpassed for nearly four decades.

Falling soil fertility led to a gradual decline in wheat yields in the latter half of the 19th century. This was progressively reversed from the turn of the century through the selective breeding of wheat varieties to suit Australian conditions, the application of artificial fertilisers, the introduction of nitrogenous legumes in crop rotation systems and improved cultivation techniques.

Today, wheat farming in Australia is a large scale, fully mechanised operation. The use of high-yielding wheat varieties which are also resistant to drought and disease has enabled the present wide distribution of wheat-growing.

Wheat is sown between April and June, and harvested in October or November in the north and December or January in the south. The wheat crop depends heavily on reliable winter rain, although too much can reduce the yield. The highest yields are obtained in the wetter areas of the wheat belts with good soils, for example, the Liverpool Plains around Gunnedah in northern New South Wales and the Darling Downs around Dalby in southern Queensland. Yields are typically lowest along the dry margins of the wheat belt, especially in Western Australia where wheat farming has expanded greatly in recent years and reached its arid limit in many areas.

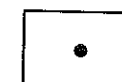
Virtually all wheat is bought by the Australian Wheat Board. The Board receives, handles, stores and sells the grain, both domestically and overseas, and distributes the proceeds to the growers. Although Australia produces only a small percentage of the world wheat crop, it exports 70-80% of its annual production.

Major markets for Australian wheat include China, Egypt, the Middle East, Japan and the USSR. Wheat is one of the nation's most valuable exports.

No. 25, Wheat (Graphs), shows two bar graphs. The graph on the left side of the page shows the area planted to wheat in each State in 1987-88. Each bar represents a State (except Tasmania) and the height of each bar represents the area of wheat in millions of hectares. Scan the graph and read off the area for each State. Western Australia had by far the largest area of wheat (4.3 million hectares), followed by New South Wales (3.1 million hectares).

The graph on the right side of the page shows wheat production by State for 1987-88. The bars again represent each of the States except Tasmania, while their height represents wheat production in millions of tonnes. Scan the graph and read off production for each State. Western Australia produced the largest quantity of wheat (5.4 million tonnes), closely followed by New South Wales with 4.9 million tonnes.

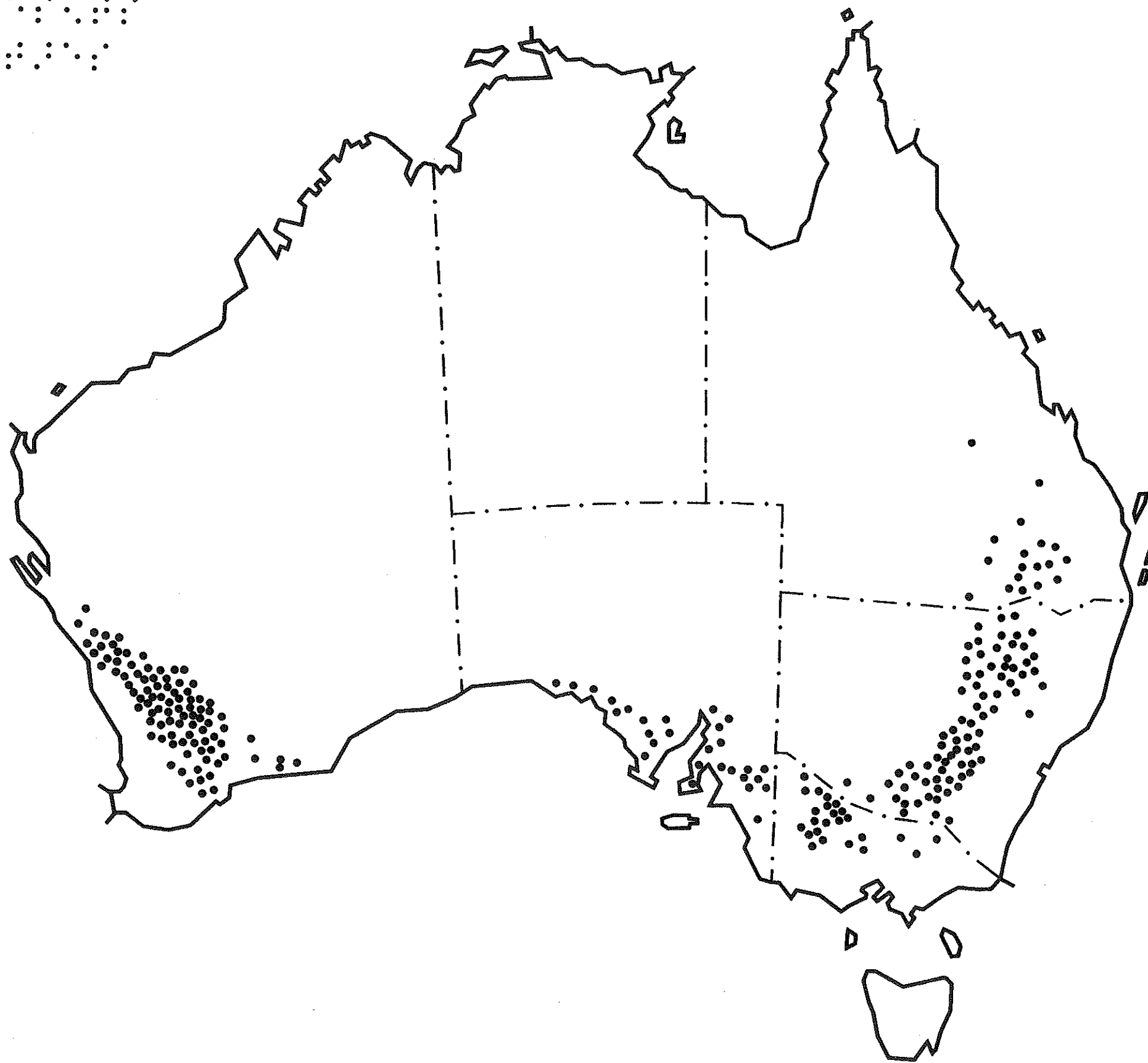
The differences in wheat yield per hectare between the States can be seen by comparing the two graphs. For example, a much larger area of wheat was planted in Western Australia than in New South Wales in 1987-88 for a comparable level of production, indicating a higher yield per hectare in the latter. Likewise, Victoria had a higher yield per hectare than South Australia.



1 dot represents 50 000 hectares

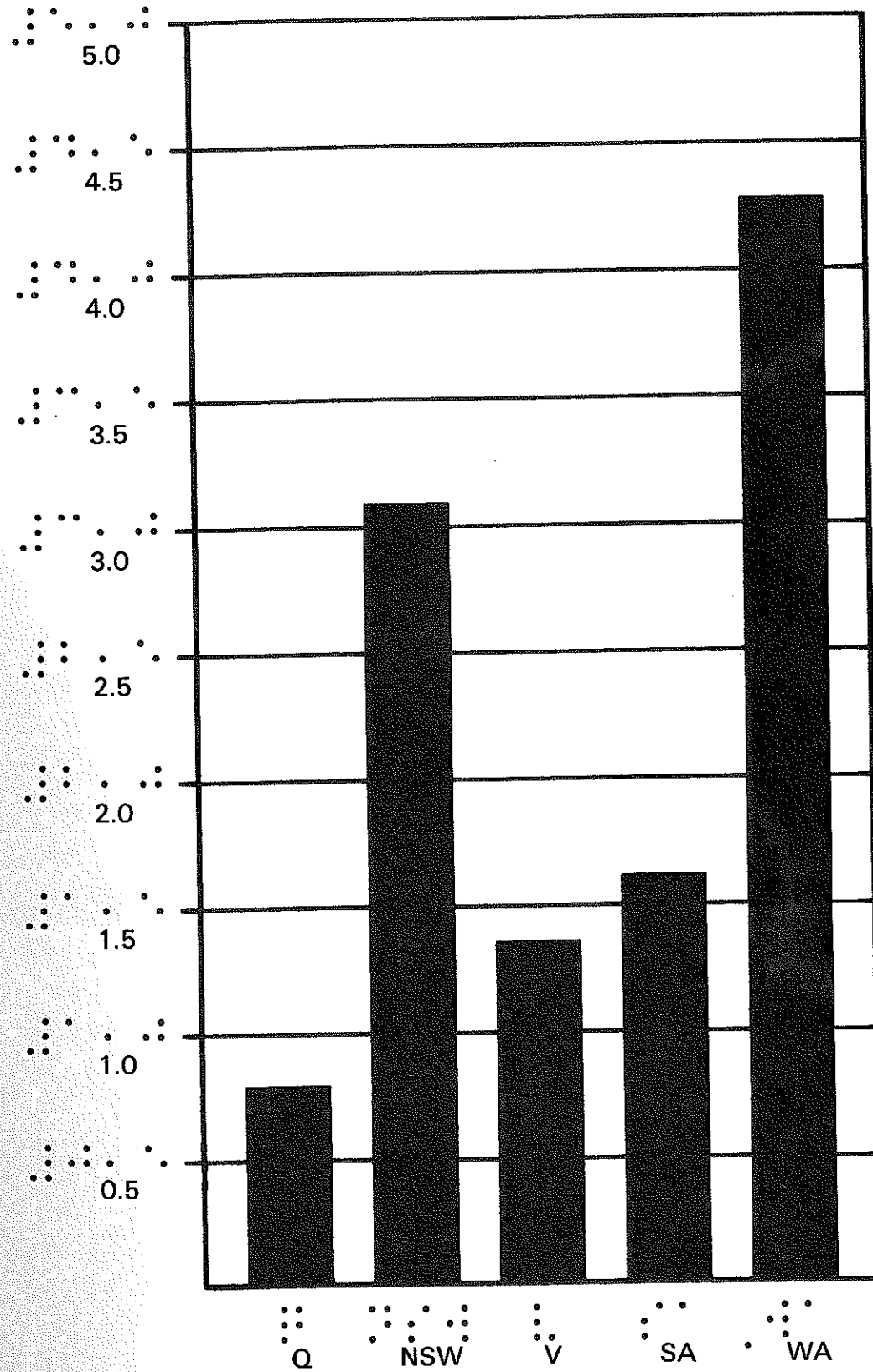


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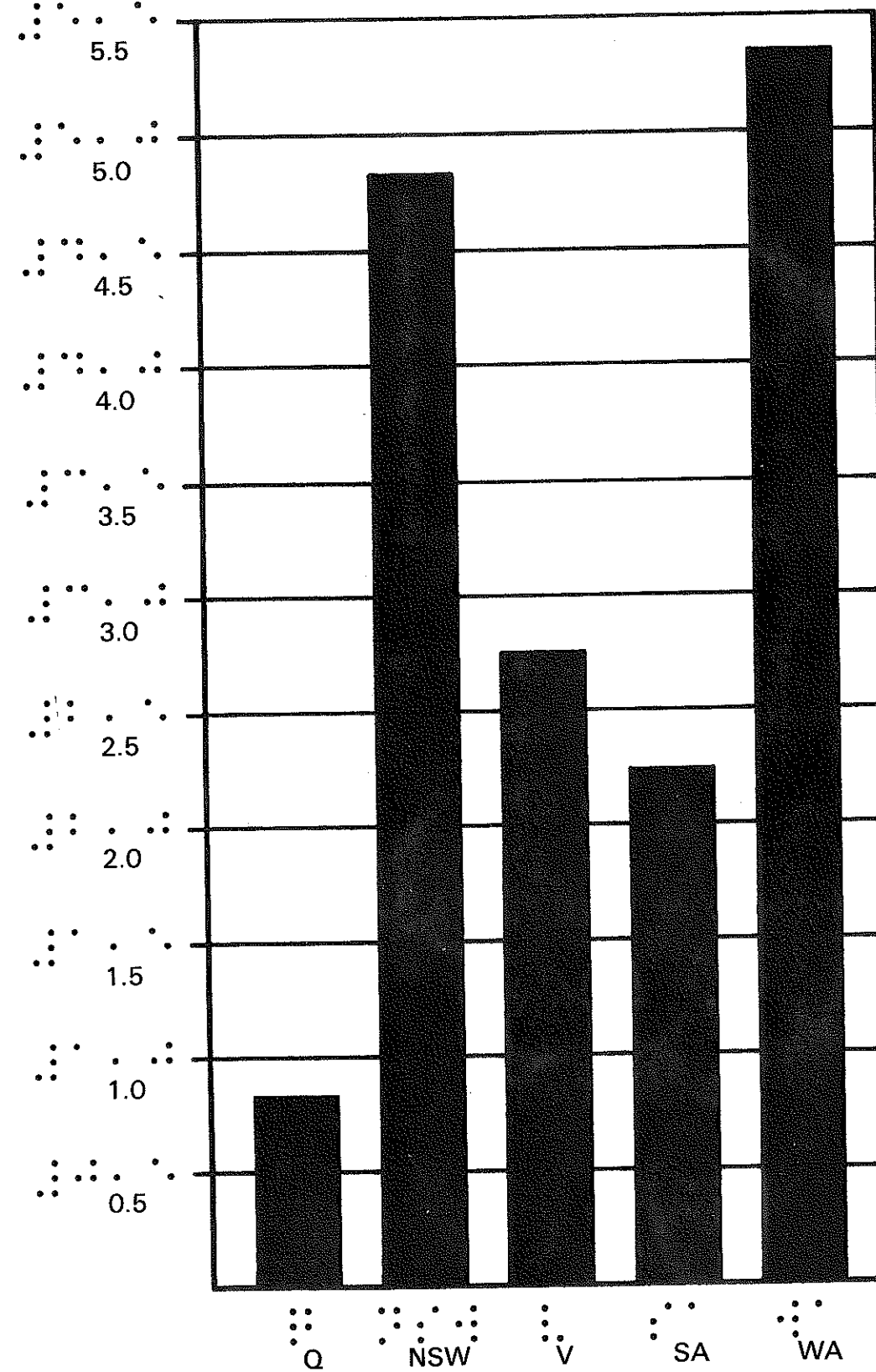
AREA OF WHEAT 1987-88

Million hectares



WHEAT PRODUCTION 1987-88

Million tonnes



There are few agricultural commodities that cannot be produced in Australia. Although a wide variety of crops are grown here, national production is dominated by relatively few.

No. 26, the 'Other Crops' map, shows the distribution of major crops other than wheat. Scan the map-sheet, and note the four symbols in the upper left of the page which represent the four different crop categories depicted: sugar cane, cotton, rice and horticulture. The symbols are concentrated in the east, SE and SW of the continent. A lack of water, unsuitable soil and difficult terrain severely limit agricultural production in the remainder of Australia. A comparison with the maps covering climate, rivers and deserts in Volume 1, for example, well illustrates these limitations.

SUGAR CANE

Sugar cane is confined to a relatively narrow strip along the NE coast, mostly north of the Tropic of Capricorn. Locate the sugar growing areas, represented by four symbols in Queensland and one in New South Wales. They are scattered over a distance of some 2000 kilometres along the coast from around Mossman in northern Queensland to the Clarence River valley in northern New South Wales and occupy mostly irrigated areas with fertile soils. This wide latitudinal range contributes to the crop's overall reliability. The cane growing zone has a high summer rainfall and a frost-free winter.

Australian cane farmers are amongst the most efficient in the world, employing a high degree of mechanisation at all stages of production. The cane is planted from early to late winter. In the north it is cut after one year's growth but in the cooler south growth is slower and the cane is usually grown for two years. The sugar cane is crushed in mills spread throughout the growing areas to minimise transport costs and the extracted raw sugar is moved to refineries in the capital cities or exported.

Nearly 3.4 million tonnes of raw sugar was produced from just over 300 000 hectares of cane in 1986-87. Australia is one of the world's largest sugar exporters, exporting 75% of its annual production. Major customers include the USA, Canada and China. In value of production, sugar is second only to wheat as Australia's most important crop.

COTTON

Cotton has been grown in Australia for well over 100 years although modern irrigated cotton production only began in the 1960s. Since the 1970s there has been very strong growth in the industry and large quantities of cotton are now exported.

Cotton is grown primarily for its fibre (lint). After harvesting, the seed cotton is taken to a gin where it is separated into lint, seed and thrash. The lint is used for yarn, the kernels of the seeds for oil and the hulls for stock feed and fertiliser.

Over 75% of Australia's cotton production comes from central and northern inland New South Wales - principally the Namoi, Macquarie, Gwydir and McIntyre river valleys. On the map, locate the three open circle symbols for these areas in inland New South Wales. The remainder is grown in southern Queensland (indicated by one symbol), mainly around St George and on the Darling Downs. More recently, cotton has also been grown in the Emerald Irrigation Area in central Queensland.

Australia produced over 200 000 tonnes of raw cotton (or lint) in 1986-87. Exports, mainly to Japan, Taiwan and South Korea, accounted for nearly all production.

RICE

Rice was first grown on a commercial scale in Australia in the 1920s, in the Murrumbidgee Irrigation Area of southern New South Wales. In recent years around 100 000 hectares of rice have been cultivated annually for a yield of around 700 000 tonnes. Around 97% of the crop is grown in three irrigation areas in southern New South Wales, identified by three symbols on the map. The remainder is grown in northern Queensland, primarily in the Burdekin River delta.

In southern New South Wales rice is grown in irrigated bays in rotation with wheat and pasture. Seed is sown in October and the crop harvested between March and May. In Queensland both a summer and winter crop are produced.

With suitable climatic and soil conditions and the use of modern cultivation methods, Australia's rice yields are amongst the highest in the world. Rice is exported to Papua New Guinea, Hong Kong, the Middle East and Pacific Island countries.

HORTICULTURE

Horticulture covers a range of intensively cultivated crops including fruit, grapes for wine-making, vegetables and tobacco. The main areas of horticulture are in SE Australia with isolated areas in the far SW, in Tasmania and in north Queensland. In general, the coastal symbols represent fruit and vegetable growing near large centres of population, while those further inland are associated with major irrigation areas.

Fruit growing in Australia is concentrated in relatively small areas where local conditions are particularly suitable. In total it occupies about 100 000 hectares, only a small fraction of the total cropped area, but the value of production per hectare is high and fruit contributes around 10% of the total value of crop production.

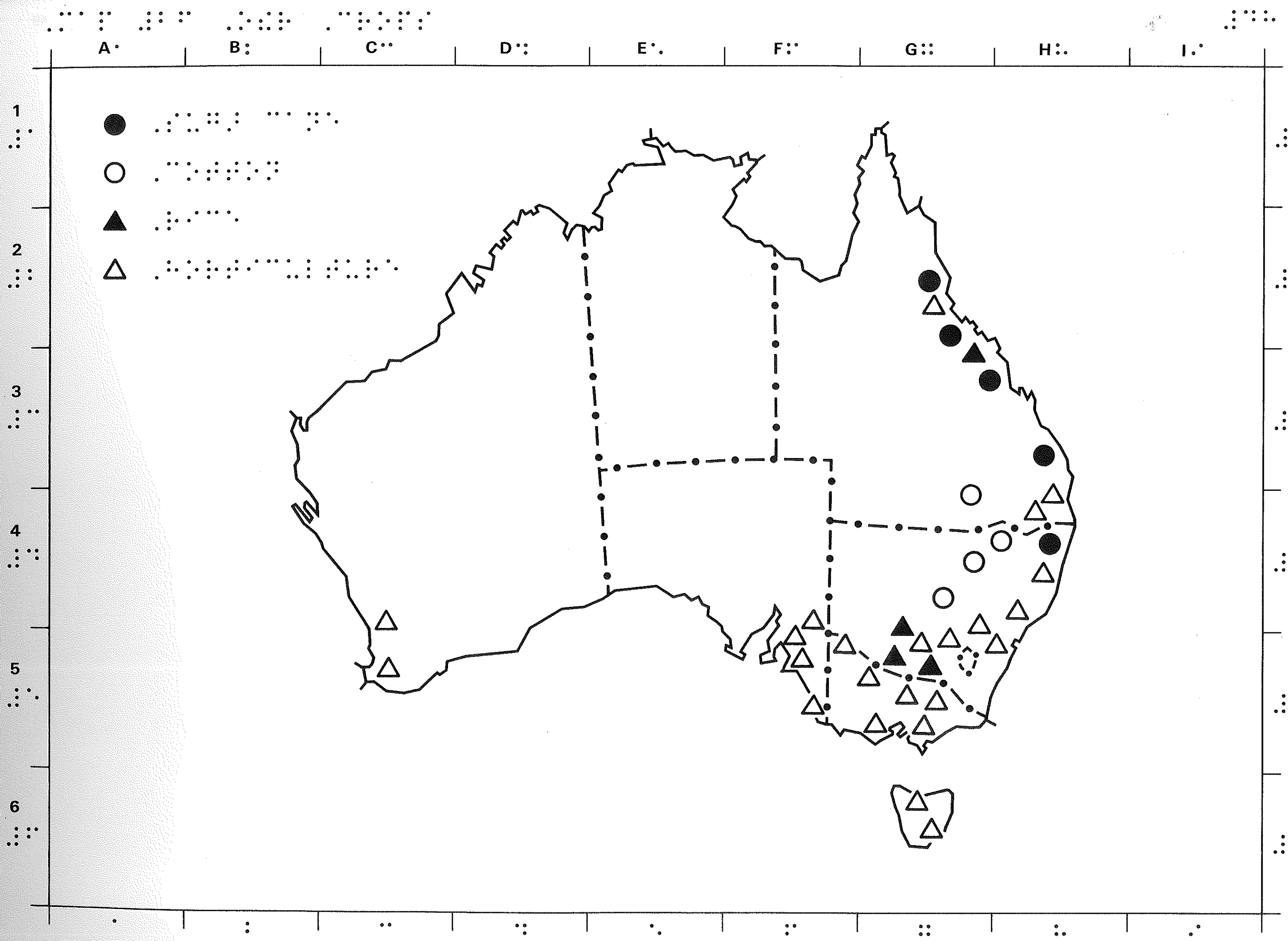
Grapes are grown principally for wine-making but also for drying and to a minor extent for fresh consumption. The area planted to grapes has increased over recent decades because of increased exports and domestic wine consumption.

Extensive vineyards in the Murray and Murrumbidgee irrigation areas in south-eastern Australia produce a large proportion of Australia's grapes. Dried grape production is concentrated around Mildura in the NW of Victoria and in South Australia, where the summers are reliably hot. In addition, there are numerous smaller districts in more temperate and often non-irrigated areas where grape growing is primarily for wine-making. The Barossa valley in South Australia and the Swan River valley in Western Australia are two such areas.

Temperate fruits, mainly apples, pears, plums and cherries are grown in cooler and moister areas such as in Tasmania, the area east of Melbourne, and on the tablelands of SE Australia extending as far north as Stanthorpe in southern Queensland.

The largest areas of orchard fruit, mainly oranges and other citrus fruits, peaches and apricots, occur along the Murray and Murrumbidgee rivers in the drier SE inland and are completely dependent on irrigation.

- Sugar cane
- Cotton
- ▲ Rice
- △ Horticulture



Other Crops

On the warmer central coast of New South Wales, oranges and other citrus fruits are grown between Sydney and Newcastle. Further north, the frost-free climates of the northern New South Wales and Queensland coasts are ideal for tropical fruits. Bananas and pineapples occupy the largest area, along with other fruits such as avocados, pawpaws and mangoes.

Historically, vegetable growing has been located near urban centres. While many small scale growers still produce crops close to city markets, urban expansion and rising land values, the location of canning, freezing and drying works, and improvements in transport and irrigation have extended the industry far from the cities.

About 100 000 hectares are currently cultivated for vegetables. The principal crops are potatoes, tomatoes, peas, onions, carrots, beans, cabbages and cauliflowers. Despite the wide distribution of vegetable growing areas in Australia, there are some notable areas of concentration, such as the alluvial soils to the west of Brisbane and the basaltic soils in southern Victoria and Tasmania. Areas in the SE generally produce the bulk of the vegetables for the large urban markets, while areas in Queensland supplement these with early season and winter-grown produce.

Much of Australia is arid or semi-arid, and settlement is heavily dependent upon the availability of a reliable and adequate water supply. This has led to the establishment by government of major water supply projects which, in turn, have played a significant role in determining the pattern of land use and settlement across the continent.

The construction of dams for large scale surface water storage regulates the highly variable flows of many Australian rivers and helps ensure a continuous supply of water downstream. Stored water is used for irrigation, urban and industrial uses, hydro-electricity generation and recreation. The early dams built in Australia were to supply urban water, while most of those constructed on the mainland in recent decades have been primarily to increase the availability of water on farms.

Irrigation is by far the largest use of water in Australia, consuming about 75% of all water supplied. Irrigation farming is practised in all States, though about 90% of all irrigated land is in the Murray-Darling Basin in south-eastern Australia. In total, around 1.7 million hectares are irrigated, accounting for around 15% of the value of national agricultural production.

Urban and industrial uses consume only 20% of the water supplied. Yet Australia is one of the world's most highly urbanised countries, with the greatest proportion of its population concentrated on the east coast, so there is extremely high local demand for urban and industrial water.

To ensure that water is always available in urban areas, much more water must be stored than will be used in a single year. Sydney, for example, has enough storage to see the city through nine years of drought. This amounts to 710 000 litres per person. Hobart, on the other hand, has a more reliable rainfall and needs to store comparatively little water. Perth and Newcastle rely heavily on groundwater while other cities, like Adelaide, must pump water long distances from rivers.

Hydro-electricity generation is most prominent in Tasmania, where many dams have been built specifically for this purpose. Elsewhere, dams are usually built for irrigation or urban water supply, with hydro-electricity being of secondary importance.

Fishing, swimming and boating are all popular forms of recreation which make use of water storages. Flood mitigation is another benefit of dam construction. Dams assist in controlling the flow of the river during both dry and wet spells, and minimise the effects of droughts and floods.

The map shows the location of major water storages and irrigation areas in Australia. The dams have been divided into three categories according to their storage capacity (in megalitres). A megalitre (ML) equals 1 million litres. Read the legend in the top left of the map-sheet and identify the three symbols representing the different sized storages. A dot pattern has been used to depict the main irrigation areas.

An examination of the map shows that most major water storages are located in the SE corner of the continent and up the east coast. In eastern Australia most large dams are located along the Great Dividing Range. From north to south the dams with capacities greater than one million ML in Queensland are Burdekin Falls, Fairbairn and Wivenhoe (the latter over 2 million ML). In New South Wales Copeton, Burrendong, Wyangala, Burrinjuck and

Blowering have storage in the 1-2 million ML range, with Warragamba (just west of Sydney) and Eucumbene (to the south), holding over 2 million ML. The largest storages in Victoria are the Hume (on the Murray River), Dartmouth and, closer to Melbourne, Eildon and Thomson. All except the Thomson hold over 2 million ML.

In south-western New South Wales locate the Menindee Lakes, a major inland storage system, where floodwater is diverted from the Darling River into a series of natural lake beds. Water for the nearby mining city of Broken Hill is piped from the Menindee Lakes.

In South Australia, River Murray water is pumped via pipelines to towns and farms from direct river off-take rather than from dams and storages. It supplies the metropolitan area of Adelaide as well as the more intensively settled agricultural areas, including Yorke Peninsula, and mining towns such as Whyalla. An extensive system of pipelines also exists on Eyre Peninsula, with water being pumped as far west as Ceduna. Without such supply systems, permanent settlement in these areas would be difficult. The only large storage shown in South Australia is the Murray Mouth Barrage. Its primary purpose is to prevent seawater from entering the lower River Murray.

Unlike the rest of Australia, Tasmania has a very reliable rainfall and streamflow, and most large dams have been constructed for hydro-electricity generation rather than water supply. Two very large dams are shown on the map: Miena (Great Lake) in the north and Lake Gordon-Lake Pedder (which has four separate dam walls) in the south. With a capacity of 11 million ML, the latter is the largest water storage in Australia.

The nation's second largest water storage is the Ord River Dam (Lake Argyle) with a capacity of almost 6 million ML, located in the far north of Western Australia. The dam was completed in the 1970s to develop intensive irrigation agriculture and encourage closer settlement in this remote part of the continent. Problems with crop disease and pests, as well as the enormous distances to markets, have so far seen only a small proportion of the land utilised. Lake Argyle is now mostly a tourist attraction.

The hills behind Perth contain dams which supply water to much of southern Western Australia. An extensive system of pipelines delivers water to farms and towns throughout the wheat belt and to mining centres such as Kalgoorlie and Norseman in the SE of the State.

Irrigation areas are generally located downstream from storages and the largest areas are located in the SE of the continent. In the SW of New South Wales and in northern Victoria the map shows the large Murray and Murrumbidgee irrigation areas. Irrigation areas are also shown along the River Murray in South Australia, close to the State's eastern border. In eastern Queensland the four irrigation areas depicted on the map are, from the north, Mareeba, lower Burdekin River, Emerald and Bundaberg.

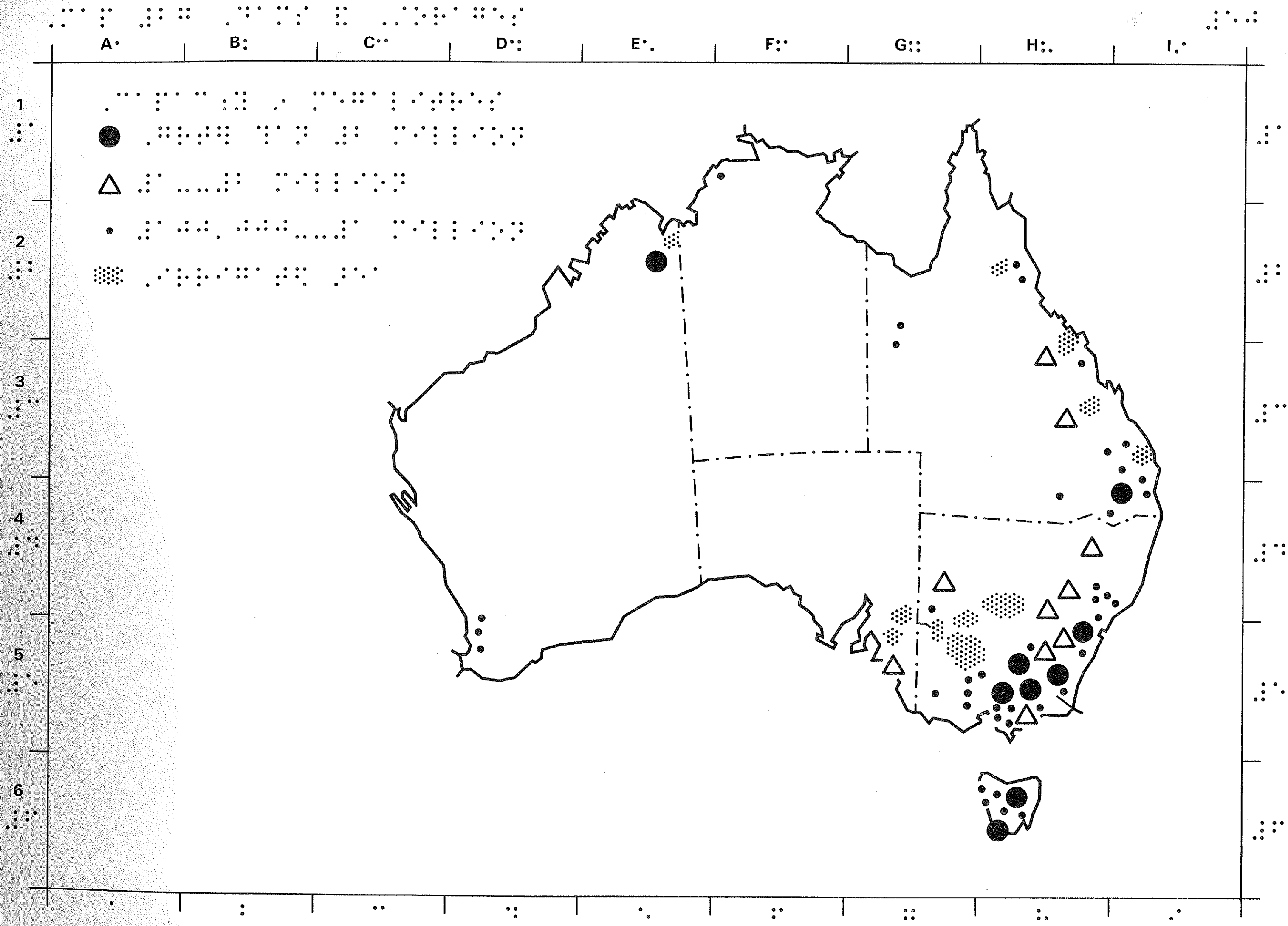
Capacity in megalitres

● Greater than 2 million

△ 1 – 2 million

• 100 000 – 1 million

⋯ Irrigation area



Australia's forested areas occur in the higher rainfall parts of the country, mostly along the east and SE coast and ranges, in Tasmania and in the SW of Western Australia. Smaller areas are found along the tropical coasts of Cape York Peninsula and Arnhem Land, in western Victoria and in south-eastern South Australia. The overall aridity of the continent limits the potential for forest cover to its wetter margins. In these generally more densely populated areas, forest land use is often in conflict with other land uses.

Native forests presently cover about 40 million hectares, or less than 6% of the land area of Australia. This is just over half of the area covered by forests at the time of first European settlement some 200 years ago.

About 75% of the forested land is publicly owned. It is mostly within State forests, although over 5 million hectares are set aside in nature conservation reserves or occur on other Crown land. The remaining 25%, or about 11 million hectares, is on privately owned land.

In addition, there are presently about 1 million hectares of forest plantations. These consist mainly of introduced softwoods with *Pinus radiata*, the Monterey pine, the most widely planted species.

The map shows areas of State forest and forest plantation over 5000 hectares. The larger areas are plotted to scale whereas the smaller areas are symbolised by dots. In total, they make up the areas managed primarily for timber production.

Examine the map and note the extent of the forestry areas. Large areas of managed forest are limited to SE Queensland, eastern New South Wales, Victoria, Tasmania and the extreme SW of Western Australia. The only sizeable forestry area in South Australia is in the extreme SE of the State and consists entirely of pine plantations.


The distribution of managed forest land is very fragmented. There are relatively few large areas and some mapped areas represent agglomerations of smaller areas which are too small to show individually.

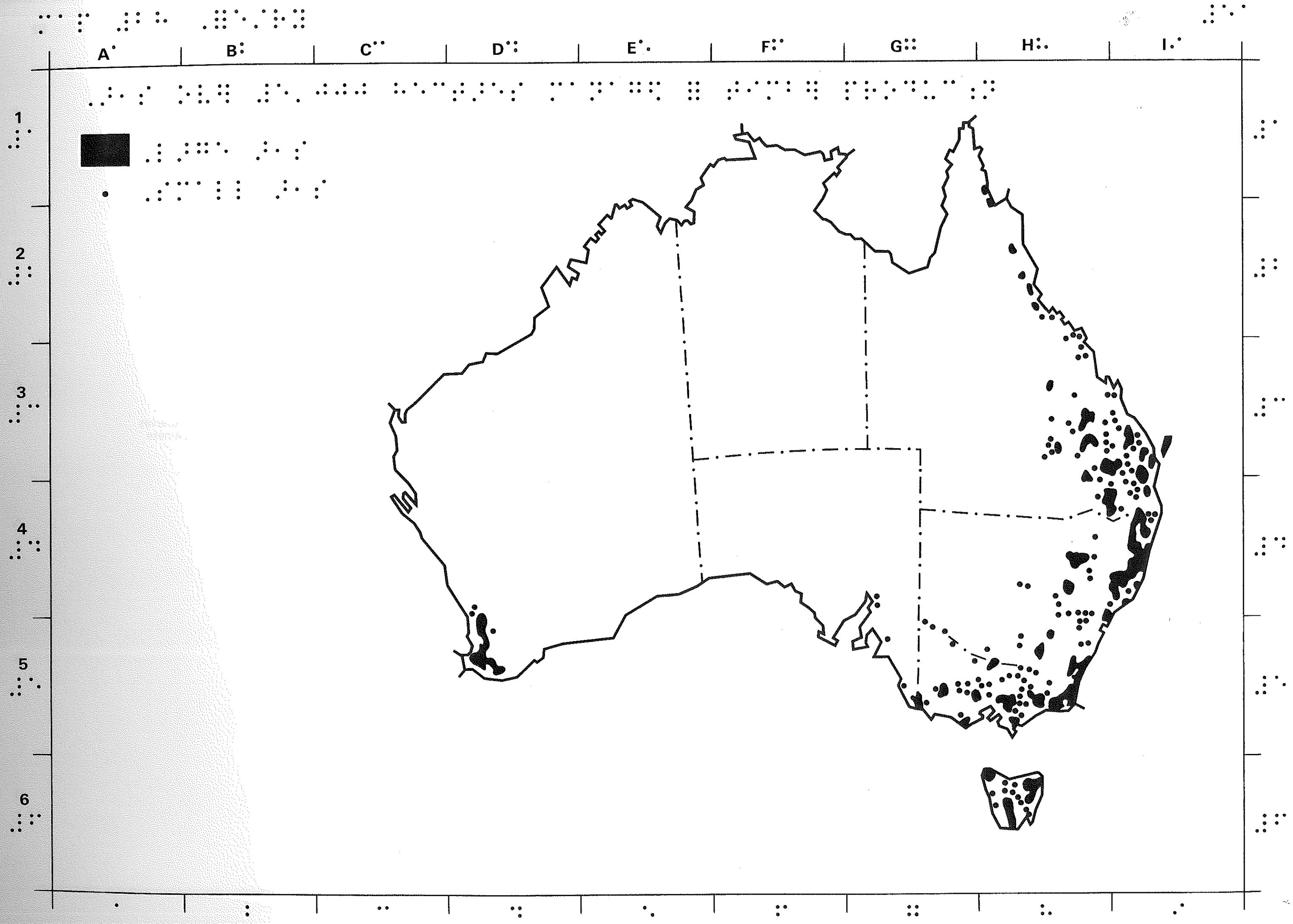
Most of Australia's forests consist of various eucalypt species, all of which are hardwoods. They supply the bulk of the harvested timber, in the form of sawlogs, construction timbers, woodchips, plywood and pulp. In addition there are some areas of closed broadleaf forest, the rainforests, along the east coast and in Tasmania. These provide timber for specialised veneers, furniture and joinery. Forest plantations account for most of Australia's softwood production, while the native cypress pine (*Callitris*) forests make up the remainder.

Forestry policy in all States now embraces the dual long-term aims of conservation and sustained timber yields and recognises the considerable recreation value of the nation's native forests.

The timber industry provides a significant proportion of domestic wood and wood product needs and supports an export industry worth over \$300 million per year. Despite this, Australia remains a net importer of timber products (over \$1 billion annually), the bulk of which are pulp and paper products. This trade imbalance points to the importance of ensuring sustained yields from the nation's forests and, in particular, to the expansion of the area of forest plantations.

Areas over 5000 hectares managed for timber production

-  Large areas
- Small areas



Nature conservation reserves (NCRs) are areas of natural landscape set aside to preserve flora, fauna and natural features. The exclusion of other types of land use within these reserves is based on the recognition of the interdependence of all organisms within an ecosystem and the need for suitable undisturbed habitats for the long-term survival of plants and animals.

At the same time as ensuring the conservation of species, most reserves serve a dual role in also providing access to natural and scenic features for public recreation. In popular national parks, for example, visitor facilities including roads, trails, information centres and camping areas have been developed to cater for the ever-increasing numbers of visitors.

Australia's NCRs include a range of State-controlled and Territory-controlled land categories including national parks, nature reserves, conservation parks, flora and fauna reserves, environmental parks and wilderness areas as well as offshore reserves, notably marine parks. The Commonwealth Government manages Kakadu and Uluru in the Northern Territory. Each State and Territory has its own set of reserve types, managed according to their specified purpose. Public access is restricted in some reserves to protect sensitive areas or species, while in some others the taking of game is permitted during specified seasons.

The first national park in Australia, the Royal National Park south of Sydney, was declared in 1879 just seven years after the world's first national park, Yellowstone, was proclaimed in the USA. Victoria followed in 1882 with the reservation of Fern Tree Gully in the Dandenong Ranges east of Melbourne. Since that time there has been a progressive expansion of Australia's system of NCRs, particularly in recent years as attention has turned to the last remaining areas of undeveloped land in the country. At present about 35 million hectares, or about 5% of the total land area of Australia, is covered by over 4500 conservation reserves.

The map shows all NCRs over 5000 hectares. The larger reserves are plotted to scale while reserves with areas too small to show to true scale are depicted by dots. Examine the extent and distribution of NCRs in each State.

By far the largest reserve on the map is offshore. It is the Great Barrier Reef Marine Park (**gbr**), which covers 34 million hectares of reef and continental shelf waters and extends almost the entire length of the Queensland coast. This enormous park was declared in stages from 1979 onwards and has its own management authority, the Great Barrier Reef Marine Park Authority, based in Townsville. The two marine reserves to the east of the Great Barrier Reef Marine Park are Coringa-Herald National Nature Reserve (**cd**) and, slightly further east, Lihou Reef National Nature Reserve (**lr**).

Locate the following large mainland reserves with areas greater than 1 million hectares.

Kakadu National Park (**ku**) is in the far north of the Northern Territory.

The large area (**sl**) shown in the NE corner of South Australia encompasses the large Simpson Desert Regional Reserve (managed for controlled other uses as well as conservation), Simpson Desert Conservation Park and Witjira National Park. The Simpson Desert National Park across the border in Queensland is also shown as part of this area. Below these is Lake Eyre National Park (**le**). On the South Australian side of the South Australian-Western Australian border is a large unnamed conservation park.

Adjoining this unnamed conservation reserve on the Western Australian side is the Great Victoria Desert Nature Reserve (**gvd**).

In the central-west of Western Australia, locate the Gibson Desert Nature Reserve (**gd**) and to the NW, Rudall River National Park (**rr**).


In south-eastern Australia a chain of large national parks extends southwards along the coastal ranges from the Hunter Valley near Newcastle to west of Sydney. Further south, in the Snowy Mountains, the Kosciusko National Park (**ko**) in New South Wales and the new Alpine National Park (**ap**) in Victoria (name shown with a leadline) form another large block of conserved land, and cover much of Australia's alpine country. These two areas can be identified on the map as the two largest blocks in the SE of the Australian mainland.

Most of SW Tasmania (**swt**) is set aside as national park or conservation area.

Two additional marine reserves can be located on the map. They are Ningaloo Marine Park (**nl**) near Exmouth in Western Australia and Cobourg Marine Park (**cbg**) surrounding the Cobourg Peninsula in the Northern Territory.

Currently, seven Australian NCRs or groups of such reserves are listed as World Heritage Areas. They include the Great Barrier Reef Marine Park (**gbr**), Kakadu (**ku**) and Uluru (**uu**) National Parks and the Tasmanian Wilderness (**swt**), which are all identified on the map. In addition, the Wet Tropics of northern Queensland, the Willandra Lakes region in the SW of New South Wales and the Australian East Coast Temperate and Subtropical Rainforest Parks in north-eastern New South Wales have been listed.

Nature Conservation Reserves over 5000 hectares

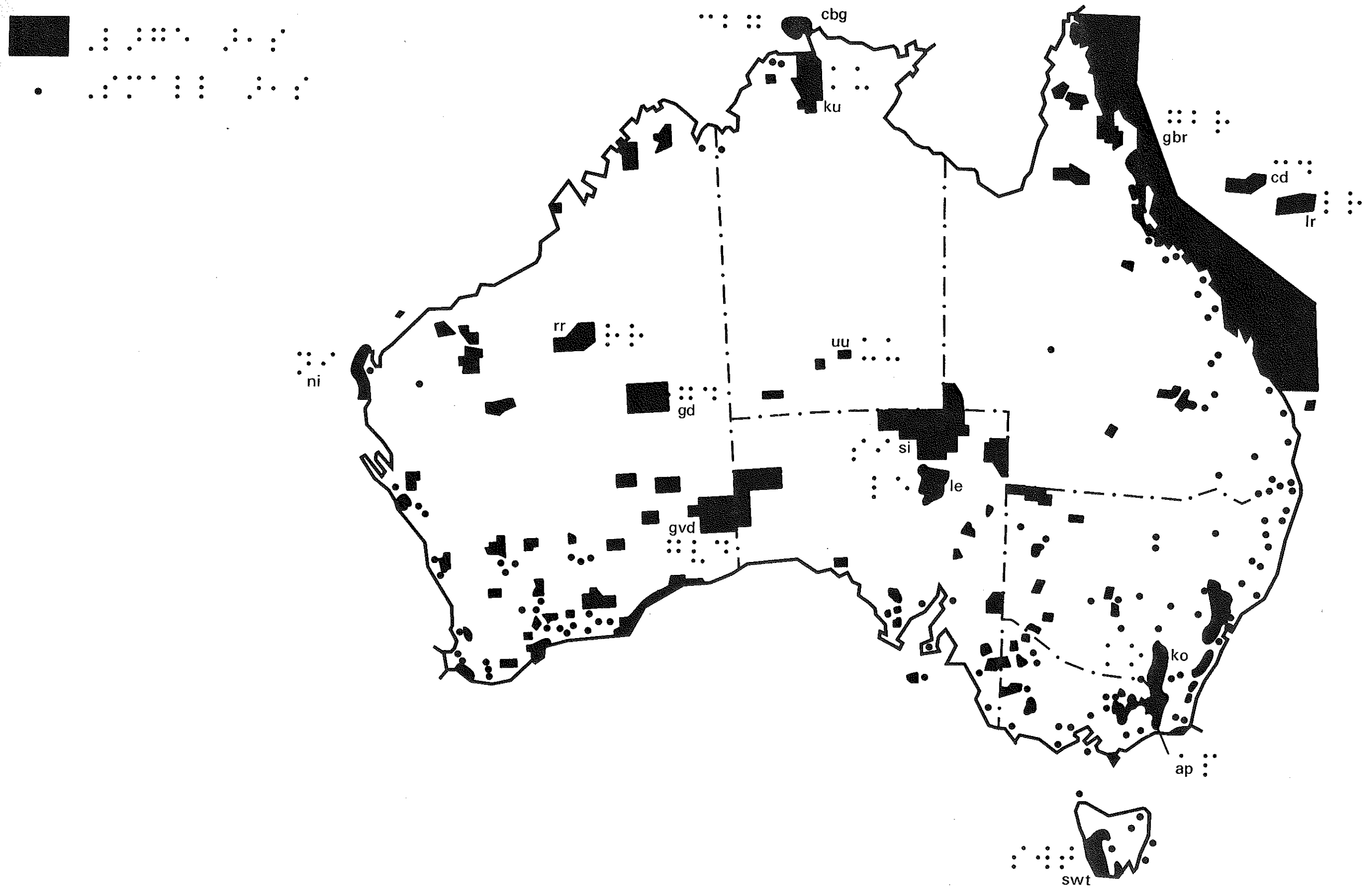
-  Large areas
- Small areas

List of abbreviations

ap	Alpine National Park
cd	Coringa-Herald National Nature Reserve
cbg	Cobourg Marine Park
gbr	Great Barrier Reef Marine Park
gd	Gibson Desert Nature Reserve
gvd	Great Victoria Desert Nature Reserve
ko	Kosciusko National Park
ku	Kakadu National Park
le	Lake Eyre Conservation Park
lr	Lihou Reef National Nature Reserve
nl	Ningaloo Marine Park
rr	Rudall River National Park
sl	Simpson Desert Conservation Park & adjoining reserves
swt	South-west Tasmania reserves/Tasmanian Wilderness
uu	Uluru National Park

A B C D E F G H I

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4
5
6



SECTION E

Minerals and Energy

The maps and commentaries in this section provide an overview of Australia's mineral and energy resources.

The first topic, 'Mineral Resources', discusses the impact of the minerals industry on Australia's development and examines the emergence and growth of most of Australia's more important mineral industries. Subsequent topics discuss the value of mine production, and specific types of minerals, energy and mineral industries in more detail.

Domestic and overseas transport movements of mineral commodities, featured on some of the maps in this section, are shown by the use of 'flow-lines'. The type of line used can represent quantity as well as movement, with direction indicated by arrows. For example, on No. 32, the 'Iron and Steel Industry' map, the various types of lines represent quantities of iron ore moving by sea around the Australian coast or to overseas destinations.

Abbreviated names used on maps in this section are listed in full after each map.

Australia's mineral resources are vast and diverse. The mineral industry has shaped much of the nation's history, following the first significant discoveries in the mid 1800s. Mineral wealth has increased in every decade since and in the last twenty years has expanded severalfold. Today, along with the agricultural sector, it is a mainstay of Australia's economy and export trade.

Australia is a leading world exporter of many minerals. Yet up until the late 1940s there was a long list of apparent mineral deficiencies, and the value of mineral trade was barely in balance as recently as 1965. By contrast, the value of exports today is more than ten times that of imports.

The early growth of Australia occurred as a series of rapid pioneering phases during which the mining industry provided a key impetus to the settlement and further development of the country. Whereas major population centres developed naturally around the coastline, particularly in the SE, where nearly all arable land is located, settlement throughout the remainder of the continent generally began for other reasons. The discovery and development of Australia's widely distributed mineral deposits helped to open up the dry interior - most inland cities of the 19th century were mining centres. Gold, more than any other mineral, was responsible for a series of rapid population increases and for producing much of the early wealth of Australia.

The emergence and growth of Australia's mineral industry has occurred in four phases - early settlement and exploration up to the 1850s gold rushes, the establishment of the industry up to the early 1900s, the lean years of only minor exploration and technological development extending from World War 1 through the Depression years until after World War 2 and, finally, the establishment of a range of large scale projects based on earlier mineral discoveries and newly found deposits. This last phase has seen iron ore and aluminium displace the base metals - copper, lead, zinc and tin - which had up until the 1960s (with coal and silver) formed the basis of the industry. In addition, long established industries such as coal and mineral sands have expanded, with a consequent boost to exports.

The accompanying map shows the location of Australia's major mineral resources. More detailed information on major mineral commodities is given in subsequent topics in this section.

The first recognition of mineral wealth in Australia inevitably concerned coal, for the first colonial settlement at Sydney Cove lay within a rich coal basin that has proved highly productive. The extensive mining of this basin is represented by the symbol labelled Sydney Basin (**sb**), near the New South Wales central coast. Some 70 million tonnes a year, about half of Australia's black coal production, is mined from this basin for domestic industry and export.

The discovery of payable alluvial gold near Bathurst in New South Wales in 1851 and the subsequent gold rushes gave the Australian mineral industry its initial impetus. Then in 1883, a boundary rider discovered the world's then largest base metal deposit at Broken Hill (**bh**) in western New South Wales. Deposits here and at Cobar (**ce**) in central New South Wales continue to produce copper, lead, zinc and silver. More recent mines at Elura (near Cobar) and at Woodlawn (**wd**) to the SW of Sydney have supplemented New South Wales base metal production.

Gold deposits played a significant part in the early development of Victoria but today fuel resources dominate. Huge brown coal deposits in the Latrobe Valley (**lv**), east of Melbourne, satisfy almost all of Victoria's electricity needs. In Bass Strait (**bs**) oil and gas resources are exploited largely for domestic consumption.

The mineral resources of Tasmania came into prominence with the establishment during the 1870s of the world's then largest tin mine at Mount Bischoff on the west coast (**wc**). Mines in this area continue to produce copper, lead, zinc and tin. Tungsten, in the form of scheelite, is mined on King Island (**kn**) NW of Tasmania in Bass Strait.

The first metals to be mined in Australia were silver, lead and copper from South Australia. By 1850 that State earned more from copper exports than from its wool and wheat exports combined. The recent opening of the massive Olympic Dam (**od**) mine in the centre of the State will see a resurgence in copper production together with uranium, gold and silver in South Australia. The other major metal mined in South Australia is iron ore from the Middleback Ranges (**mr**), to the south and a little east of Olympic Dam, for use in domestic steelworks. Black coal has been mined at Leigh Creek (**lc**), NE of the Middleback Ranges, since World War 2 and is fired at Port Augusta to generate power for Adelaide. Further north at Moomba (**mo**), in the NE corner of the State, substantial petroleum reserves were discovered in the 1960s. Natural gas was first piped from there in 1969 for power generation and domestic use in Adelaide. Coober Pedy (**cp**), west of Moomba in the northern part of the State, is the largest opal-producing centre in Australia and has been worked since 1915.

Western Australia gained immeasurably from gold mining in the late 1800s when diggers trekked across from the east coast. Their explorations culminated in the discovery of gold in 1891 at Kalgoorlie (**kg**), which can be located on the map amongst a group of mining symbols in the State's SE. Today Western Australia produces twice as much gold as the rest of Australia, largely from the famed 'Golden Mile' mines at Kalgoorlie and the large deposits at Kambalda (**km**) and Norseman (**nr**) close by to the south. One of Australia's largest producers of gold is at Telfer (**tf**), well to the north of Kalgoorlie.

Nickel is mined at Kambalda (**km**) and at Agnew (**ag**), although at a much reduced scale compared to the nickel mining boom of the 1960s.

In the SW of the State, four mines extract bauxite from very large deposits in the Darling Range (**dl**) for processing into alumina at local refineries.

Mineral sands mining is relatively recent in Western Australia. Over 80% of the nation's annual ilmenite production now comes from mineral sands at Capel (**cl**) on the coast to the SW of the Darling Range, and at Eneabba (**eb**), further north on the coast. Ilmenite is a major source of titanium dioxide pigment which is used in the manufacture of paint. Just to the SE of Capel, there is a large tin mine at Greenbushes (**gu**).

Impressive as Western Australia's gold, bauxite and mineral sands mining activity is, output from the massive Pilbara (**pl**) iron ore reserves in the central west of the State far exceeds the combined production of these minerals. Here, 90% of Australia's

Major mineral deposit

A

B

C

D

E

F

G

H

I

1

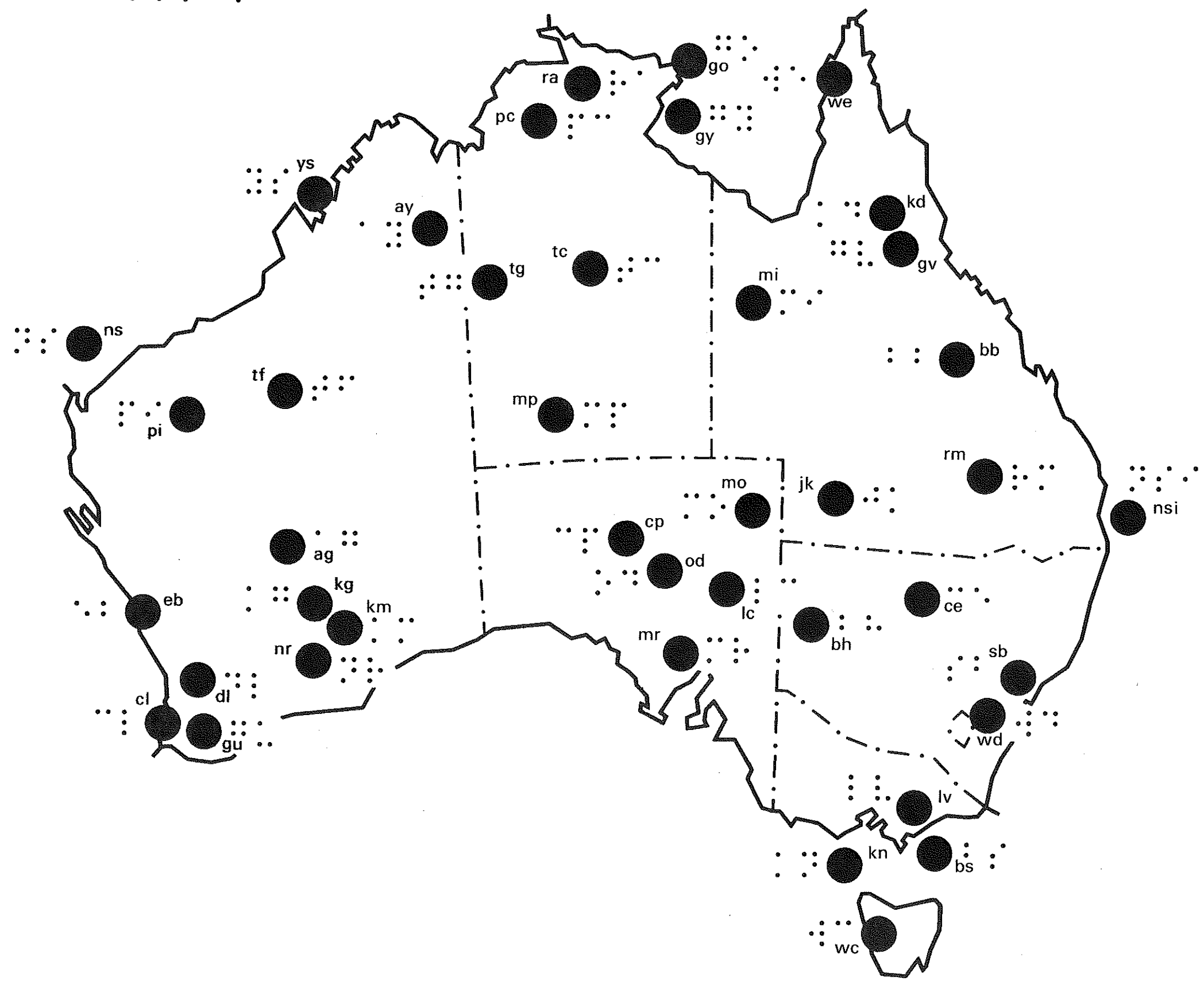
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6



annual production of around 100 million tonnes of iron ore is won from four large opencut mines. Significant reserves are also exploited at Yampi Sound (**ys**) to the NW on the coast.

Just off the coast to the SW of Yampi Sound are the huge North West Shelf (**ns**) natural gas resources discovered in the early 1970s. Gas from here has been piped to Perth since 1984, a distance of over 1600 kilometres. Substantial quantities of liquefied gas are being exported to Japan over the next 25 years.

To the east of Yampi Sound one of the world's richest diamond deposits was discovered at Argyle (**ay**) in 1979. Mining began in 1983 and Australia is now the world's largest producer of diamonds, although only about 5% of Argyle production is of gem quality.

To the south, just inside the Northern Territory border, locate the Territory's largest single gold producer - The Granites (**tg**) mine - which commenced operations in 1986.

Further south, towards the South Australian border, significant deposits of natural gas from the Mereenie and Palm Valley fields (**mp**) are piped to Darwin along a newly constructed 1500 km pipeline and to Alice Springs. Oil is also piped from Mereenie to Alice Springs for processing.

The mining of a copper and gold orebody in the Tennant Creek (**tc**) area, in the centre of the Northern Territory, began on a small scale in 1935. With further development in the 1950s mining flourished, but reserves are now nearing exhaustion.

Further north, recent exploration has revealed significant gold resources at Pine Creek (**pc**), although mining first began there in the 1870s.

Just to the NE of Pine Creek the Ranger (**ra**) mine, which is one of the world's largest uranium producers, can be located. Uranium mining here dominates mineral resource development in the Northern Territory.

Australia's only source of manganese was discovered in 1960 on Groote Eylandt (**gy**), an island located to the SE in the Gulf of Carpentaria. Much of the ore is exported although some is used in the production of manganese alloys at Bell Bay in Tasmania.

On the mainland to the north of Groote Eylandt locate Gove (**go**), where huge quantities of bauxite were discovered in 1952. It was the first of many discoveries which have made Australia one of the world's largest producers of bauxite.

Two years later a second huge bauxite deposit was found to the east on the other side of the Gulf, at Weipa (**we**) in Queensland. It contains about one-quarter of the world's known high grade reserves.

During the early 1900s rich veins of gold were mined at Kidston (**kd**), to the SE of Weipa. Mining recommenced in 1985 and, with the use of modern mining technology, it is now one of Australia's largest gold producers.

Just south of Kidston a large lateritic nickel deposit at Greenvale (**gv**) has been mined since 1972, producing about a third of Australia's annual nickel output. Reserves there, however, are expected to be mined out during the early 1990s.

In 1923 a station hand discovered the massive copper and lead-zinc-silver deposits at Mount Isa (**mi**), SW of Greenvale near the Northern Territory border. Today it is the world's largest single producing lead-silver mine and a major producer of copper and zinc.

Towards the coast to the SE of Mount Isa, extensive mining of the enormous black coal resources of the Bowen Basin (**bb**) has dominated mineral development in Queensland for the past two decades. Annual production of coal from the Bowen Basin is around 60 million tonnes, most of which is exported.

Further south, Australia's first petroleum strike was made in 1900 at Roma (**rm**) in SE Queensland, when a bore for water unexpectedly intercepted natural gas. Subsequent exploration proved reserves of oil and gas in the area. To the west of Roma, commercial production of oil began at Jackson (**jk**) in 1981 and oil is now piped to Brisbane via the Moonie fields.

Most east coast production of mineral sands currently comes from North Stradbroke Island (**nsi**), off the coast adjacent to the SE corner of Queensland. Australia is the world's principal source of mineral sands and exports virtually all output.

Australia has a natural advantage in its wide range of mineral resources and is practically self-sufficient in most. Oil reserves are a notable exception and, unless further discoveries are made, Australia's dependence on imports will increase.

List of abbreviations

ag	Agnew	nickel
ay	Argyle	diamonds
bb	Bowen Basin	black coal
bh	Broken Hill	lead, zinc, silver
bs	Bass Strait	oil, natural gas
ce	Cobar-Elura	copper, lead, zinc
cl	Capel	mineral sands
cp	Coober Pedy	opals
dl	Darling Range	bauxite
eb	Eneabba	mineral sands
go	Gove	bauxite
gu	Greenbushes	tin
gv	Greenvale	nickel
gy	Groote Eylandt	manganese
jk	Jackson	oil, natural gas
kd	Kidston	gold
kg	Kalgoorlie	gold
km	Kambalda	nickel, gold
kn	King Island	tungsten
lc	Leigh Creek	black coal
lv	Latrobe Valley	brown coal
mi	Mount Isa	copper, lead, zinc, silver
mo	Moomba	oil, natural gas
mp	Mereenie-Palm Valley	oil, natural gas
mr	Middleback Ranges	iron ore
nr	Norseman	gold
ns	North West Shelf	natural gas
nsi	North Stradbroke Island	mineral sands
od	Olympic Dam	uranium, copper, gold, silver
pc	Pine Creek	gold
pi	Pilbara	iron ore
ra	Ranger	uranium
rm	Roma	oil, natural gas
sb	Sydney Basin	black coal
tc	Tennant Creek	copper, gold
tf	Telfer	gold
tg	The Granites	gold
wc	West Coast (Tasmania)	tin, lead, zinc, copper
wd	Woodlawn	copper, lead, zinc
we	Weipa	bauxite
ys	Yampi Sound	iron ore

Australia's mineral industry is fundamental to the national economy. In 1986-87 the country's Gross Domestic Product amounted to \$260 billion of which nearly \$17 billion, about 6%, came from the mineral industry. In the same year, the industry generated about 40% of Australia's export earnings.

No. 31, a bar graph of the Value of Mine Production, shows the ex-mine values of major minerals in Australia for 1986-87. The ex-mine value of a mineral includes the cost of preliminary ore processing and concentration undertaken at the mine and any subsidy payments. Each vertical bar of the graph represents a different mineral, coded with a letter which is explained in a table within the graph. The height of each bar represents the ex-mine value of each mineral in millions of dollars, with the minerals ranked in order of value along the horizontal axis.

In 1986-87 oil, black coal, gold and iron ore together accounted for almost 70% of the value of Australian mine production. In that year Australia was the world's leading exporter of black coal, the second largest exporter of iron ore and the fourth largest producer of both iron ore and gold. The position of gold on the graph reflects the recent very marked increases in annual gold production. Even though oil production has the highest value on the graph, Australia ranks far behind the world's leading oil producers.

The other minerals featured on the graph contribute much less to the total value of mine production but are still significant. Australia is the world's largest producer of bauxite and is a leading exporter of lead, mineral sands, nickel and zinc.

The moderately high value recorded for natural gas indicates increased output since commercial production began in 1961. Diamonds are an even more recent contributor to mineral production in Australia. Since diamond mining began at Argyle in Western Australia in 1983, the mine has become the world's most productive, putting Australia at the forefront of diamond-exporting countries.

The value of mine production varies widely between the States and Territories of Australia. It also fluctuates over time, reflecting changing world markets and new mining ventures. In 1987 Western Australia accounted for 28% of Australia's ex-mine value of minerals, closely followed by Victoria contributing 26%, double its 1977 value. Gold and iron ore were the main income earners for Western Australia, and for Victoria, oil and natural gas. Queensland and New South Wales contributed 20% and 15% respectively, although New South Wales has suffered a relative decline since 1977. The major earners for these two States were black coal, copper and zinc, with significant earnings for Queensland from bauxite. The Northern Territory and South Australia each accounted for 5% of the value of mine production. The recently opened Olympic Dam mine in South Australia is expected to significantly increase that State's contribution. The major earners for the Northern Territory were manganese, bauxite and uranium. Tasmania's contribution of 1% came from tin and zinc production.

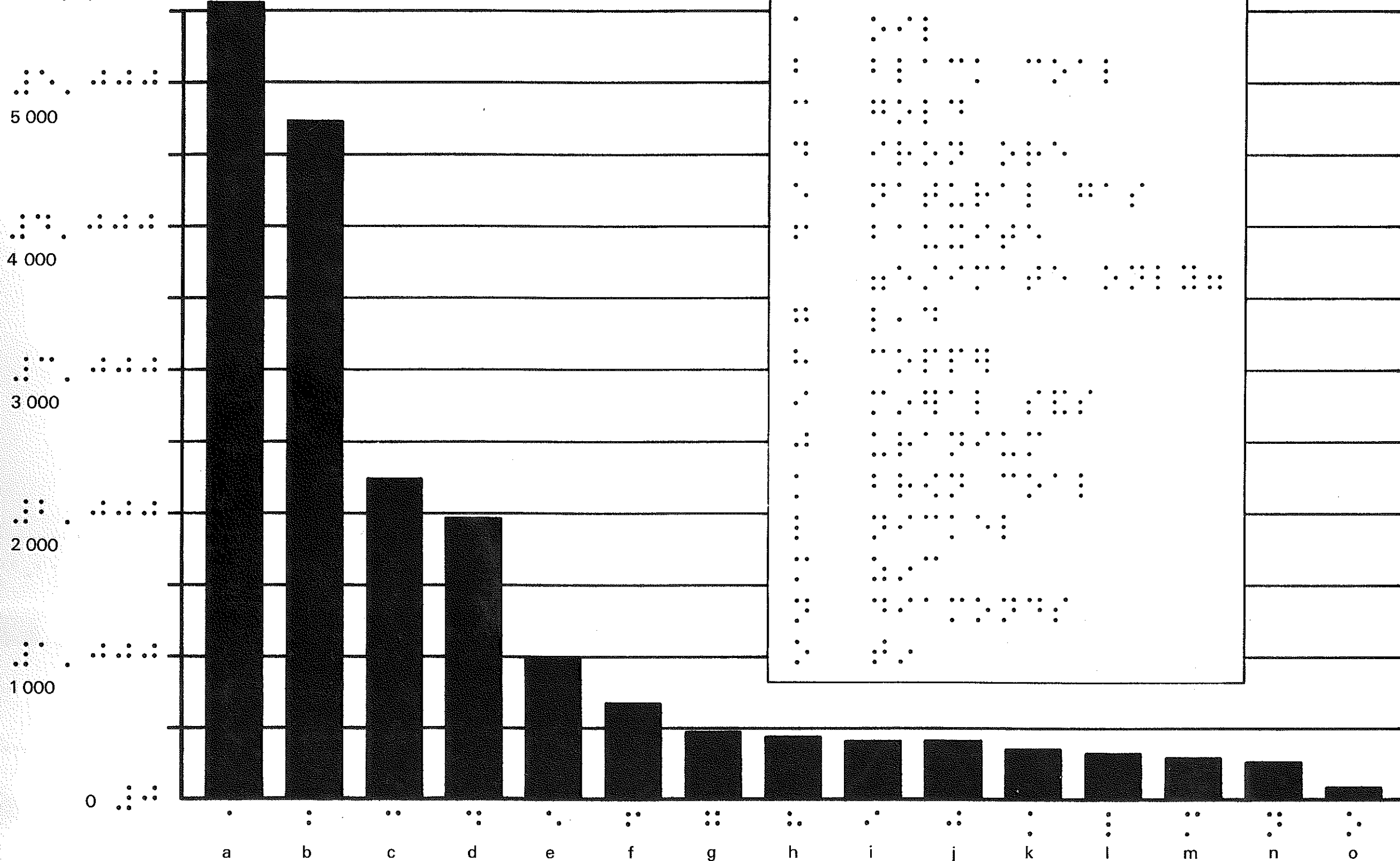
Australia's value of mine production for 1986-87 improved slightly over that recorded for the previous financial year, a year characterised by sharply depressed world prices for tin and oil. The previous 25 years had seen a steady rise, culminating in a record value of mine production for Australia in 1984-85.

Key to minerals

- a oil
- b black coal
- c gold
- d iron ore
- e natural gas
- f bauxite (estimate only)
- g lead
- h copper
- i mineral sands
- j uranium
- k brown coal
- l nickel
- m zinc
- n diamonds
- o tin

Million dollars

10 000
5 000
4 000
3 000
2 000
1 000
0



Key to Minerals

1. Gold
2. Silver
3. Copper
4. Iron
5. Lead
6. Zinc
7. Nickel
8. Cobalt
9. Manganese
10. Aluminum
11. Potassium
12. Sodium
13. Magnesium
14. Calcium
15. Barium
16. Strontium
17. Bismuth
18. Antimony
19. Arsenic
20. Tellurium
21. Selenium
22. Molybdenum
23. Vanadium
24. Chromium
25. Manganese
26. Nickel
27. Cobalt
28. Iron
29. Copper
30. Silver
31. Gold

1. Gold
2. Silver
3. Copper
4. Iron
5. Lead
6. Zinc
7. Nickel
8. Cobalt
9. Manganese
10. Aluminum
11. Potassium
12. Sodium
13. Magnesium
14. Calcium
15. Barium
16. Strontium
17. Bismuth
18. Antimony
19. Arsenic
20. Tellurium
21. Selenium
22. Molybdenum
23. Vanadium
24. Chromium
25. Manganese
26. Nickel
27. Cobalt
28. Iron
29. Copper
30. Silver
31. Gold

Australia has about 16 000 million tonnes of iron ore, some 7% of the world's known reserves. Iron ore has been mined in Australia for over a century although large-scale production did not commence until 1915, to supply the newly established Newcastle steelworks. Current output is around 100 million tonnes per year, making Australia the world's fourth largest producer of iron ore after the USSR, China and Brazil. In 1987 just over three-quarters of Australia's production was exported for \$1.7 billion, making iron ore one of its largest export earners.

The map shows some of the features of the Australian iron and steel industry. Point symbols are used to indicate the location of major iron ore deposits and mines as well as iron and steel works. Flow-lines show the movement of iron ore to overseas markets and to domestic iron and steel works, with arrowheads indicating the direction of ore movements.

Scan the whole map-sheet and read both parts of the legend on the left side of the map. The point symbols are listed in the upper part of the legend and the flow-lines in the lower. Note that export and domestic ore movements are depicted by different arrowheads.

On the map locate Yampi Sound (**ys**) on the NW coast of Western Australia. The deposit on Koolan Island in Yampi Sound is the most northerly of Western Australia's producing iron ore mines. Annual output from this mine is about 4 million tonnes; over half is exported to Asia and the rest is shipped to Australian iron and steel works on the east coast. These shipments are indicated on the map by the thin dashed line going north from Yampi Sound (**ys**), and another going south representing the coastal movement of iron ore to Newcastle (**nc**) and Port Kembla (**pk**) on the New South Wales coast.

To the SW of Yampi Sound is the Pilbara region which contains the world's largest and richest iron ore deposits. Nearly 95% of the iron ore mined in Australia comes from here. Find the symbol representing the Shay Gap-Sunrise Hill (**sg**) mines. Further to the south and SW are the giant mines at Robe River (**rr**), Mount Tom Price (**tp**), Paraburdoo (**pr**) and Newman (**nm**). Although only 3 have been mapped, more than a dozen unmined deposits - several of which are being developed - are located in the vicinity of these mines.

Around 80 million tonnes of iron ore are exported from the Pilbara region each year through three nearby ports (Dampier, Port Walcott and Port Hedland) to Asian and European markets. On the map this is indicated by the thick flow-line pointing northward. Pilbara iron ore is also shipped to Port Kembla (**pk**) and Newcastle (**nc**). This movement is shown by the thin dashed line moving away from the coast and joining the flow-line moving south from Yampi Sound. Several large undeveloped iron ore deposits to the south of the Pilbara are also shown on the map.

By comparison with Western Australia, the remainder of Australia has relatively few iron ore deposits and mines. In South Australia, the Middleback Ranges (**mr**) deposit (directly north of Eyre Peninsula) produces about 2 million tonnes of ore annually, three-quarters going to the Whyalla (**wy**) iron and steel works (located just to the SE), and the remainder going to the east coast iron and steel works. The latter ore movement is indicated on the

map by a dotted line passing out through Spencer Gulf and joining the main flow of ore (shown as a dashed line) moving from Western Australia around the southern coast to the east coast.

In Tasmania, the iron ore mined at Savage River (**sr**) in the NW is concentrated and piped as a slurry to Port Latta on the State's northern coast, where the slurry is converted into pellets. The pellets are exported to Japan (indicated by a dashed flow-line) and also shipped to the New South Wales steelworks (indicated by a dotted flow-line).

Victoria and New South Wales have no significant iron ore deposits. Queensland has two large deposits: one in the SE and the other in the NW corner of the State. In the Northern Territory there are two deposits to the south of Darwin.

Australia's three integrated iron and steel works are situated at Whyalla (**wy**), Port Kembla (**pk**) and Newcastle (**nc**). They are located close to port facilities, other service infrastructure and, except for Whyalla, to supplies of coal - a vital ingredient in steelmaking. Almost all of the steel produced is for Australian consumption and includes sheet steel, tin plate, structural steels, machinery, tubes and cold drawn products such as wire, springs and nails.

Iron ore



Mine



Major unmined deposit



Iron and steel works

Movement of iron ore (million tonnes)



80



1 - 10



0.1 - 1



Export



Domestic

List of abbreviations

mr Middleback Ranges

nc Newcastle

nm Newman

pk Port Kembla

pr Paraburdoo

rr Robe River

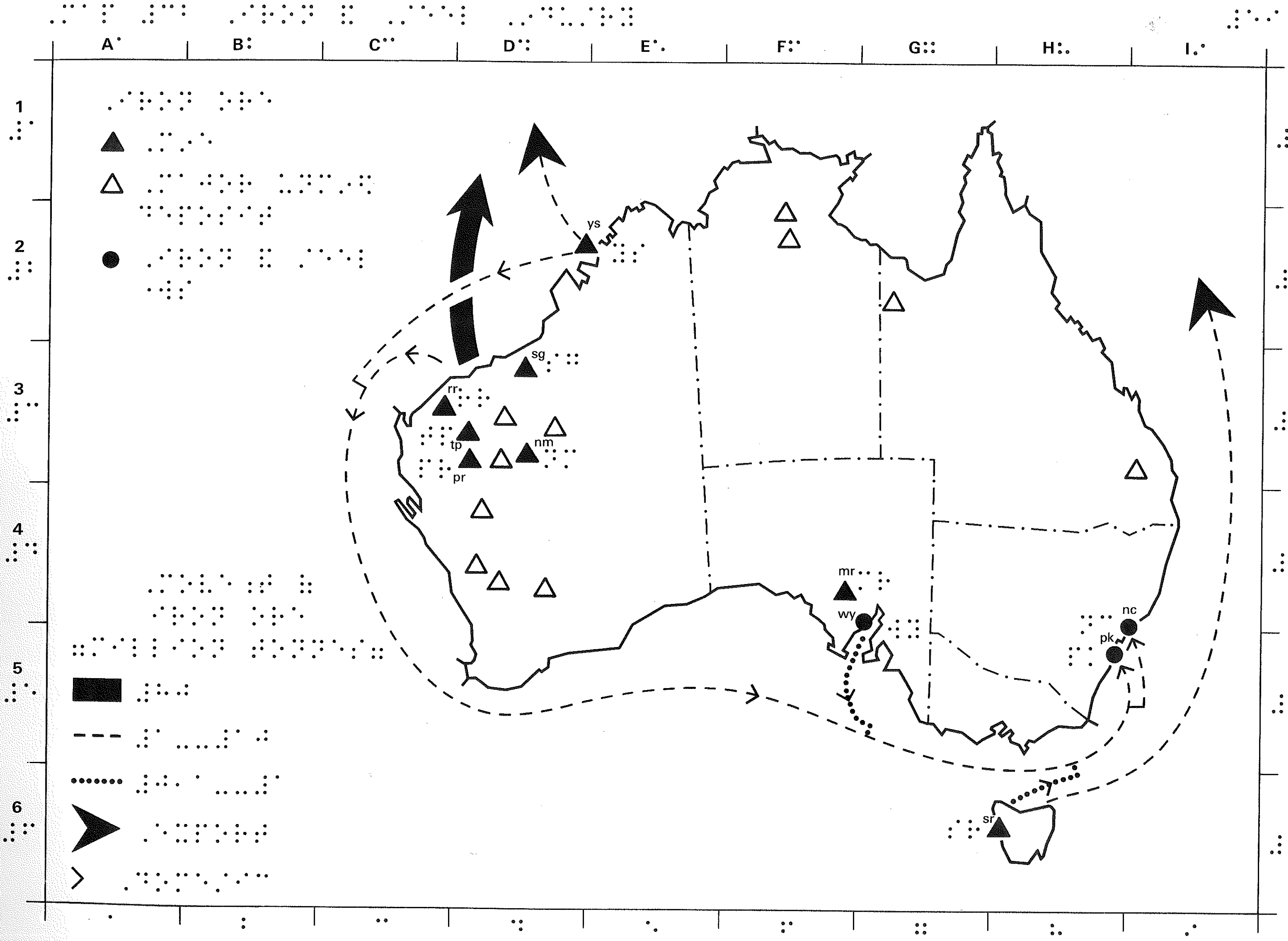
sg Shay Gap-Sunrise Hill

sr Savage River

tp Mount Tom Price

wy Whyalla

ys Yampi Sound



Since its beginning in the mid 1960s, the Australian aluminium industry has expanded rapidly. Australia is now the world's largest producer of bauxite, the largest producer and exporter of alumina, and the third largest exporter of primary aluminium.

Bauxite is a form of aluminium oxide which occurs in deeply weathered land surfaces. Bauxite deposits are mined in huge quantities at several locations throughout Australia and refined to produce alumina (pure aluminium oxide), which in turn is smelted under extremely high temperatures to extract aluminium metal.

The accompanying map shows the location of major bauxite deposits, mines and processing facilities, as well as the movement of bauxite and alumina within Australia and to overseas markets. Scan the entire map-sheet and locate the two parts of the legend on the left hand side. In the upper part of the legend the different symbols for undeveloped and mined bauxite deposits, alumina refineries and aluminium smelters are listed. In the lower part the different flow-lines distinguishing export and domestic movements of bauxite and alumina are indicated.

Bauxite

Up until the discoveries in the 1950s of major bauxite deposits at Gove (go) in the Northern Territory, Weipa (we) in north Queensland and Jarrahdale in the Darling Range (dl) area of SW Western Australia, Australia appeared to be seriously deficient in bauxite. Other large deposits were subsequently found at Mitchell Plateau (mt) and Cape Bougainville (cbv) in the NW of Western Australia, at Aurukun (au) south of Weipa, and at Del Park, Huntly, Willowdale and Mount Saddleback in the Darling Range (dl). With economic resources of over 4000 million tonnes, Australia now has approximately 20% of the world's known bauxite reserves.

Bauxite mining began at both Weipa and Jarrahdale in 1963 and at Gove in 1971. These mines, together with those in the Darling Range, account for virtually all of Australia's annual bauxite production of just over 30 million tonnes.

Study the map and locate the bauxite deposits and mines at Weipa (we), Gove (go) and in the Darling Range (dl). The Darling Range bauxite is refined at 4 nearby refineries (together also labelled dl). There are flow-lines pointing north from Weipa and Gove which denote the export of bauxite from these two areas. Note also the shipment of bauxite from Weipa around the top of Cape York Peninsula and down the east coast of Queensland to the Gladstone (gl) refinery.

Alumina

Most of Australia's major bauxite deposits occur on or near the coast. To minimise the cost of transporting large tonnages of bauxite, all 6 alumina refineries in Australia are close to deep-water ports and all but one have been built adjacent to the bauxite mines. The exception is the Gladstone (gl) refinery on Queensland's central coast, which was sited to take advantage of nearby coalfields for its power supply. This refinery, together with that at Gove (go) in the Northern Territory, and those at Kwinana, Pinjarra, Wagerup and Worsley near the Darling Range (dl) in Western Australia, consumes 85% of all Australian bauxite production.

The combined annual capacity of Australia's alumina refineries, of which Gladstone is the world's largest, is 9 million tonnes. Together they account for a quarter of all world production. The solid flow-lines from the Gove (go), Gladstone (gl) and Darling Range (dl) refineries represent a total export of more than 7 million tonnes of alumina, mainly to the USA and Europe.

The remaining alumina is consumed by the Gladstone (gl) smelter or, as indicated by the dotted flow-lines, shipped to the various aluminium smelters in the SE of Australia. Alumina from the Darling Range (dl) refineries is shipped to the Portland (pd) and Point Henry (py) smelters in Victoria. The Gladstone refinery supplies alumina to the Gladstone smelter, and to the Tomago (tm) and Kurri Kurri (kk) smelters on the central coast of New South Wales, and also to the Bell Bay (bb) smelter in northern Tasmania.

Aluminium

As the smelting of aluminium uses large amounts of electricity, smelters have been built close to major power stations associated with the coalfields in Victoria, New South Wales and Queensland. In Tasmania the Bell Bay (bb) smelter draws on the State's plentiful hydro-electricity. Australia's 6 smelters annually produce just over 1 million tonnes of primary aluminium, of which around 70% is exported.

The principal consumers of primary aluminium in Australia are the semi-fabricating facilities for rolling, extrusion and foil production, which are situated mainly in the larger capital cities.

Mining and processing

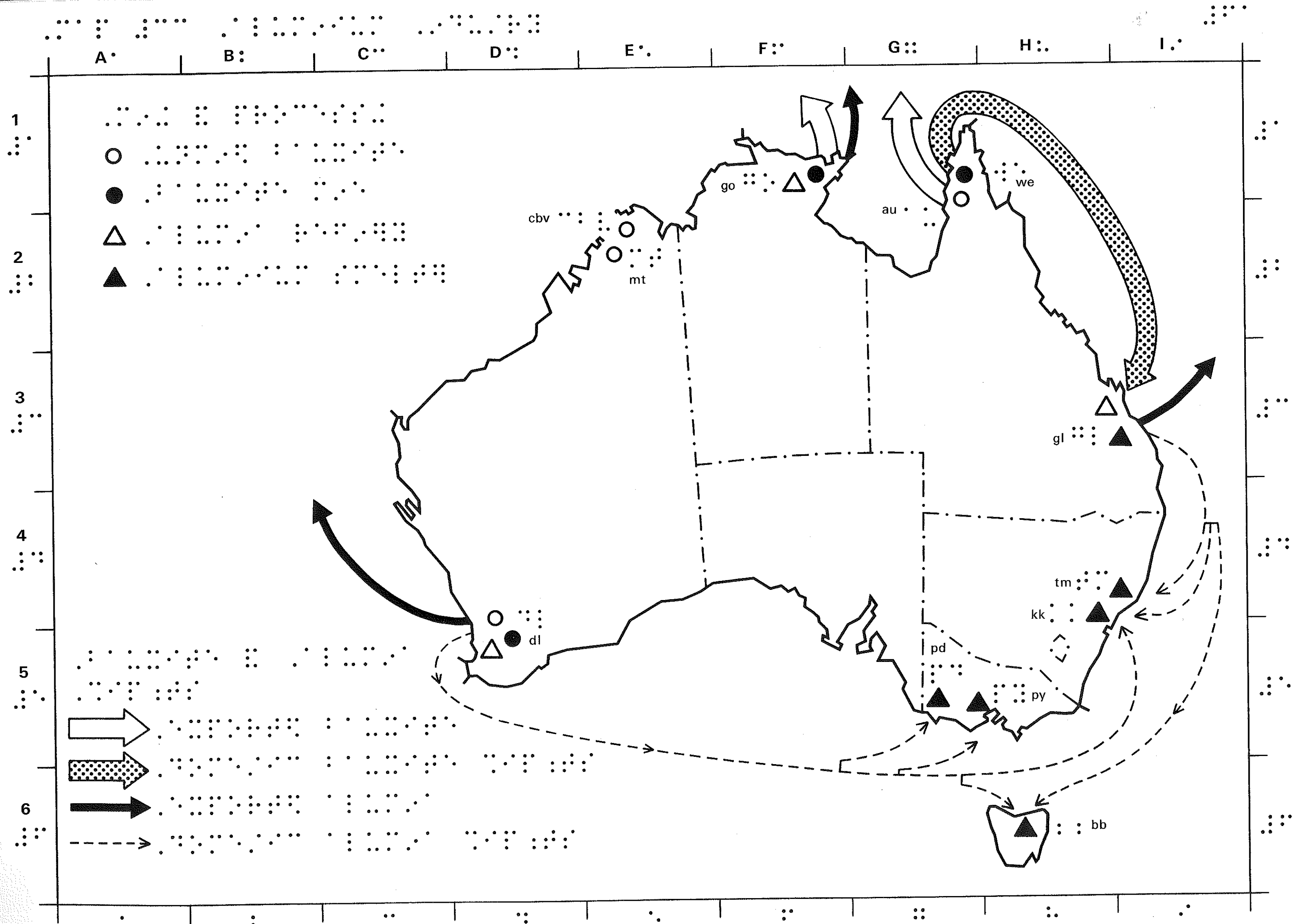
- Unmined bauxite
- Bauxite mine
- △ Alumina refinery
- ▲ Aluminium smelter

Bauxite and Alumina Shipments

- Exported bauxite
- Dotted bauxite shipments
- Exported alumina
- → Domestic alumina shipments

List of abbreviations

- au Aurukun
- bb Bell Bay
- cbv Cape Bougainville
- dl Darling Range
- gl Gladstone
- go Gove
- kk Kurri Kurri
- mt Mitchell Plateau
- pd Portland
- py Point Henry
- tm Tomago
- we Weipa



These four minerals are historically known as the 'base metal' group. They are abundant in comparison with the precious and rare metals such as gold and platinum. Copper, lead and zinc often occur together within an orebody, while most tin deposits in Australia are mined separately. The base metals are common alloy minerals which are used in a wide range of industrial processes and metal products. The major use of copper is in the electrical industry, while lead is primarily used in batteries and in alloys. Zinc is used for galvanising, and tin for plating, solder and chemicals.

The map shows the location of major mined deposits and treatment plants in Australia. The legend is in two parts in the upper and lower left of the map-sheet. Different symbols have been used to distinguish the minerals, while treatment plants are indicated by filled-in symbols. Base metal deposits are widely distributed throughout Australia, but the major mines are still those working large high-grade deposits such as those at Mount Isa and Broken Hill. There are currently only three large-scale tin mines in operation.

Copper

Australia began mining copper in the mid 19th century in South Australia and rapidly became one of the world's largest producers. Today, the nation ranks tenth but accounts for only 3% of world mine production. In 1923 large high-grade copper resources were discovered adjacent to the lead-zinc lodes at Mount Isa (mi) in NW Queensland, but full-scale production did not begin there until 1953. The copper ore is concentrated and smelted on site and the resultant 'blister' copper is railed east to Australia's largest copper refinery at Townsville (tv) on the Queensland coast. About half of the refined copper is exported.

Mount Isa now produces about two-thirds of Australia's annual mine output of around 250 000 tonnes of copper. Much of the remaining third is produced elsewhere as a by-product from the processing of other minerals.

Copper is an important by-product of lead-zinc-silver mining at Broken Hill (bh) in far western New South Wales. It is treated at the small copper refinery at Port Pirie (pp) in South Australia.

Copper is mined at Cobar (ce) in the north of New South Wales and is a by-product of lead-zinc mining at nearby Elura (ce). At Woodlawn (wd), in the SE of the State, lead-zinc mining also produces some copper concentrates which are railed to Port Kembla (pk), south of Sydney, for smelting and refining, as are Cobar copper concentrates.

It is also produced as a by-product of lead-zinc mining at the Rosebery and Que River mines on Tasmania's west coast (wc) and, together with copper concentrates from the nearby Mount Lyell copper mine at Queenstown, is exported to Japan.

In South Australia a massive new venture exploiting a rich copper-uranium-gold-silver deposit at Olympic Dam (od), in the centre of the State, commenced operation during 1988. The copper is treated on site at a newly completed smelter and refinery. In addition to the mine development, an adjacent town with all essential services has been constructed for 3500 people.

Copper is recovered as a by-product from nickel mining at Kambalda (km), near Kalgoorlie, in southern Western Australia.

In the Tennant Creek (tc) area in the centre of the Northern Territory, once large and prosperous copper-gold mining operations continue to produce reduced quantities of copper concentrate, mostly for overseas consumption, though some output is sent to South Australia for use in fertiliser manufacture.

Lead and Zinc

From 1953 the huge mining complex at Mount Isa (mi) in NW Queensland took over from Broken Hill (bh) in western New South Wales as the world's largest producer of lead and zinc (and silver), a position which it still retains. This has helped Australia become the world's second largest mine producer of lead and the third largest of zinc. Most of the lead concentrate is converted to bullion at the Mount Isa lead smelter. The bullion and unprocessed concentrates are railed to Townsville (tv) for shipment overseas. Zinc concentrates are also railed to Townsville, mostly for export but also for treatment by the zinc refinery at Risdon (rs) in SE Tasmania.

Originally established in 1916 to process zinc-rich ores from Tasmania's west coast (wc), the Risdon (rs) zinc refinery near Hobart is now Australia's largest, and the second largest in the world. It has an annual production capacity of 214 000 tonnes of high-grade electrolytic zinc, and today treats zinc concentrates from most Australian lead-zinc mines.

Lead concentrates from mines at Que River, Hellyer and Rosebery on Tasmania's west coast (wc) are exported to Japan.

The Broken Hill (bh) lead-zinc orebody in western New South Wales, reputed to be the richest the world has ever known, and the Mount Isa (mi) mine in NW Queensland together account for 75% of lead and 50% of zinc output in Australia today. Elsewhere in New South Wales, lead and zinc are mined at Cobar and nearby Elura (ce) in the north, and at Woodlawn (wd) in the SE.

Lead concentrates from various mines in New South Wales are smelted at Cockle Creek (cc) on the central coast and exported as bullion through the nearby port of Newcastle. Lead concentrates are also shipped overseas through Newcastle. Most of the zinc concentrates are exported and the rest are sent to either Cockle Creek (cc) or Risdon (rs) for refining. Almost all lead and zinc concentrates from Broken Hill (bh), in western New South Wales, are railed to Port Pirie (pp) in South Australia where the lead is smelted and refined. The zinc concentrates are through-shipped to the zinc refinery at Risdon (rs) in Tasmania. A small zinc refinery at Port Pirie recovers zinc from stockpiled and lead-smelter slag.

In the far north of Western Australia the new Cadjebut (ct) lead-zinc mine began production in 1987. The lead concentrates are treated at Port Pirie and the zinc concentrates are exported to Japan and Korea.

The Woodcutters (wt) lead-zinc mine just south of Darwin in the Northern Territory produces concentrates for export.

Tin

Tin mining in Queensland accounts for around 8% of Australian production and is centred on the Herberton (hn) area in the NE of the State. Most production from this area is exported.

Mined deposit

○ Copper

□ Lead

△ Zinc

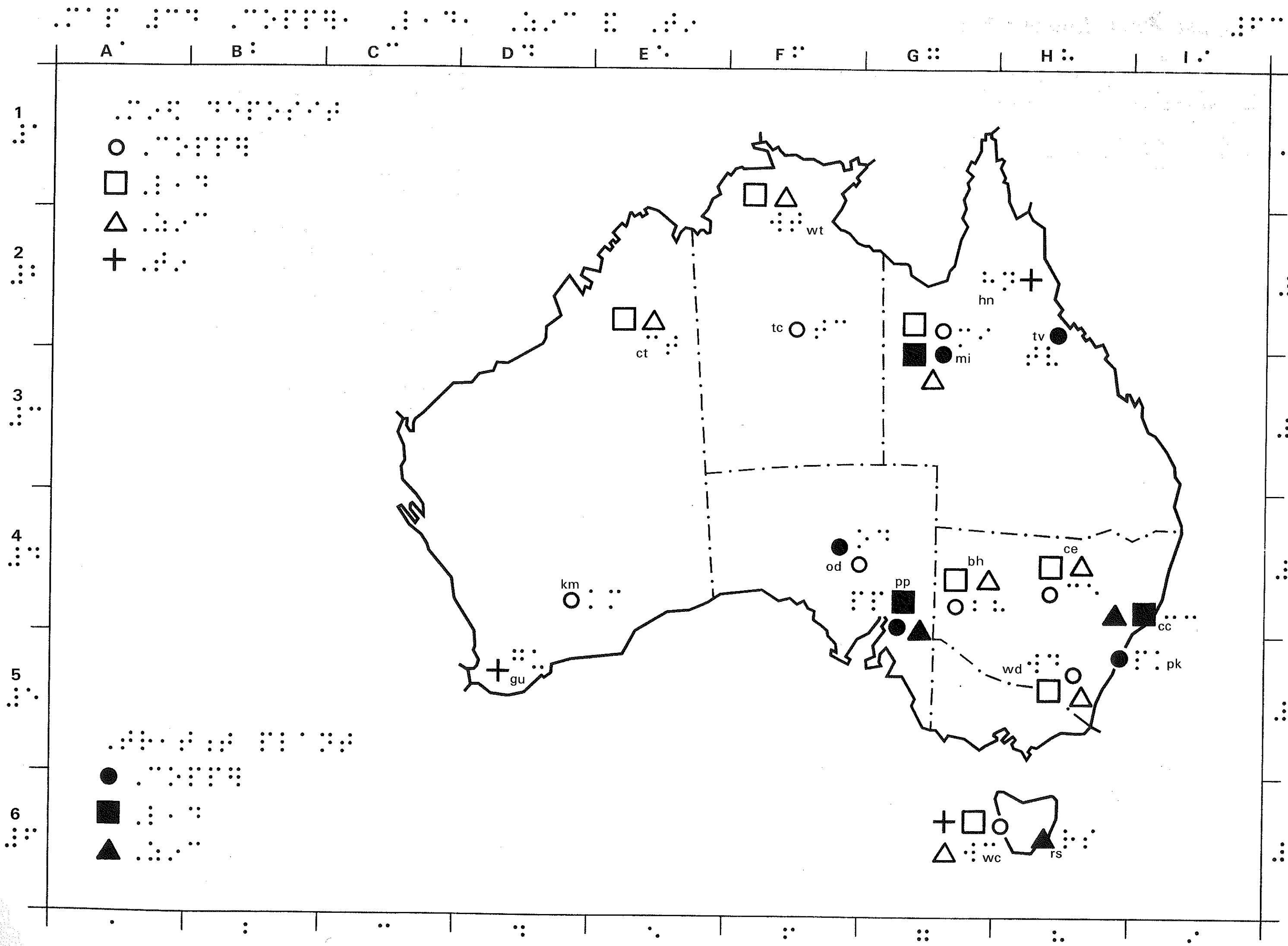
✚ Tin

Treatment plant

● Copper

■ Lead

▲ Zinc



Renison, on Tasmania's west coast (**wc**), is one of the world's largest underground tin mines. It produces about 85% of Australia's annual output of tin, all of which is exported as concentrate.

Virtually all tin produced in Western Australia is from the Greenbushes (**gu**) mine in the extreme SW of the State. The tin concentrate is smelted and refined on site for both the local and export market.

List of abbreviations

bh	Broken Hill	copper, lead, zinc
cc	Cockle Creek	lead, zinc
ce	Cobar-Elura	copper, lead, zinc
ct	Cadjebut	lead, zinc
gu	Greenbushes	tin
hn	Herberton	tin
km	Kambalda	copper
mi	Mount Isa	copper, lead, zinc
od	Olympic Dam	copper
pk	Port Kembla	copper
pp	Port Pirie	copper, lead, zinc
rs	Risdon	zinc
tc	Tennant Creek	copper
tv	Townsville	copper
wc	West Coast (Tas)	copper, lead, zinc, tin
wd	Woodlawn	copper, lead, zinc
wt	Woodcutters	lead, zinc

Australia is well endowed with good quality, easily worked deposits of coal. It is the nation's largest source of primary energy, accounting for around 70% of all identified, economically recoverable energy reserves, and sufficient for hundreds of years at current extraction rates. Black coal was first mined in New South Wales in the early 1800s and soon developed into a major sector of the Australian mineral industry.

The last two decades have seen a spectacular increase in the growth of the Australian black coal industry, due principally to increased world demand for coal, for steel production and electricity generation. In 1987 Australian exports exceeded 100 million tonnes for the first time, more than double the 45 million tonnes consumed domestically. About three-quarters of all black coal consumed in Australia goes into thermal power stations for electricity generation. All but 5% of the remainder is used in smelting and refining - largely alumina, aluminium, and iron and steel processing.

Australia is the leading world exporter of coal, supplying about a third of internationally traded coal. Black coal resources in Australia amount to only about 6% of the known world total, but in terms of annual production (around 145 million tonnes) Australia ranks seventh. Black coal now accounts for nearly a quarter of the value of all minerals produced in Australia. In recent years it has been Australia's largest single export earner, with Japan consuming nearly half of all coal exported. Most of the remainder is shipped to other Asian destinations and Europe.

The map shows the location of major black and brown coal deposits and the principal movements of coal by rail and sea transport. Scan the whole map-sheet and examine the two parts of the legend on the upper and lower left side. Different patterns are used to distinguish the black and brown coal producing areas, while distinctive lines indicate the rail and sea movements of coal.

Australia's black coal resources are concentrated on the eastern side of the continent in New South Wales and Queensland, with smaller deposits mined in South Australia, Tasmania and Western Australia. A massive brown coal deposit is mined in Victoria.

Over 85% of the demonstrated economic resources of black coal are in Queensland and New South Wales, which together account for 96% of Australian production. The coal is largely bituminous and can generally be used for either coke-making or steam generation. The largest and economically most important deposits occur in two sedimentary basins fringing eastern Australia - the Bowen Basin (**bb**) in Queensland and the Sydney Basin (**sb**) in New South Wales.

The bulk of Queensland's production comes from huge, opencut mines in the Bowen Basin. Primarily coking coals of low to medium volatility are mined for export, but steaming coal such as that from Blair Athol (**ba**) just to the west of the Bowen Basin has increased in importance and now accounts for about a third of Queensland's exports.

Lesser quantities of steaming coal are mined from smaller basins at Callide (**cd**), Tarong (**ta**) and Ipswich (**ip**) mainly for use by nearby thermal power stations. The development of the enormous Bowen Basin coal fields in thinly populated central Queensland has required huge capital investment, particularly in rail construction, with hundreds of kilometres of new line built between the mines and export ports.

On the map, note the movement of coal by rail from the Bowen Basin region to the coast and the flow-lines indicating export through the ports of Abbot Point (**ap**), Hay Point (**hp**) and Gladstone (**gl**). Letters denoting the ports are shown at the seaward end of the flow-lines.

The map also shows the movement of Bowen Basin coal by rail west to Mount Isa (**mi**), where it is used for electricity generation and as coke to fuel the copper and lead smelters. Coal from the Ipswich (**ip**) area is exported through Brisbane (**B**).

In contrast to Queensland, almost 60% of the black coal produced in New South Wales comes from underground mines. Virtually all the coal is extracted from the Sydney Basin (**sb**) and well over half - predominantly steaming coal - is exported. The remainder is consumed domestically: for electricity generation, as coke for the steelworks and by local industry.

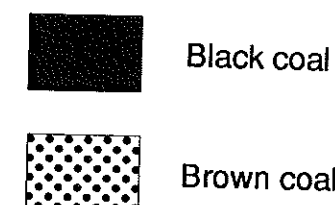
Flow-lines on the map show the export of Sydney Basin coal through the ports of Newcastle (**nc**), Sydney (**S**) and Port Kembla (**pk**). In addition, a flow-line from Port Kembla shows the shipment of coking coal south and then west through Bass Strait to the steelworks at Whyalla (**wy**), on the western side of Spencer Gulf in South Australia.

Steaming coal is also mined at Fingal (**fi**) in Tasmania, Leigh Creek (**lc**) in South Australia and Collie (**co**) in Western Australia.

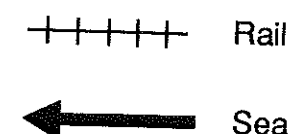
In Tasmania, coal from Fingal is railed north to Railton (**rn**), where it is used in the manufacture of cement, and south to Boyer (**br**) for use in paper manufacture. In South Australia, Leigh Creek coal is railed to Port Augusta (**pa**) for use in power generation. In Western Australia, Collie coal is used locally for power generation and also railed to Kwinana (**kw**) for industrial use and power generation.

Australia's known resources of brown coal are also very large. The major economic deposits and mines are concentrated in the Latrobe Valley (**lv**) in eastern Victoria, which is the only brown coal-producing area shown on the map. The utilisation of raw brown coal depends on large scale, low-cost mining and negligible transport (because of cost and the volatility of the coal). In the Latrobe Valley a high degree of sophistication has been reached in coal extraction, on-site electric power generation (the major use), briquette production and char manufacture. The annual output of around 35 million tonnes represents almost all of Victoria's brown coal production.

Major producing areas

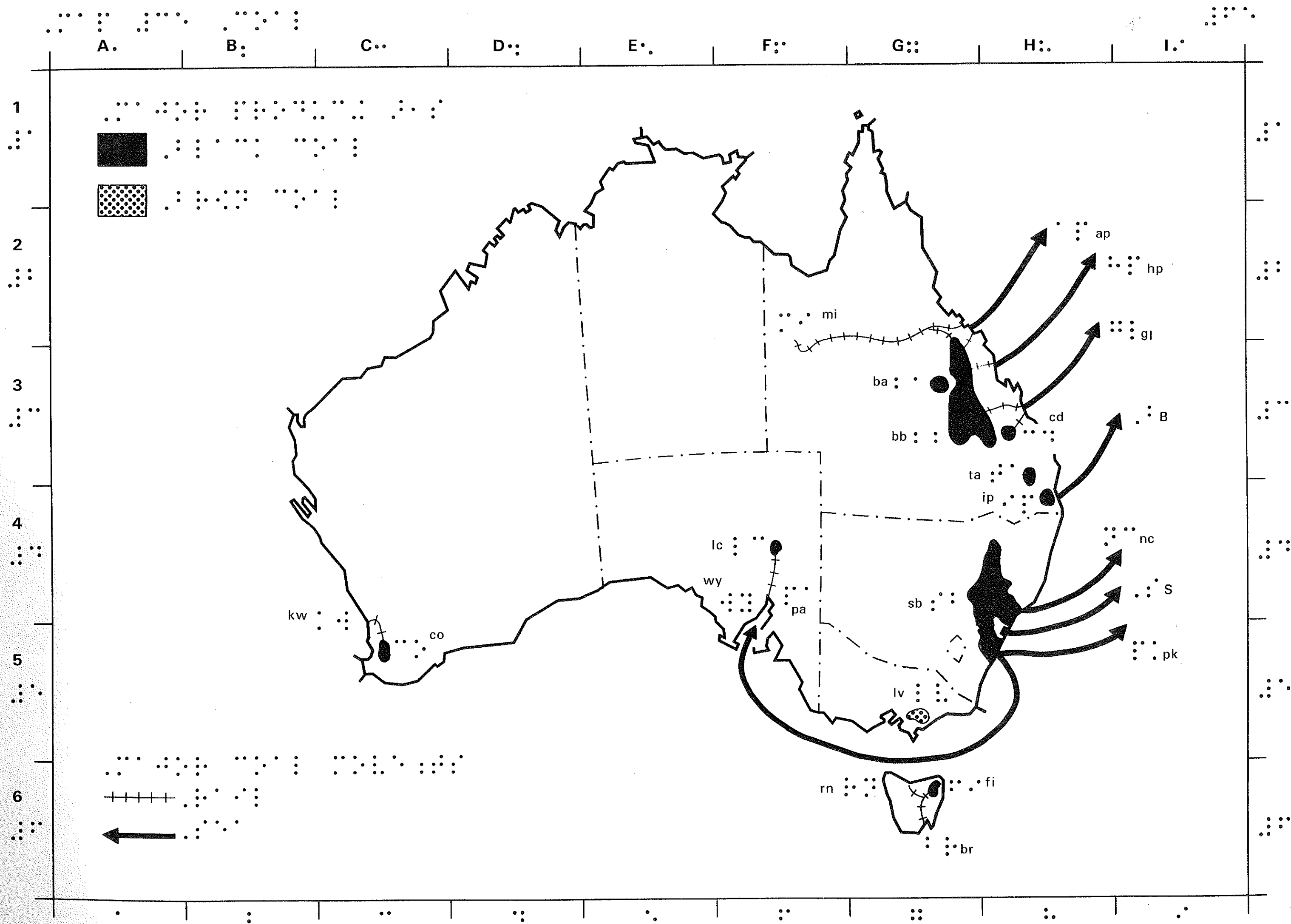


Major coal movements



List of abbreviations

ap	Abbot Point
B	Brisbane
ba	Blair Athol
bb	Bowen Basin
br	Boyer
cd	Callide
co	Collie
fi	Fingal
gl	Gladstone
hp	Hay Point
ip	Ipswich
kw	Kwinana
lc	Leigh Creek
lv	Latrobe Valley
mi	Mount Isa
nc	Newcastle
pa	Port Augusta
pk	Port Kembla
rn	Railton
S	Sydney
sb	Sydney Basin
ta	Tarong
wy	Whyalla



For a long time Australia's main mineral deficiency was indigenous petroleum, particularly crude oil. This deficiency was substantially overcome in the 1960s with the discovery of important reserves of both oil and natural gas. Australia now manages to meet about 90% of its overall petroleum product needs. Light crude oil requirements for automotive consumption are largely met by domestic output, and self-sufficiency in natural gas seems assured for several decades. However, the production of light crude is expected to fall significantly during the early 1990s. Unless new discoveries are made, imports will rise again. The heavy crude oils required for fuel oil and lubricating feedstock have always been fully imported.

Examine the map and locate the legend on the left side of the page. Note the symbols used to depict oil and gas fields, treatment plants and pipelines.

Before 1965 Australia depended almost entirely on imports of crude oil and petroleum products. Natural gas exploitation had not begun except for a short-lived attempt in 1906 to gas-light the streets of Roma in SW Queensland. Then, encouraged by government subsidies between 1958 and 1974, exploration during the 1960s resulted in the discovery and development of commercially viable oil and gas fields in Australia.

The Roma gas fields were linked to Brisbane (B) by pipeline in 1969. On the map locate Roma (rm) to the NW of Brisbane and follow the pipeline SE to the coast. Note also that a pipeline is shown heading NE from Roma to Gladstone (gl). This pipeline is currently under construction and will supply natural gas for domestic and industrial use in the Gladstone area.

Oil from Australia's first commercial oil field, at Moonie (mn) in southern Queensland, began flowing to Brisbane by pipeline in 1964. On the map Moonie is shown directly west of Brisbane and connected to it by an oil pipeline. Further west, a significant oil find at Jackson (jk) commenced production in 1981 and augmented the Moonie-Brisbane oil supply when a connecting pipeline from Jackson to Moonie was completed in 1984.

Australia's most important oil and gas discoveries were made in Bass Strait (bs) off the Victorian coast in 1964. Since then, the bulk of the country's crude oil has been produced from Bass Strait fields which today provide 80% of crude oil needs. Gas has been supplied to Melbourne (M) since 1969 from the plentiful Bass Strait gas supplies. Gas and oil from the 12 offshore platforms is carried by pipeline to Longford (lf). Here the gas is processed, while the oil is simply stabilised. Currently, an estimated 50 000 tonnes of crude oil and 15 million cubic metres of natural gas are piped ashore each day to Longford.

Dry natural gas from the Longford plant is distributed to homes and industry in central Victoria via an extensive pipeline network that can be traced on the map.

Ethane and liquefied petroleum gas (LPG) removed from natural gas at Longford are piped to the Long Island Point (li) fractionation plant on Western Port Bay for separation into propane, butane and ethane. Crude oil and condensate are also sent by pipeline from Longford to Long Island Point and then piped to the nearby Geelong and Altona (ga) refineries or shipped to interstate refineries or export markets. Most of the propane and butane is

exported to Japan while the ethane is sent to the Altona petrochemical complex by a submarine pipeline across Port Phillip Bay.

In the early 1960s substantial gas reserves were discovered at Moomba (mo) in the NE of South Australia. Since then a gas processing plant has been established there and pipelines constructed to supply gas from the Moomba area to Adelaide, Sydney, Canberra, Wollongong, Newcastle and other centres. Note the pipeline running SE from Moomba to Sydney (S) and the associated network serving other centres.

Moomba is also Australia's second largest producer of petroleum liquids. Oil and gas liquids are piped south to a fractionation plant at Port Bonython (pb), where LPG is separated from the crude oil and condensate. The crude oil is shipped to the Port Stanvac (ps) refinery just to the south of Adelaide (A), and to interstate refineries.

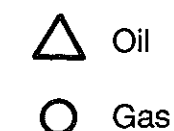
Western Australia began petroleum production in 1967 when oil was shipped from Barrow Island (bi), off the west coast, down to the Kwinana (kw) refinery just south of Perth (P). Gas was piped from the Dongara (dg) field to Perth, a short distance to the south, two years later. In 1971 huge reserves of natural gas were discovered along the North West Shelf (ns), located off the NW coast of Western Australia. Technical difficulties in developing offshore resources in deep water delayed production until 1984. Gas is now delivered along a 1600 kilometre pipeline to Perth from the Withnell Bay (wb) gas processing plant, which is located on the coast close to the North West Shelf. The second phase of the massive North West Shelf Project - in total the largest single resource development in Australia's history - came on stream at Withnell Bay in late 1989 with exports of liquefied natural gas to Japan.

In the north of Western Australia, NE of Withnell Bay, crude oil is produced from the small Blina (bl) field and several nearby fields.

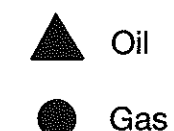
Substantial reserves of natural gas in central Australia were proved during the mid 1960s but the remoteness of the area delayed development until 1984 when the Palm Valley (pv) field began supplying gas by pipeline to Alice Springs (as). In 1987 gas began flowing to Darwin (D) along a newly constructed 1500 kilometre pipeline from both the Palm Valley and Mereenie (me) fields; Mereenie also pipes oil to Alice Springs for processing.

There have recently been several important petroleum developments. Australia's most distant offshore oil field of Jabiru (ju) - 600 kilometres west of Darwin - began producing and exporting oil in 1986. Production has recently commenced from the nearby Challis (ch) oil field.

Operating Field



Treatment Plant

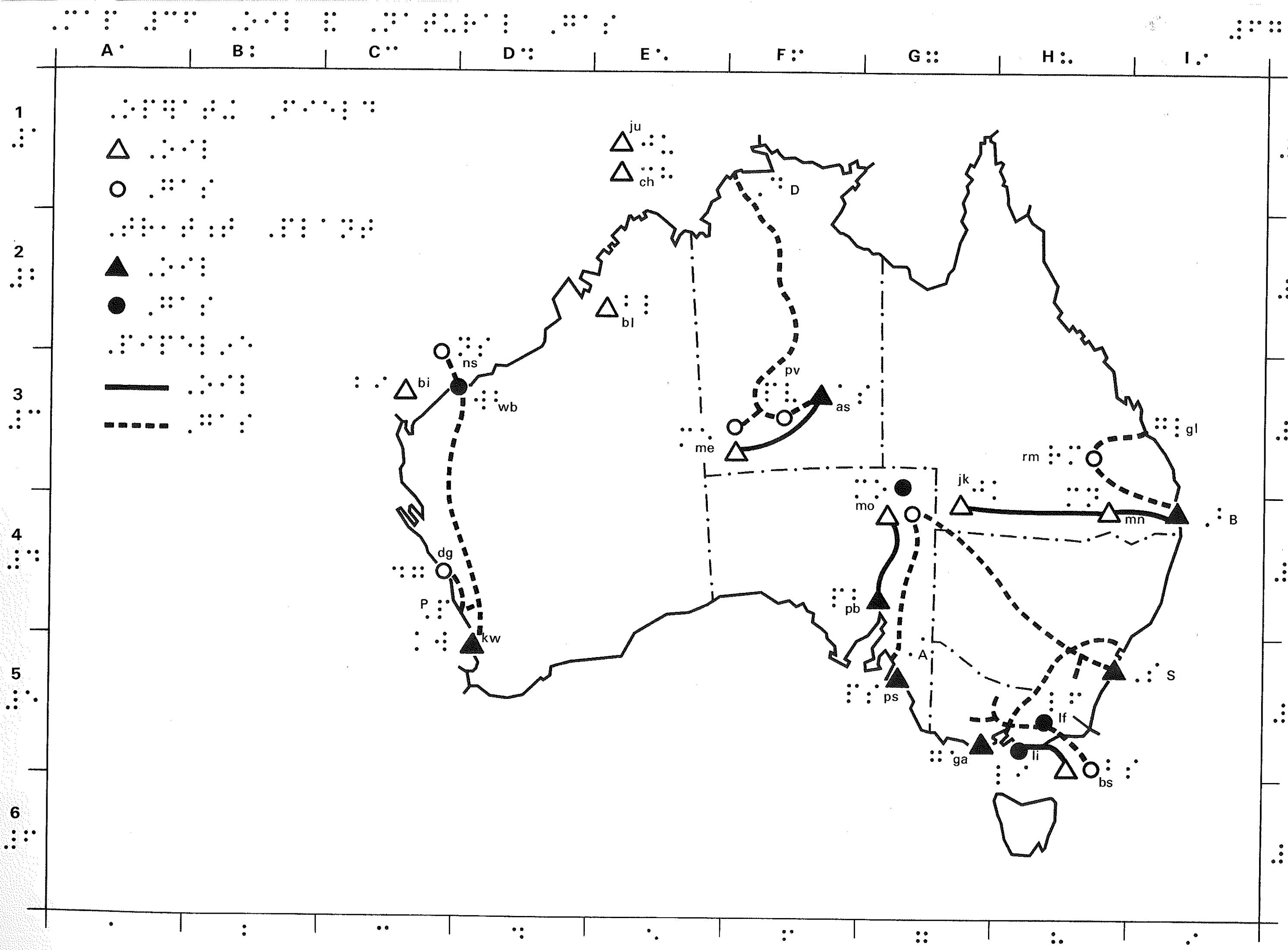


Pipeline



List of abbreviations

A	Adelaide	lf	Longford
as	Alice Springs	li	Long Island Point
B	Brisbane	me	Mereenie
bi	Barrow Island	mn	Moonie
bl	Blina	mo	Moomba
bs	Bass Strait	ns	North West Shelf
ch	Challis	P	Perth
D	Darwin	pb	Port Bonython
dg	Dongara	ps	Port Stanvac
ga	Geelong-Altona	pv	Palm Valley
gl	Gladstone	rm	Roma
jk	Jackson	S	Sydney
ju	Jabiru	wb	Withnell Bay
kw	Kwinana		



Electricity is essential for the smooth running of a modern society. It is available at the flick of a switch, but little thought is usually given to the processes underlying the provision of this service. The electricity supply industry in Australia employs a large number of people and is supported by a complex infrastructure which extends throughout much of the country.

The three main stages involved in the supply of electricity are generation, transmission and distribution. Generation is the process of converting various forms of energy into electricity. There are two main methods of large-scale electricity production in Australia. These are the conversion of the heat content of fossil fuel (thermal generation) or of the energy of falling water (hydro-electric generation) into electricity. Transmission is the transfer of electricity at high voltages to bulk supply centres, while distribution is the delivery of low voltage electricity to consumers. Electricity is measured in megawatts (MW). One megawatt equals one million watts.

Almost 80% of Australia's total generating capacity of nearly 35 000 MW is thermal. This reflects the country's heavy reliance on fossil fuels for electricity generation, and the general lack of high rainfall and extensive areas of strong topographic relief necessary for hydro-electric generation.

Many small towns, mines, mining settlements and individual rural properties in vast areas of Australia are not reached by the distribution grids. Instead, they have their own generating plants which usually burn diesel fuel, although some employ solar panels and wind power.

The map shows the location and type of the largest generating stations and the extent of electricity distribution. Read the legend, which is in two parts on the left hand side of the page. The power stations are distinguished according to their type (thermal or hydro-electric) and size (2 classes). On the map, examine the extent of the areas covered by each State's electricity networks.

The electricity industry in Australia is mainly organised by public authorities in each State. The Commonwealth Government has some input, controlling the huge Snowy Mountains Hydro-electric Scheme (sm) in south-eastern Australia. Each State maintains a separate electricity transmission network, and while there is presently little exchange of power, Victoria and South Australia have established an interstate link.

Hydro-electric Generation

For the reasons already mentioned, hydro-electric generation is a relatively minor component of the Australian electricity industry. It is estimated that existing hydro-electric generators already account for around 60% of the overall potential for hydro-electric generation in Australia.

The major hydro-electric stations on the mainland are in the Snowy Mountains and Wivenhoe schemes. They mainly provide electricity for periods of peak demand, unlike the thermal base-load stations which provide continuous bulk electricity to consumers. Only in Tasmania is hydro-electricity the main power source.

The major exception to the non-sharing of bulk electricity between the States involves power from the Snowy Mountains Scheme. New South Wales, Victoria and the Australian Capital Territory all share in the electricity generated by the 7 hydro-electric stations in the Scheme.

The solid circle denoting hydro-electricity generation in excess of 1000 MW from the Snowy Mountains Scheme (sm) can be located in the extreme SE of New South Wales. The other significant hydro-electric plants (300 to 1000 MW) shown on the map are Wivenhoe (wl) just to the NW of Brisbane, and those in the Central Plateau (cp) and the Gordon River (gr) schemes in Tasmania.

Thermal Generation

The dominance of thermal power stations on mainland Australia is due to the availability of abundant fossil fuel resources. Most major generating stations are located near large concentrations of population and industry to reduce transmission costs. In addition, the expense of transporting fossil fuels, especially coal, dictates that power stations also be sited as closely as possible to fuel reserves.

Victoria's electricity generation is centred around the huge brown coal resources of the Latrobe Valley (lv), which is located just to the east of Melbourne (M). The solid square symbol here represents three very large base-load stations and two smaller stations which have a combined generating capacity of 5255 MW. The 300-1000 MW symbol at Melbourne (M) covers the Newport power station which is now only used as a reserve station.

In New South Wales, the major thermal generating stations are located near Newcastle (nc) on the central coast, in the Hunter Valley (hv) immediately to the NW of Newcastle and at Wallerawang (wa) to the west of Sydney. All are situated on the extensive Sydney coal basin and lie close to the State's major population and industrial concentrations. There are two large base-load stations in the Hunter Valley and three others just to the south of Newcastle. Two of these stations, Eraring near Newcastle and Bayswater in the Hunter Valley, are Australia's largest, each having a capacity of 2640 MW.

Queensland's major thermal generating stations are located at Tarong (ta) to the NW of Brisbane (B), and at Gladstone (gl) on the coast north of Brisbane. A third large generating station is under construction at Stanwell near Rockhampton (rk), just to the NW of Gladstone. Smaller stations are situated near Ipswich (ip) on the western outskirts of Brisbane, and at Callide (cd) immediately SW of Gladstone.

In South Australia the major thermal generating stations are located at Torrens Island in Adelaide (A), and near Port Augusta (pa), to the NW.

Western Australia's principal thermal generating station is at Muja near Collie (co) in the far SW of the State. The next largest station is at Kwinana (kw) just south of Perth (P).

The power station for Darwin (D) is Channel Island, which was commissioned in 1987. It is fuelled by natural gas piped

Thermal Generating Stations

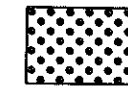
■ More than 1000 megawatts

□ 300 - 1000 megawatts

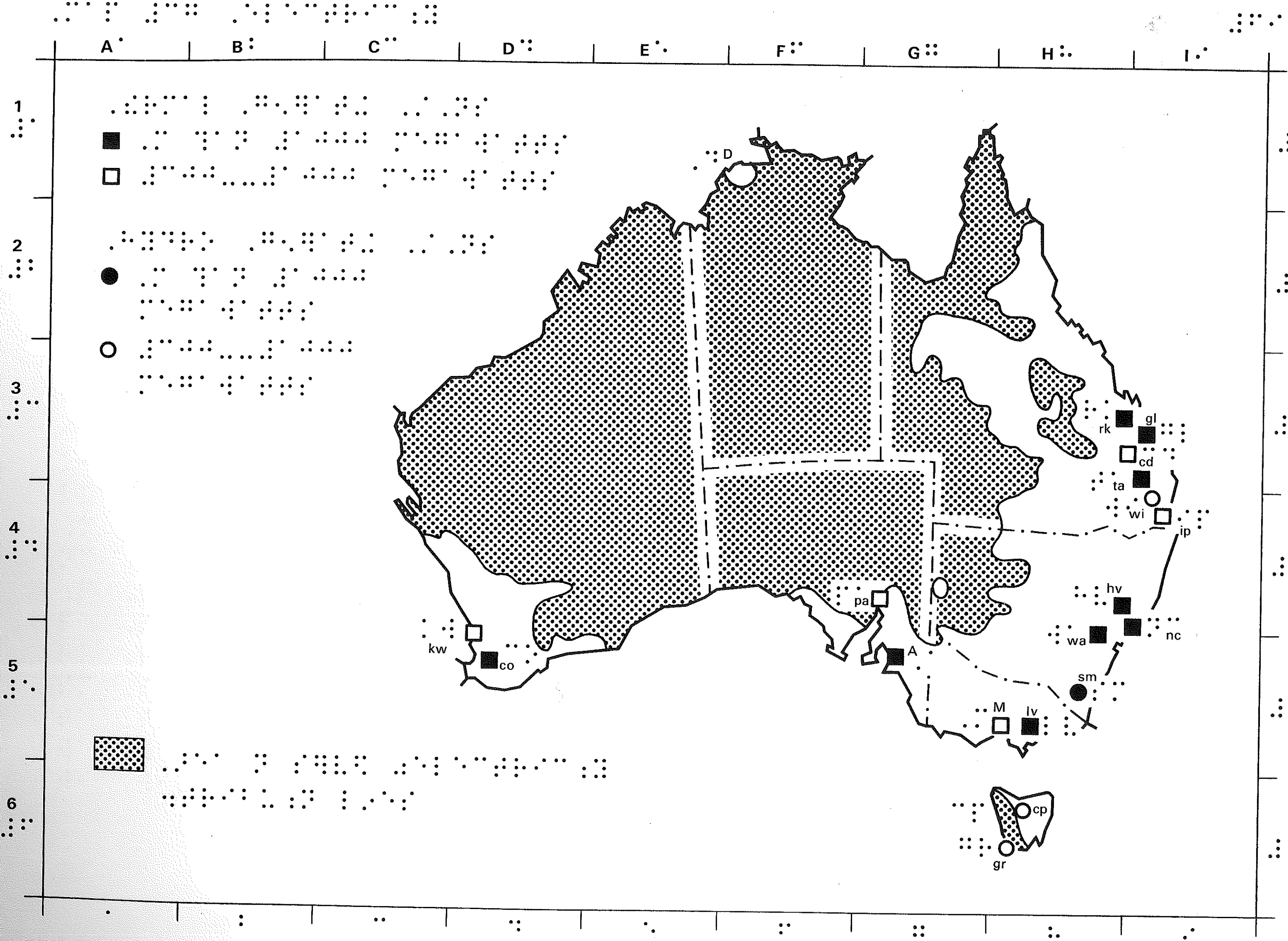
Hydro Generating Stations

● More than 1000 megawatts

○ 300 - 1000 megawatts



Area not served by electricity distribution lines



northwards along a 1500 kilometre pipeline from the Palm Valley and Mereenie gas fields in central Australia.

Overall, the demand for electricity in Australia is rising as population and industry expand. Additional thermal and hydro-electric power stations are already being planned for most States. It may even become necessary and cost-effective in the future to provide for major inter-connections between the eastern States' systems over and above the few links now in operation.

List of abbreviations

- A Adelaide
- cd Callide
- co Collie
- cp Central Plateau
- D Darwin
- gl Gladstone
- gr Gordon River
- hv Hunter Valley
- lp Ipswich
- kw Kwinana
- lv Latrobe Valley
- M Melbourne
- nc Newcastle
- pa Port Augusta
- rk Rockhampton
- sm Snowy Mountains
- ta Tarong
- wa Wallerawang
- wl Wivenhoe

SECTION F

Transport

The establishment of a well developed, integrated transport sector has been essential to Australia's development.

Before roads and railways linked the various colonial settlements, regional ports provided a vital transport and communication network. Today, major ports are engaged in importing and exporting vast quantities of raw materials and manufactured goods. While many smaller ports have now ceased to operate, new special-purpose ports have been built, often in remote areas.

In the early colonial period, roads were the first form, albeit notoriously poor, of overland transportation in Australia. Over time they influenced the patterns of settlement and a network evolved. Today the federally-funded National Highway System circumnavigates the continent, linking all capital cities, and carries the majority of all interstate and intra-city road traffic. Today, roads are the most important transport links in Australia.

The railway network also reflects its colonial origins. The States' railways were initially built through colonial rivalry, to ensure a monopoly on carrying all goods moving within their borders. As a result Australia today uses three different rail gauges, and the States continue to have their own rail authorities. The railway network serves the mining, manufacturing and agricultural sectors, as well as urban and country travellers. In recent years the rural rail network has contracted and many smaller lines have closed, in response to the shift to road transport of freight and the decline in rural rail passenger numbers.

After World War 2 air transport developed quickly, providing rapid and efficient travel over Australia's vast distances. It led to a network of aerodromes around the country, linking the outback to the capitals, and the capitals to the rest of the world.

The topics in this section deal with roads, railways, aerodromes and ports. Abbreviated names used on the maps are listed in full after each map.

Australia's population is highly mobile and road travel by private vehicle is an important part of everyday life. There are about 900 000 kilometres of roads, of which over 80% are residential streets or rural access roads.

Scan the accompanying map-sheet and study the legend in the top left corner. On the map there is a large concentration of roads in the east, SE and SW of the continent. In northern Australia there are only a few major roads, while in central Australia there is a large area without any major roads. The distribution of roads reflects the pattern of settlement, as depicted on the 'Population Density' map (No. 6). All the capital cities as well as selected cities and towns have been included on the map.

This map shows the 'National Highway System' (by thick lines), which consists of the principal roads linking mainland State and Territory capital cities. It also shows the more important non-urban 'Arterial Roads' (by broken lines), which link major cities and towns and facilitate travel throughout much of rural Australia. Urban arterial roads enable vehicles to travel more easily within and through cities and towns. About 75% of all road traffic is carried on the national highway and arterial road networks, though they comprise only 16% of the total road length.

'Local Roads' also form a significant part of the overall road network but are not depicted because of the small scale of the map. They provide access between small centres of population and between the home, school, shopping centre and workplace.

The Commonwealth Government finances all construction and maintenance on the National Highway System, shown as the thick lines on the map. In addition, substantial federal grants are made to State and local government bodies responsible for arterial and local roads.

Australia's best-known national road route is 'Highway One'. It follows the coastline around much of the continent and consists of a number of separately-named highways, though not all of them (notably the Pacific Highway from Brisbane to Sydney) form part of the National Highway System. Highway One can be traced as the thick line from Cairns (cn) in northern Queensland to Brisbane (B) and then as the broken line right around the coast of New South Wales and Victoria - via Sydney (S) and Melbourne (M) - and along the South Australian coast as far as Adelaide (A). From Adelaide to Kalgoorlie (kg), Highway One follows the thick line of the National route. Then, as a broken line, it turns south, then north to Perth (P) and continues up along the coast as far as Port Hedland (ph) in the NW of Western Australia, where it rejoins the National route. From Broome (br), it turns inland and crosses the Northern Territory border before turning north at Katherine (kt) to finish at Darwin (D).

The first significant road in the Colony of New South Wales was a 25 kilometre stretch cut from the bush between Sydney and Parramatta over the period 1789-91. A plentiful supply of convict labour was available to build roads in the Sydney district but the roads soon deteriorated in wet conditions and with increased use. The first road through the Blue Mountains and on to Bathurst, finished in 1815, closely followed the 1813 route of the explorers Blaxland, Wentworth and Lawson. At the time, this was the most important road in the Colony, as it opened up new and fertile land in the interior.

Once the Blue Mountains had been crossed, settlers began to spread out and road construction and maintenance could not keep pace. Furthermore, the decline in convict transportation in the 1850s, coupled with major gold discoveries, created an acute shortage of labour for road construction. These problems led to a rapid deterioration of roads at a time when wool and wheat producers needed improved roads to reduce transport costs.

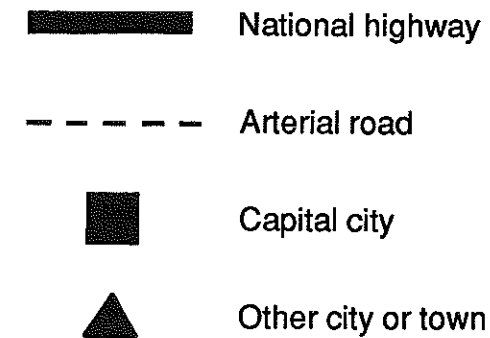
The story was similar in Victoria. In the early days of settlement, the Colonial government allocated little money to road construction, and most roads became impassable in wet weather. Resources were concentrated on roads leading to the goldfields.

From the 1880s to the 1930s, railways were the dominant mode of transport throughout much of the country. Initially there was little need for high standard arterial roads, but as motor vehicles gained in popularity the existing roads became increasingly inadequate. However, some improvements were implemented. Asphalt was introduced for surfacing roads in 1890 and gradually became more common. Important bridges were constructed from iron and steel rather than timber, which was more vulnerable to flood and fire.

The Great Depression of the 1930s slowed road development, although the situation changed rapidly a decade later with the outbreak of World War 2. There was an urgent need for better roads for heavy army traffic and for the defence of the north. During this time, 1000 kilometres of the Stuart Highway between the rail heads at Alice Springs (as) in the southern part of the Northern Territory and Larrimah, just to the SE of Katherine (kt), were reconstructed and sealed. In addition, the Eyre Highway across the Nullarbor Plain between Port Augusta (pa) and Coolgardie, just SW of Kalgoorlie (kg), was built.

Many of the nation's major highways are named after early overland explorers such as Oxley, Hume, Cunningham, Mitchell, Stuart, Eyre and Sturt. The Hume Highway, between Sydney (S) and Melbourne (M), was named in 1928 and closely follows Hume and Hovell's route of 1824 to Western Port. It was not until 1940 that its entire length was sealed.

Today Australia has a very extensive road network and, in terms of road length per capita, is amongst the world's most extensive. Nevertheless, there remains much to be done to cope with the ever-increasing road traffic and to link isolated settlements with all-weather roads.



List of abbreviations

A	Adelaide
as	Alice Springs
B	Brisbane
br	Broome
bu	Burnie
C	Canberra
cn	Cairns
cv	Charleville
D	Darwin
H	Hobart
kg	Kalgoorlie
kt	Katherine
M	Melbourne
mi	Mount Isa
P	Perth
pa	Port Augusta
ph	Port Hedland
rk	Rockhampton
S	Sydney
tc	Tennant Creek
tv	Townsville



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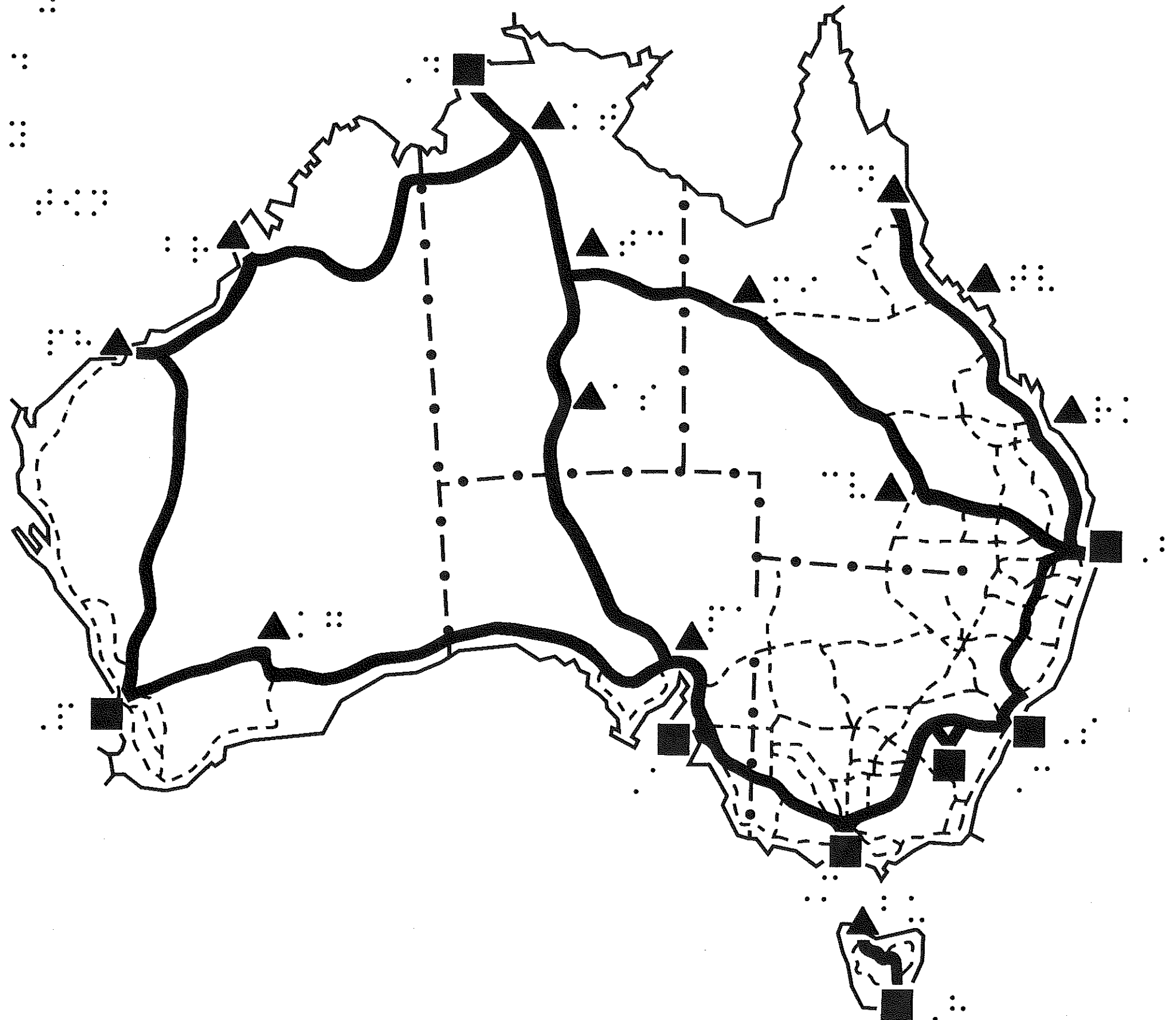
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Australia's railways are unique. Three main rail gauges - narrow (1067 mm), standard (1435 mm) and broad (1600 mm) - are still used extensively in different parts of the country. And in contrast to most other nations, the majority of Australia's railways are neither privately owned nor owned by the federal government. Instead, six separate State government railway authorities own and operate more than 80% of the total route length of over 40 000 kilometres. One Commonwealth Government railway authority controls all but a small portion of the remainder.

Australia's first railways were built in the 1850s. However, it was not until 1982, when the standard gauge railway from Port Pirie (pp) to Adelaide (A) in South Australia was completed, that all mainland capital cities (except Darwin) were finally linked by a railway of the same gauge.

This situation can be traced back to the colonial origins of Australia's railways. Each Colony began constructing lines to suit its own particular needs and the earliest long distance railways were built out from the capital cities towards major rivers and colonial borders in an attempt to stop the flow of freight, and hence much needed revenue, to neighbouring Colonies. At that time, inter-colonial lines were very much in the future.

With relatively short distances to cover, an increased population after the gold rushes of the 1850s and no great physical barriers to surmount, Victoria opted for the broad Irish gauge and its earliest lines (to Ballarat and Bendigo) were grandiose affairs. Lines were soon completed to Echuca (1864) and Wodonga (1873), on the New South Wales border, and freight from as far away as Queensland began flowing through Victoria.

New South Wales had formidable obstacles - rugged mountains and plateaux - to overcome in building lines in any direction away from Sydney. Despite these difficulties, standard gauge was adopted. Once the mountainous barriers were crossed, lines soon extended outwards to Bourke (1885) on the Darling River, Wagga Wagga (1879) and Hay (1882) on the Murrumbidgee River, and Albury (1881) on the Murray River.

Western Australia and Queensland, with vast distances to cover and only small populations to support large public expenditure, opted for the much cheaper narrow gauge for their lines. Tasmania also adopted the narrow gauge. Only South Australia foresaw the likelihood of intercolonial lines from the outset and adopted the broad gauge for its line extending towards Victoria, where a network of lines of this gauge was already well developed. South Australia adopted the narrow gauge for the majority of its other rural lines.

To add further to the already complex gauge situation, the Commonwealth adopted standard gauge for that section of the transcontinental line which was completed in 1917 between Kalgoorlie (kg) in the south of Western Australia and Port Pirie (pp) to the north of Adelaide (A). It was not until 1969 that this gauge stretched right across the continent from Sydney (S) to Perth (P).

The route length of Australia's railways today is roughly comparable to that of France or West Germany, twice that of the UK but much smaller than Canada's and only about one-eighth that of the USA.

In 1985-86 government railways handled over 170 million tonnes of freight and nearly 380 million passengers. Railways owned and operated by private organisations handled a further 105 million tonnes. Over 80% of this was iron ore transported on four dedicated lines connecting iron mines and export ports in the Pilbara region of NW Western Australia.

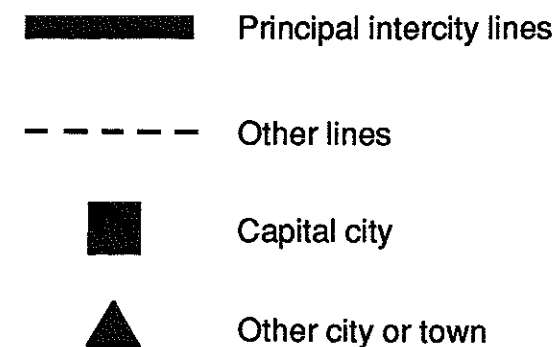
Scan the entire map and you will notice that most of the railways occur in the east and SE and SW of the continent. Most are interconnected in one large network by the principal inter-city railways (represented by thick lines), which extend from Cairns (cn) in northern Queensland through New South Wales, Victoria and South Australia, to Perth (P) in Western Australia and to Alice Springs (as) in the Northern Territory.

Note that there are two principal inter-city routes from Sydney (S) to Port Pirie (pp) in South Australia. The more southerly route is via Melbourne (M) and Adelaide (A) whereas the more direct one is westward via Broken Hill (bh) and forms part of the Sydney to Perth transcontinental link.

The majority of lines from the coast to inland centres serve the mining and pastoral industries. These include the lines to western Queensland centres such as Mount Isa (mi), Longreach (lr) and Charleville (cv) and the lines to Cobar and Broken Hill (bh) in western New South Wales. On the other side of the continent in Western Australia they include the lines from Perth (P) to Kalgoorlie (kg), in the south of the State, from Kalgoorlie to Esperance (es) on the south coast, and in the NW from Dampier (dm) and Port Hedland (ph) inland to the Pilbara iron ore mines.

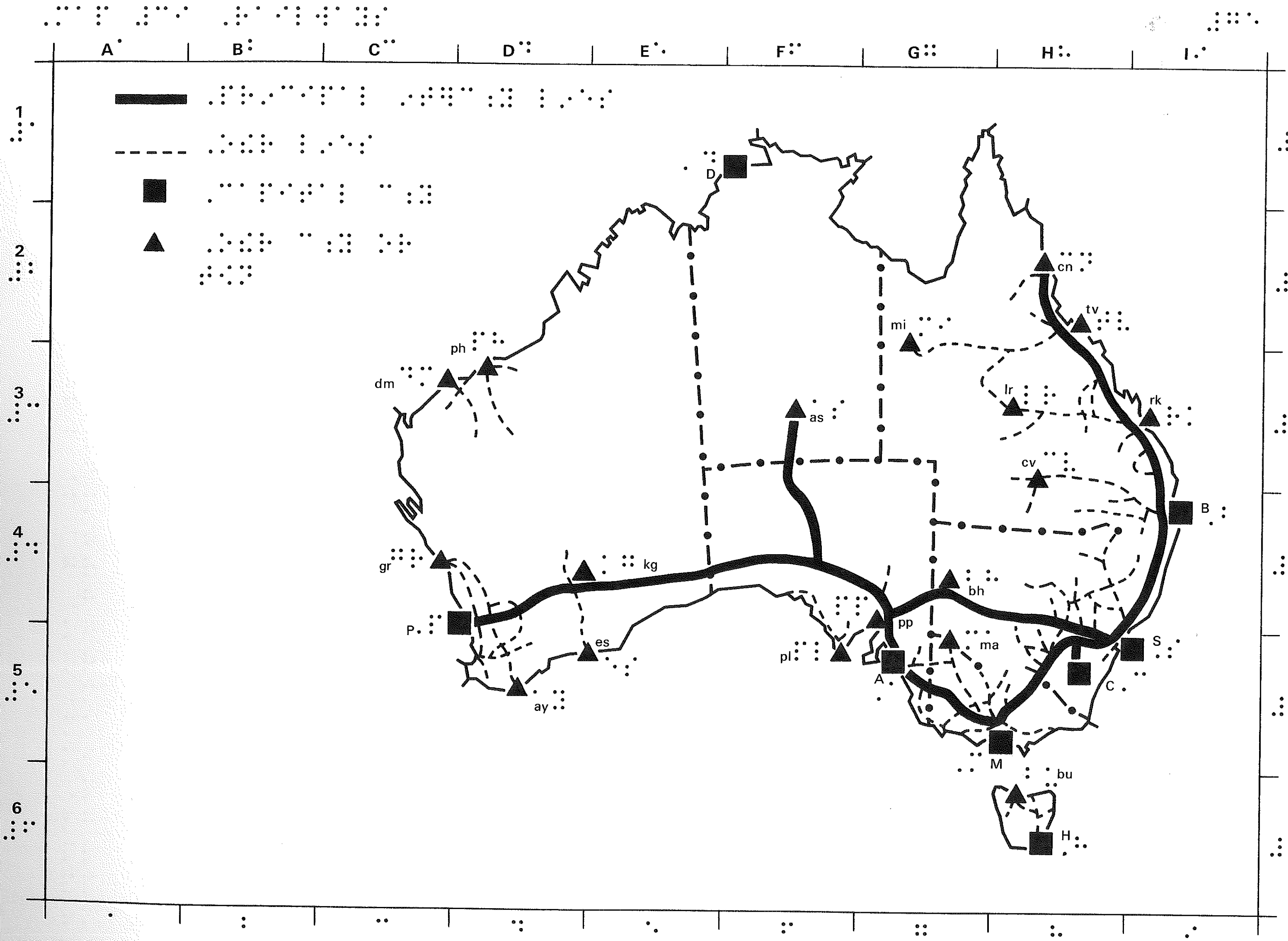
With the exception of the coal-carrying lines of central Queensland, most other railways (represented by broken lines) are used primarily for the transport of grain from the 'wheat belt' to the coast. Bulk storage and handling facilities for wheat and other grains are located at regular intervals along these lines. From here the grain is transported by rail to large, centralised country terminals for further periods of storage or direct to seaboard terminals for export.

Australia's railways are currently undergoing a major rationalisation. Many branch lines, totalling some thousands of kilometres and carrying only low volumes of freight annually, have closed in recent years. At the same time a number of new lines have been constructed, mainly for the movement of huge quantities of minerals from mines to export ports. Most notable are the various central Queensland coal railways and the iron ore lines in the NW of Western Australia.



List of abbreviations

A	Adelaide
as	Alice Springs
ay	Albany
B	Brisbane
bh	Broken Hill
bu	Burnie
C	Canberra
cn	Cairns
cv	Charleville
D	Darwin
dm	Dampier
es	Esperance
gr	Geraldton
H	Hobart
kg	Kalgoorlie
lr	Longreach
M	Melbourne
ma	Mildura
mi	Mount Isa
P	Perth
ph	Port Hedland
pl	Port Lincoln
pp	Port Pirie
rk	Rockhampton
S	Sydney
tv	Townsville



The vast area of the Australian continent and the concentration of population in coastal capital cities makes aviation a rapid and efficient means of transporting people throughout the country. Australia was in the forefront of early developments in the aviation industry. The first flights were made from racecourses, showgrounds, cricket grounds and isolated fields. In 1910 the nation's first airfield was established by the Aerial League of Australia on a parcel of land near Penrith railway station, west of Sydney.

Australia's earliest customs aerodrome is considered to be Darwin, where the first aircraft from overseas landed in 1919. Darwin later became an important stopover for flights en route to Sydney from England and Europe.

Australia's first airline, QANTAS (Queensland and Northern Territory Aerial Services Ltd), was registered in Brisbane in 1920 and was based initially at Winton in western Queensland. QANTAS was not, however, the first airline to operate; this honour went to Western Australian Airlines which was founded in 1921.

In the years between the two world wars the airline industry expanded and regular services were introduced between the major centres of population. After World War 2, civil aviation emerged as a major form of rapid, long distance transportation.

By the late 1980s there were well over 400 aerodromes throughout Australia. In 1988-89, Australia's domestic air services accounted for 15 million passenger journeys while scheduled international services to and from Australia carried a further 7.9 million passengers.

The map shows the distribution of aerodromes which handled more than 5000 passengers on domestic and international services in 1988-89. They are divided into five classes (based on the number of passengers handled), which are depicted by five different sized symbols. Examine the entire map-sheet and note the position of the legend which is in two parts in the top and bottom left corners.

The ten international airports (those having customs facilities and thus handling overseas flights) are distinguished by a diagonal cross next to their symbols or the letters denoting their name. They comprise the seven State capital city airports, plus Cairns (cn) and Townsville (tv) in north Queensland and Port Hedland (ph) in Western Australia. Norfolk Island (not shown on the map) also has an international airport.

While there is a network of larger aerodromes down the eastern side of the continent, there are only a few elsewhere throughout the country. There are of course many small aerodromes and landing fields not shown on the map, serving small communities, isolated mines and grazing properties.

Due to lack of space the symbols for a number of larger aerodromes in the SE and the symbol for Perth (P) in the SW have been placed out to sea with dashed leadlines to their true locations.

There are only two aerodromes in the category covering greater than 5 million passengers annually: Sydney (S) and Melbourne (M). Sydney's Kingsford-Smith airport is the hub of Australia's air transport network, with a total of just over 12 million passengers

passing through the gates in 1988-89. Melbourne's Tullamarine airport is the second busiest, with 7.7 million passengers in the same year.

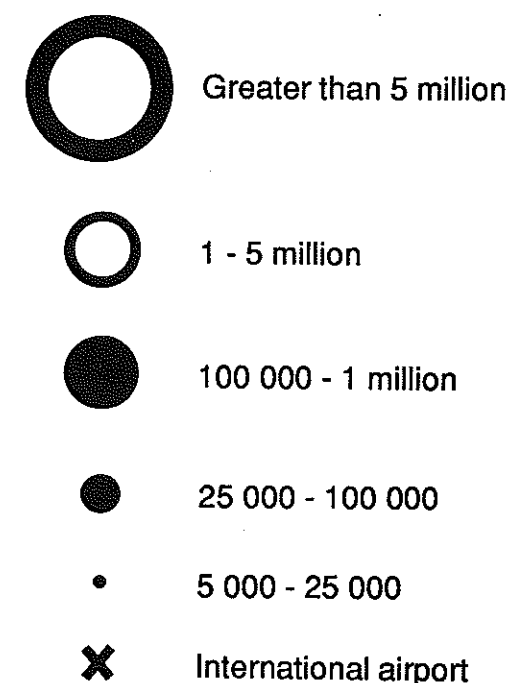
Cairns (cn), Brisbane (B), Coolangatta (cg) - the airport for the Gold Coast, Canberra (C), Adelaide (A) and Perth (P), each with between 1 million and 5 million passengers annually, are the next busiest airports. This group of aerodromes, together with Sydney and Melbourne, handled over 80% of all passengers on domestic air services in 1988-89.

A large proportion of the passengers passing through aerodromes handling between 100 000 and 1 million passengers are tourists. These are located along the Queensland coast at Townsville (tv), Hamilton Island (hi), Mackay (mk) and Rockhampton (rk), at Coffs Harbour (ch) in New South Wales, at Alice Springs (as) and Darwin (D) in the Northern Territory, and at the three Tasmanian centres of Hobart (H), Launceston (la) and Devonport (de).

Tourists feature less at the other three aerodromes in the 100 000 to 1 million category: Albury (ab), on the New South Wales-Victorian border, and Kalgoorlie (kg) and Karratha (ka) in Western Australia. Karratha, on the State's northern coastline, primarily services the iron ore mines of the Pilbara area and the offshore drilling rigs on the North West Shelf.

Most aerodromes in the 25 000 to 100 000 and the 5000 to 25 000 passenger categories primarily service their surrounding regions though some, especially along the eastern and SE coast of the continent, are predominantly tourist-oriented. Port Hedland, in the NW of Western Australia, also handles a small number of international passengers.

Number of Passengers 1988 - 89



List of abbreviations

A	Adelaide
ab	Albury
as	Alice Springs
B	Brisbane
C	Canberra
cg	Coolangatta
ch	Coffs Harbour
cn	Cairns
D	Darwin
de	Devonport
H	Hobart
hi	Hamilton Island
ka	Karratha
kg	Kalgoorlie
la	Launceston
M	Melbourne
mk	Mackay
P	Perth
ph	Port Hedland
rk	Rockhampton
S	Sydney
tv	Townsville

A

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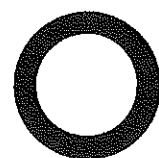
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ka

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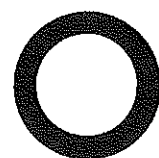
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D

Sea transport was the first means of communication between the Colonies in the early days of settlement in Australia. Numerous regional ports were established to serve the many small centres of population scattered around the continent. As land transport developed, many of these small ports ceased to operate and only ports associated with the capital cities or the shipment of commodities such as agricultural and mineral products, have survived. All new ports developed in recent years have been to service the burgeoning mineral industry.

On the map the ports have been divided into four categories, which are represented by four different symbols. Scan the entire map-sheet and note the legend in the top left corner, which shows the tonneages represented by the different symbols.

Australia's major ports, those in the top three categories handling over 1 million tonnes of cargo annually, are named on the map. Together, these 37 ports handled 372 million tonnes of cargo in 1987-88, over 95% of the total handled by all Australian ports. The ports in the last category, handling between 100 000 and 1 million tonnes, are also shown but are not named.

Over 200 million tonnes (Mt), more than 50% of the total handled by all Australian ports in 1987-88, passed through just six ports. They are Port Hedland (ph) with 43 Mt and Dampier (dm) with 39 Mt - both on the NW coast of Western Australia; Newcastle (nc) with 40 Mt and Sydney (S) with 21 Mt in New South Wales; and Hay Point (hp) with 34 Mt and Gladstone (gl) with 28 Mt in Queensland. These ports have in common the export of enormous quantities of coal or iron ore, though Sydney, Newcastle and Gladstone handle large amounts of other commodities as well.

The following text lists for every State its major ports and the most important commodities handled through each one. As you locate each port, identify the symbol and the tonnage category to which it belongs.

Queensland

The most northerly port depicted in Queensland is Weipa (we), on the western side of Cape York Peninsula. Weipa was developed to service nearby bauxite mines and almost 10 Mt are shipped out annually. Trace the coastline north to Cape York and then SE to Cape Flattery (cf), from where large quantities of silica sand are exported to Japan. A short distance to the south is Cairns (cn), a general cargo port and a large exporter of raw sugar.

Continue southward and find the port of Townsville (tv). It is the general cargo port for northern Queensland and outlet for the mining products of Mount Isa, and for raw sugar grown in the nearby coastal region. Just to the SE is Abbot Point (ab), the most northerly of several ports developed in recent years for the export of coal mined in central Queensland. Further SE is Mackay (mk), a major raw sugar exporting port, and next the export coal port of Hay Point (hp), Queensland's largest port in terms of tonnage handled. The next port is Gladstone (gl), second only to Hay Point in tonnage handled. Bauxite (shipped in from Weipa to be processed and exported as alumina and aluminium), grain and coal are the major commodities exported.

The most southerly Queensland port depicted is Brisbane (B), where modern port facilities at the mouth of the Brisbane River handle such inward bulk cargoes as petroleum products, fertilisers and minerals, and export coal and grain.

New South Wales

From the border with Queensland, follow the coastline south to the industrial centre of Newcastle (nc), the nation's second largest port in quantity of cargo handled. Coal, wheat, iron and steel are the major exports; iron ore, alumina, limestone (for steel-making) and petroleum products are the largest imports.

Further south is Sydney (S), which has two ports - Port Jackson and Botany Bay. Together they form one of the busiest ports in Australia. Port Jackson is primarily for general cargo, with export coal and grain being progressively transferred to new facilities at Port Kembla. Botany Bay caters mainly for petroleum products and container traffic.

Just south of Sydney is Port Kembla (pk) which, like Newcastle, is a major industrial centre. Exports include coal, grain and iron and steel products; imports are dominated by iron ore and limestone.

Victoria





Follow the Victorian coastline from the New South Wales border to Western Port (wp), through which petroleum products from the nearby Bass Strait oil and gas fields are shipped. Just to the NW, at the head of Port Phillip Bay, is Melbourne (M), a busy general cargo and container port handling a wide variety of goods. Bulk cargoes include crude oil and petrochemicals. Much of the domestic traffic between the mainland and Tasmania passes through Melbourne.

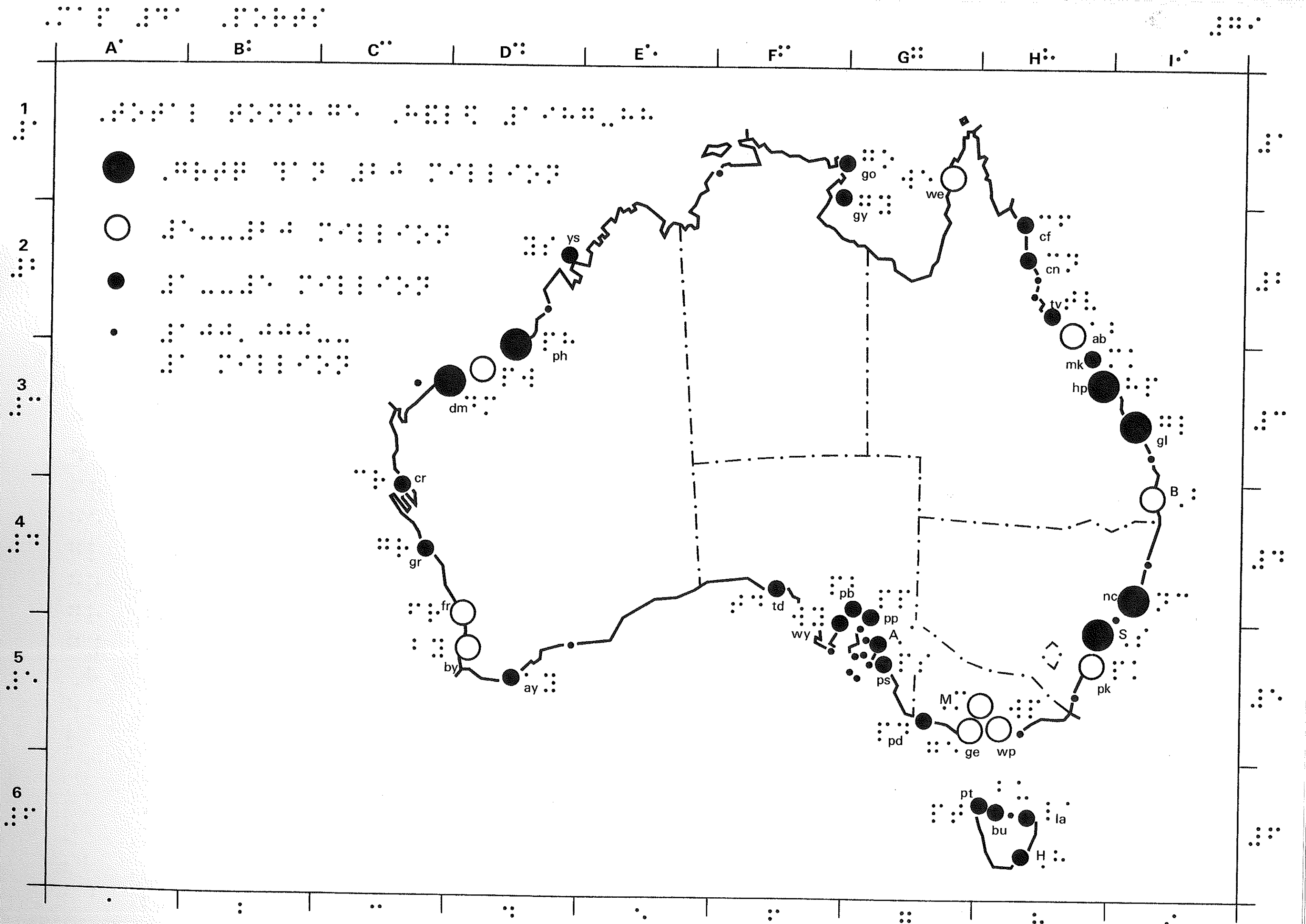
Immediately SW of Melbourne is Geelong (ge), Victoria's main grain export port. Petroleum products, and alumina for the Point Henry aluminium smelter are the major imports. To the west of Geelong is Portland (pd), a grain export port and unloading point for alumina for the Portland aluminium smelter.

Tasmania

Move south across Bass Strait to Tasmania, where three major ports lie close together on the northern coast. The most easterly is Launceston (la), through which alumina and manganese ore are imported for treatment, and woodchips are exported. To the west is Burnie (bu), the export port for mineral products from western Tasmania, and then Port Latta (pt), shipment point for iron ore pellets produced from ore mined at Savage River. Follow the coastline south and then east to Hobart (H), a general cargo port and off-loading point for zinc concentrates for the large Risdon zinc refinery.

Total Tonneage Handled 1987 - 88

-  Greater than 20 million
-  5 - 20 million
-  1 - 5 million
-  100 000 - 1 million



South Australia

Return to the mainland and, from the Victorian-South Australian border, follow the coastline NW to Port Stanvac (**ps**), which serves an adjacent petroleum refinery. Immediately north, on the same side of Gulf St Vincent, is Adelaide (**A**), the State's general cargo port and an important grain exporting port. North of Adelaide, on the eastern side of Spencer Gulf, is Port Pirie (**pp**), which exports wheat, barley, and lead and zinc produced from Broken Hill ore. NW of Port Pirie, on the western side of Spencer Gulf, is Port Bonython (**pb**), which exports petroleum products from the Moomba oil and gas fields. Just SW is Whyalla (**wy**), where imports include limestone and coal for use in iron and steel-making, and exports are mainly iron ore and iron and steel products. Continue SW and then NW around Eyre Peninsula to Thevenard (**td**), an export port for local grains and minerals such as wheat, barley, oats, gypsum and salt.

Western Australia

From the South Australian border, follow the coastline of the Great Australian Bight SW to Albany (**ay**), primarily a grain export port, and then west and north around Cape Leeuwin to the port of Bunbury (**by**), which serves the SW corner of the State. The main exports from Bunbury are alumina, woodchips, mineral sands, wheat and timber. Just north of Bunbury is Fremantle (**fr**), the port serving Perth and the industrial centre of Kwinana. Exports include grain, alumina, nickel and petroleum products, with the major imports being general cargo, crude oil, coke, steel and fertiliser.

Continue NW along the coast to Geraldton (**gr**), from where grain, mineral sands and talc are exported, and on to Carnarvon (**cr**), where the major exports are salt and gypsum. Follow the coastline northward then NE to Dampier (**dm**), one of several ports in the NW of the State handling huge quantities of iron ore from mines in the Pilbara region. Large quantities of salt are also exported through Dampier. Just NE of Dampier is Port Walcott (**pw**), another of the iron ore ports.

Port Hedland (**ph**), the northernmost port associated with the Pilbara iron mines, is immediately NE of Port Walcott. With around 43 million tonnes handled in 1987-88, Port Hedland is Australia's largest port in tonnage handled. Further NE is Yampi Sound (**ys**), the port for the iron ore mines on Koolan Island.

Northern Territory

From the Western Australian border, follow the coast NE past the small unnamed symbol representing the port of Darwin and then eastward to Gove (**go**), the export port for bauxite and alumina produced nearby. Directly south of Gove is the island port of Groote Eylandt (**gy**), from which large amounts of manganese ore are exported.

List of abbreviations

A	Adelaide
ab	Abbot Point
ay	Albany
B	Brisbane
bu	Burnie
by	Bunbury
cf	Cape Flattery
cn	Cairns
cr	Carnarvon
dm	Dampier
fr	Fremantle
ge	Geelong
gl	Gladstone
go	Gove
gr	Geraldton
gy	Groote Eylandt
H	Hobart
hp	Hay Point
la	Launceston
M	Melbourne
mk	Mackay
nc	Newcastle
pb	Port Bonython
pd	Portland
ph	Port Hedland
pk	Port Kembla
pp	Port Pirie
ps	Port Stanvac
pt	Port Latta
pw	Port Walcott
S	Sydney
td	Thevenard
tv	Townsville
we	Weipa
wp	Western Port
wy	Whyalla
ys	Yampi Sound

SECTION G

Industry and Trade

Australia's position in the world economy is dependent on the international market for the export of its primary commodities and on the relative balance of its export earnings and import costs. The topics in this section deal with the value and type of exports and imports on a State and national basis for the 1986-87 financial year. The development of manufacturing and its current employment profile are also covered.

Australia is a major exporter of coal, iron ore, alumina, gold and many other minerals. It is the world's largest exporter of wool and among the top in wheat, meat and sugar. The value of these and other major exports varies from year to year as world prices for such commodities fluctuate. In 1986-87 coal was the principal export, with \$5.4 billion or 15% of total export earnings, while wool, in second place, accounted for 10% of the total. Australia's exports are heavily weighted to primary commodities rather than manufactured goods.

Australia has a nationwide dependence upon imported manufactured goods, even though it has a well-established and diverse manufacturing sector. There is a strong demand for industrial machinery and transport equipment, which cost nearly \$10 billion in 1986-87, and a huge domestic market for textiles, electrical goods and office (mainly computing) equipment. Other large imports are petroleum products and chemicals.

Topic No. 42, 'Manufacturing', shows two bar graphs on employment in manufacturing. An explanation of how to read bar graphs is given in the introduction to Section C: 'People'. Nos 43 and 44 use pie graphs on a map of Australia to show by State the value of exports and imports respectively. Pie graphs are also explained in the introduction to Section C. A separate pie graph is given for each State, its size determined by the total value of exports or imports. Each pie graph is divided into segments which represent broad categories of export and import commodities. The total value represented by each pie graph is shown adjacent to it. Australia's international trade is addressed in No. 45, which presents two bar graphs dealing with imports and exports at a national level.

The industries covered by the broad categories which make up the graphs are:

Agriculture - crops, livestock, forestry, fishing and hunting.

Mining - metallic and non-metallic minerals, coal, oil and gas, and construction materials.

Manufacturing - food, beverages, tobacco, textiles, clothing, paper products, chemicals, petroleum products, non-metallic mineral products, basic metal products, fabricated metal products, transport equipment and other machinery and equipment.

Other - wholesale and retail trade, business services, waste and scrap, second-hand goods.

Although Australia does not have the major industrial complexes found in the northern hemisphere, manufacturing has played an important role in national development.

In the early days of settlement the colonial government was the main consumer of manufactured goods, and needs were met through imports from Britain. Increasing domestic demand gradually encouraged local enterprise and the growth of cottage industries. As Australia's population grew, especially after the gold discoveries of the 1850s, so manufacturing developed. The need for machinery on the goldfields provided an important stimulant. Manufacturing was initially small scale, labour intensive, and situated close to local markets. With government encouragement through the use of protective tariffs, import quota restrictions, grants and favourable policies, manufacturing grew and has become increasingly capital-intensive. However, cost disadvantages, such as high freight and labour costs, have prevented Australia from becoming a broadly based, major international manufacturer.

Manufacturing has been an important area of employment, especially for immigrants and people leaving the rural sector. The broadening and growth of manufacturing was one of the goals of Australia's post-war immigration policy.

The graph on the left hand side of No. 42, "Manufacturing", shows the average number of people employed in manufacturing for each decade since 1901. There have been four distinct stages in the growth of manufacturing. The first stage, between 1901 and 1929 was one of steady growth. The second stage covered the Depression years and was one of minimal growth. The third encompassed the increased manufacturing demands of World War 2 and the post-war boom. Substantial growth in employment in manufacturing occurred during these years. The fourth and current stage is one of reduced growth. The maturing of the Australian economy over the last two decades has seen the growth of the tertiary, service-oriented sector at the expense of the manufacturing sector. In addition, manufacturing has absorbed technological advances which have resulted in more efficient production methods and reduced employment.

Australian manufacturing is highly urbanised and centralised. Today there are approximately 30 000 firms in Australia. Of these, the twenty largest account for one sixth of all employment and output. The manufacturing categories employing the most people are wood products and fabricated metal products. About 75% of all manufacturing is located in the five mainland capital cities, with over 50% in Sydney and Melbourne alone.

The table below shows the importance of manufacturing in each State.

MANUFACTURING 1986-87

State	Total Employed '000	Employed in Manufacturing '000	Revenue \$ million
Qld	1 534	115	14 849
NSW	2 401	407	40 541
Vic	1 631	338	39 970
Tas	197	24	3 050
SA	610	103	9 353
WA	712	68	8 215
NT	68	3	405
ACT	72	4	327
Aust	7 226	1 064	116 709

The graph on the right hand side of the page shows that Victoria is the State with the highest proportion of its workforce in manufacturing. However the table shows that New South Wales has the highest number of people employed in manufacturing and also generates the highest sales revenue. The Northern Territory has the least manufacturing in both employment and revenue terms.

In Queensland manufacturing is dominated by food processing, which in 1986-87 employed 33 000 people. The other four main employers are fabricated metal products, wood products, paper products and transport equipment.

Manufacturing in New South Wales grew rapidly after World War 2. The broadening manufacturing base helped to satisfy post-war consumer demands and high population growth. Currently the largest manufacturing category in New South Wales, employing 55 000 people, is non-transport machinery and equipment.

Victoria has over 50% of the national clothing, transport equipment and textile industries. Since 1980 there has been an overall decline of 10% in manufacturing employment, and also in the number of establishments. Transport and machinery production have both fallen by about 17%. Total manufacturing revenue, however, has increased by 67%.

In Tasmania, manufacturing contributes more to the State's economy than either agriculture or mining. Forest-based products make the greatest contribution, and include the paper and wood products categories. Food processing is also a major employment area.

South Australian manufacturing is centred on Adelaide and, since World War 2, has grown around motor vehicles and household appliances. The number of establishments has been increasing, although average employment per establishment has dropped. Most people are now employed in food processing and the production of transport equipment and other machinery.

Western Australia is second only to New South Wales in the manufacture of basic metal products. The discovery of large mineral resources in Western Australia after the 1950s led to the expansion of a previously small manufacturing base. Food processing is also important.

The Australian Capital Territory and the Northern Territory have small manufacturing sectors. While the food processing category is the largest employer in the Northern Territory, paper products account for most of the Australian Capital Territory's employment and revenue.

Average Total Employment in Manufacturing

- a 1901 - 09
- b 1910 - 19
- c 1920 - 29
- d 1930 - 39
- e 1940 - 49
- f 1950 - 59
- g 1960 - 69
- h 1970 - 79
- i 1980 - 88

Percentage of Employed People in Manufacturing

1986 - 87

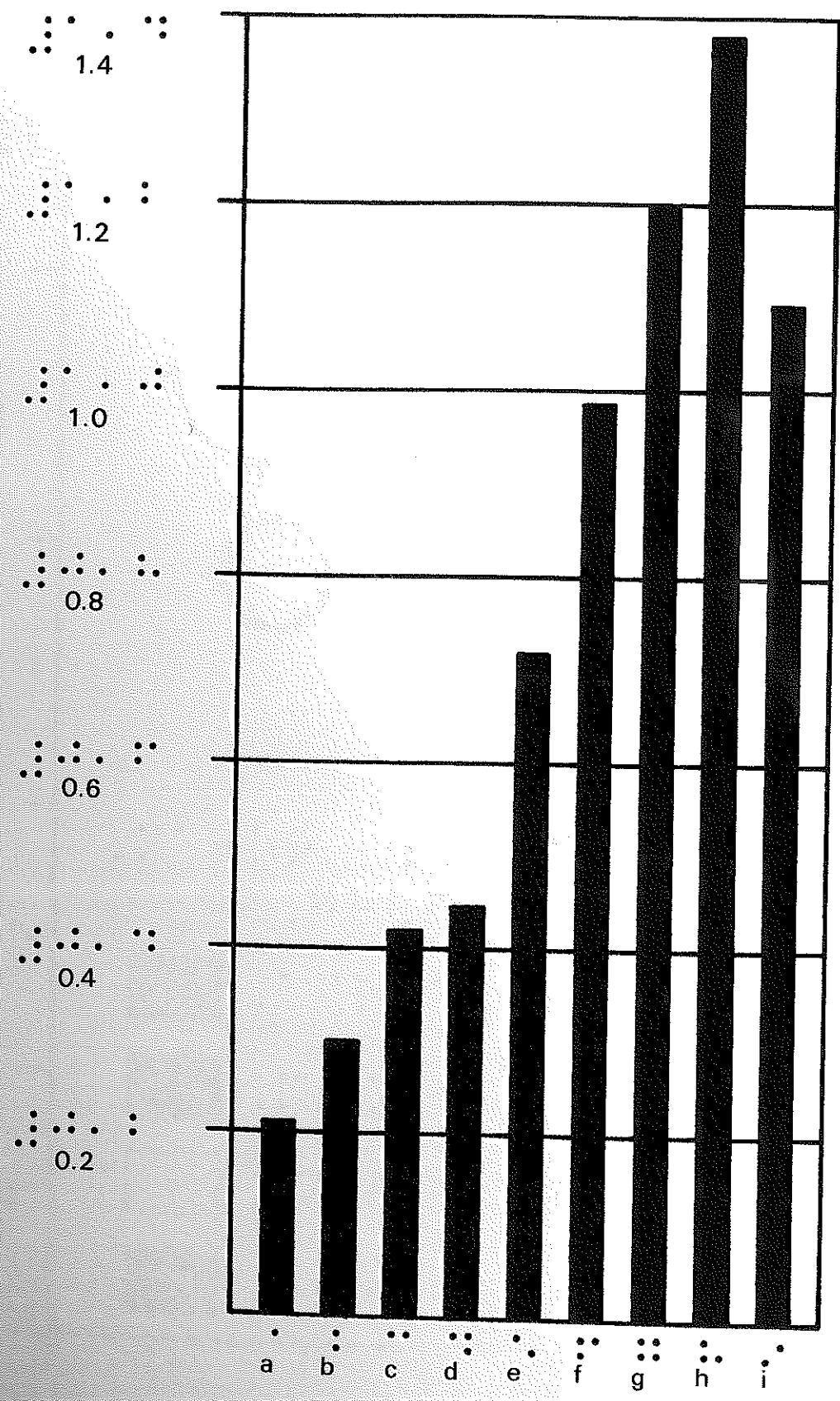
- q Qld
- n NSW
- v Vic
- t Tas
- s SA
- w WA
- y NT
- a ACT

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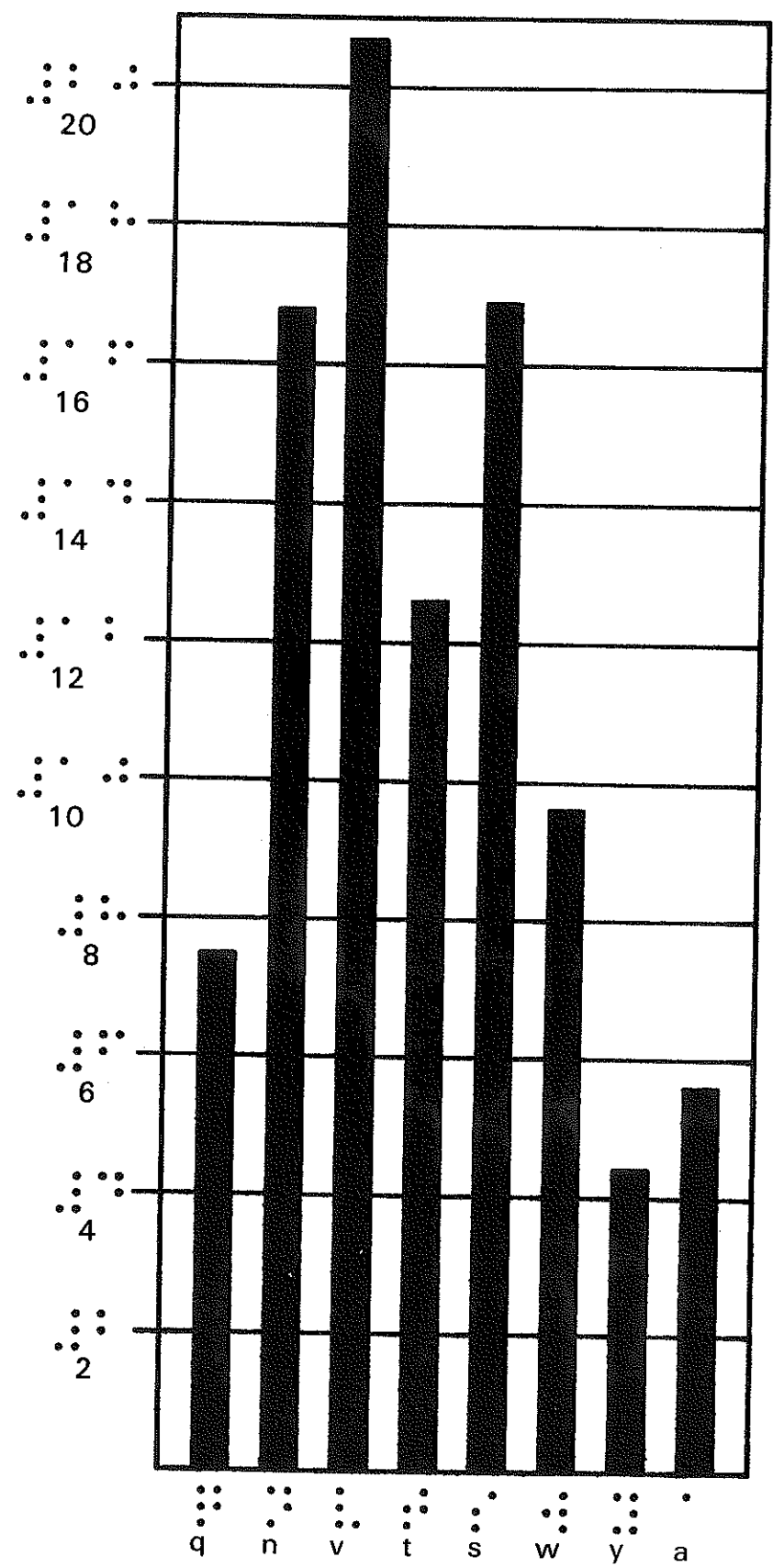
Braille label: Million employed



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Braille label: Percent



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The accompanying map shows Australia's overseas exports by State for 1986-87. The value of each State's exports is represented by a pie graph divided into the four major product groups: agriculture, mining, manufacturing and other.

In total, the value of Australia's exports in 1986-87 was nearly \$36 billion. In that year the value of exports exceeded that of imports in all States except New South Wales and Victoria. The result for Australia as a whole was a trade deficit of over \$2 billion.

Queensland's exports in 1986-87 were valued at \$7.7 billion, some \$5.2 billion more than imports. Minerals are by far Queensland's most valuable export, accounting for around half of total export earnings. The value of black coal exports alone was \$3.2 billion. Meat, sugar, lead, wool and copper are other major exports. Almost 35% of Queensland's total exports go to Japan, the State's main market. Western Europe, USA, UK and the Republic of Korea are also important markets.

New South Wales is Australia's largest trading State, accounting for nearly 25% of the nation's total exports. Since 1945 the value of annual exports from New South Wales has risen from \$153 million to around \$8.4 billion in 1986-87. Despite this massive increase, the value of imports exceeded exports by \$7.8 billion in 1986-87. The State's major export destinations over the past decade have been Japan, New Zealand and USA, with the Republic of Korea becoming more significant in recent years. Together, these four countries account for nearly half of the State's exports, which are dominated by black coal, wheat, wool, cotton, iron and steel and meat.

Victoria makes a substantial contribution to Australia's international trade, accounting for just over 20% of total exports. In 1986-87 the value of Victorian exports was nearly \$7.5 billion, though this represented a shortfall of \$6.3 billion when compared to imports for the same period. Major exports include petroleum and petroleum products, wool, wheat, meat and dairy products, principally to Japan, USA and New Zealand.

Tasmanian exports amounted to a little more than \$1 billion, some \$800 million in excess of imports in 1986-87. The State's most valuable exports are mineral ores and concentrates, notably iron and copper ore, and refined zinc. Abalone, wool and meat are other important exports. The principal markets for Tasmanian products are Japan, USA, Malaysia and Taiwan.

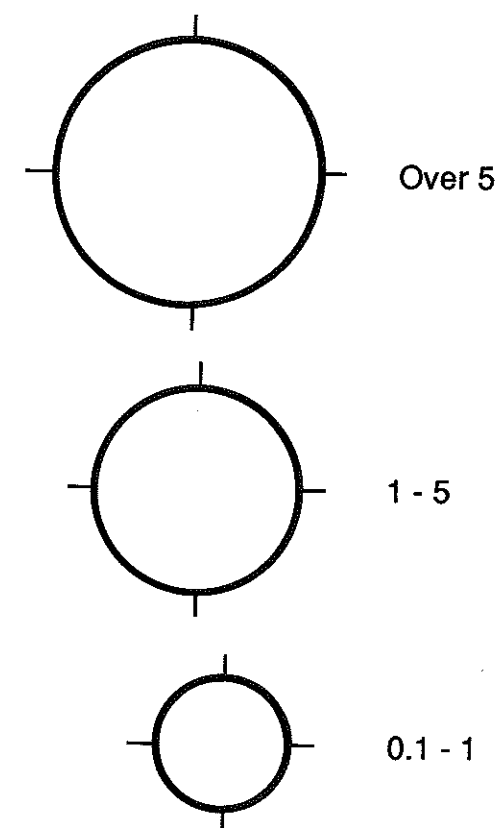
The total value of South Australia's exports during 1986-87 was just over \$2 billion, more than \$500 million in excess of imports. The principal exports are wheat and barley, mostly to Middle Eastern countries, and wool. Exports of liquefied petroleum gas and condensate from the Port Bonython treatment facility near Whyalla have added a new dimension to the State's overseas trade since production commenced in 1984. Meat, seafood, iron and steel, lead and road vehicles are also major exports. Around 15% of all exports go to Japan, South Australia's principal market.

The total value of exports from Western Australia in 1986-87 was about \$6.7 billion, over \$4 billion more than imports during the same period. The largest single export item is iron ore from the Pilbara region (valued at \$1.7 billion in 1986-87), sold mostly to Japan, China and the Republic of Korea. Other major exports include wool, wheat, gold bullion, petroleum and petroleum products, mineral sands, rock lobsters, live sheep and alumina.

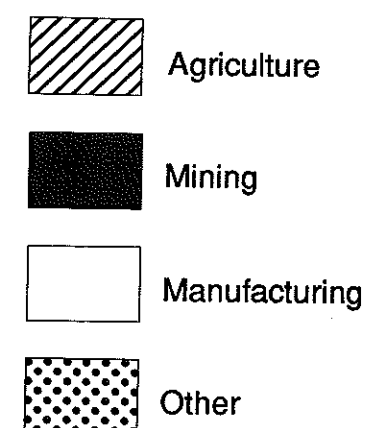
The Northern Territory's exports in 1986-87 were valued at \$750 million, nearly \$500 million more than imports. Two-thirds of all exports were products of mining. The main export commodities are bauxite and alumina, from Gove, as well as uranium, manganese ore, and lead and zinc ores and concentrates.

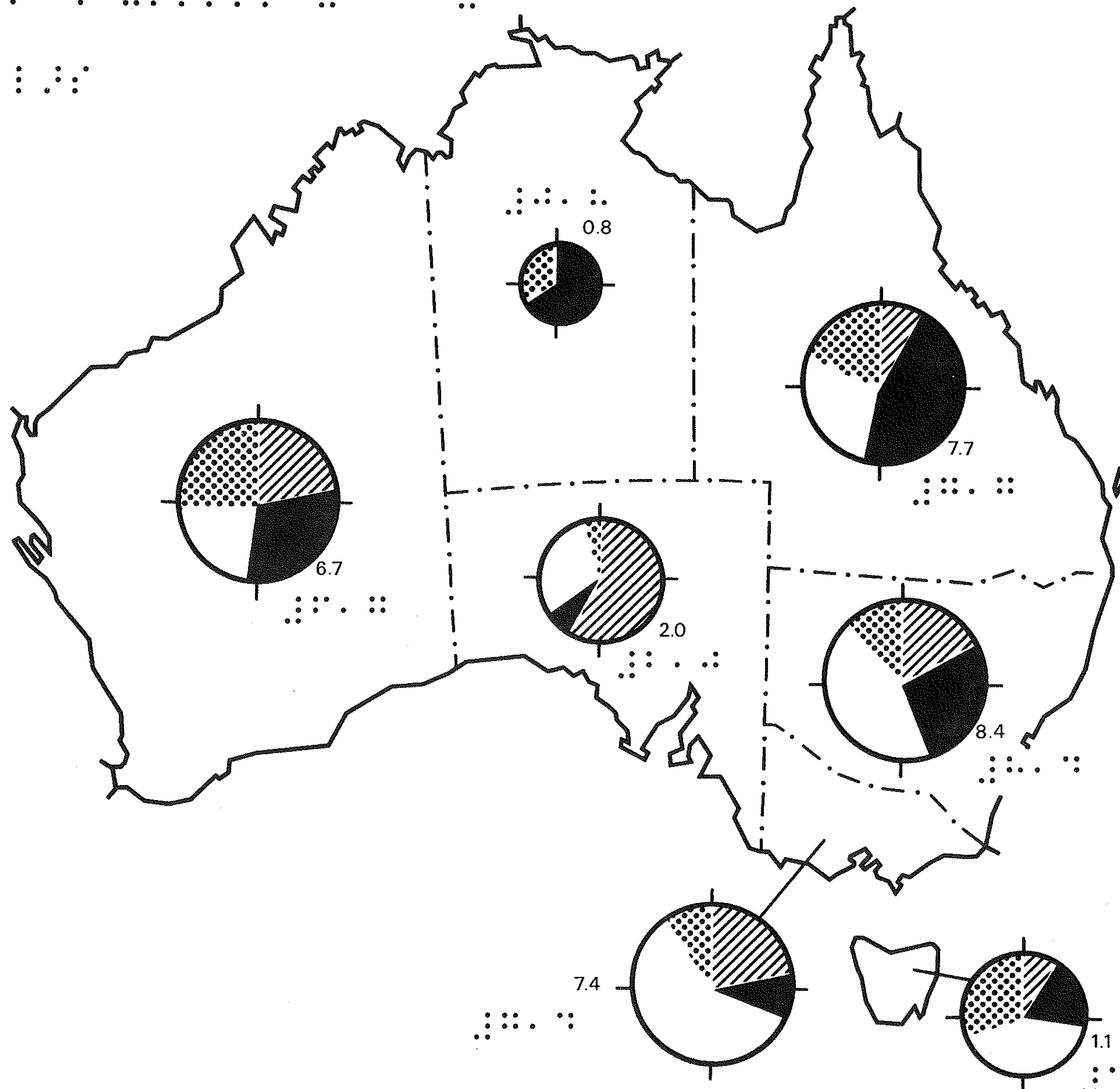
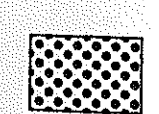
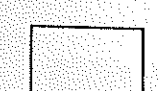
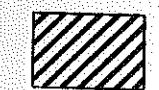
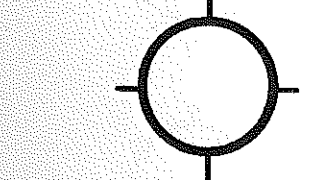
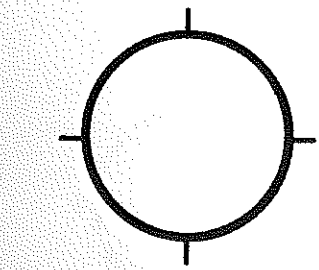
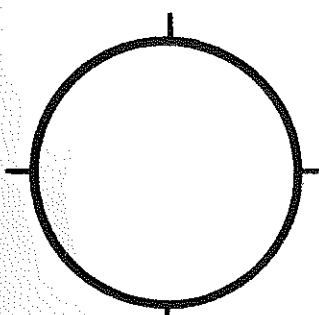
Value of Overseas Exports 1986-87

Billion Dollars



Major Product Group





The accompanying map shows Australia's overseas imports by State for 1986-87. The value of each State's imports is represented by a pie graph divided into only two broad product categories: manufactured goods and all other imports. The significant feature of this map is the heavy reliance of every State on imported manufactured goods. This category includes transport equipment, industrial machinery, office machinery, electrical goods, textiles and chemicals, which together account for the bulk of the nation's imports.

Queensland's imports in 1986-87 were valued at \$2.5 billion, of which around 90% were manufactured products. The State's imports cover a wide variety of commodities, with machinery and transport equipment having the highest value. Other notable imports were miscellaneous manufactured goods, chemicals, rubber products and distillate fuels.

New South Wales imported goods worth more than \$16 billion during 1986-87, accounting for just over 40% of Australia's total import expenditure. Of this amount, almost 90% was spent on manufactured goods. The State's main imports include data processing equipment, road vehicles, industrial machinery, electrical equipment and appliances, textile yarns and fabrics, petroleum products, and telecommunications and sound recording equipment. The major sources of imports to New South Wales were Japan, USA and UK.

The total value of Victoria's overseas imports in 1986-87 was nearly \$14 billion, 88% of which was for manufactured goods. Major imports into Victoria include road vehicles and other transport equipment, textile yarns and fabrics, industrial machinery, electrical equipment and appliances, and telecommunications and sound recording equipment. The most significant exporters of commodities to Victoria are USA, Japan, Federal Republic of Germany and UK.

Tasmania's imports were valued at nearly \$300 million in 1986-87 and consisted mostly of manufactured goods. Woodpulp, road vehicles, textile yarns and fabrics, petroleum products, specialised machinery and chemicals are major imports.

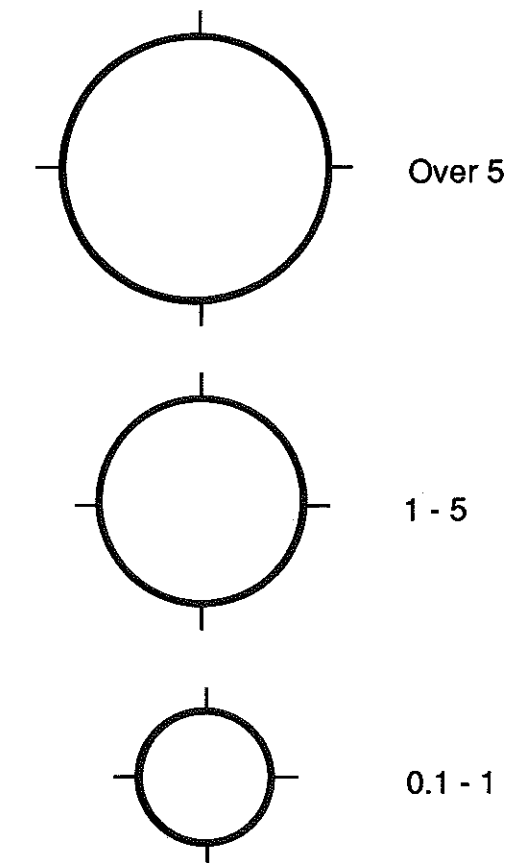
Imports into South Australia in 1986-87 were valued at \$1.5 billion, 90% of which were manufactured goods. The State's imports are dominated by petroleum products, road vehicles, industrial machinery, and electrical equipment and appliances.

Western Australia's imports were valued at \$2.5 billion in 1986-87. Around 90% of imports consisted of manufactured goods. Major import items include petroleum products, road vehicles and industrial machinery.

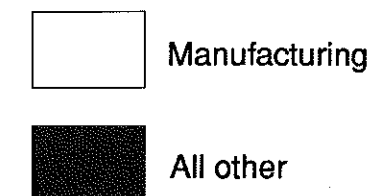
Some 95% of the Northern Territory's imports, valued at \$266 million in 1986-87, were manufactured goods. Road vehicles, petroleum products and machinery of all kinds make up the bulk of the Territory's imports.

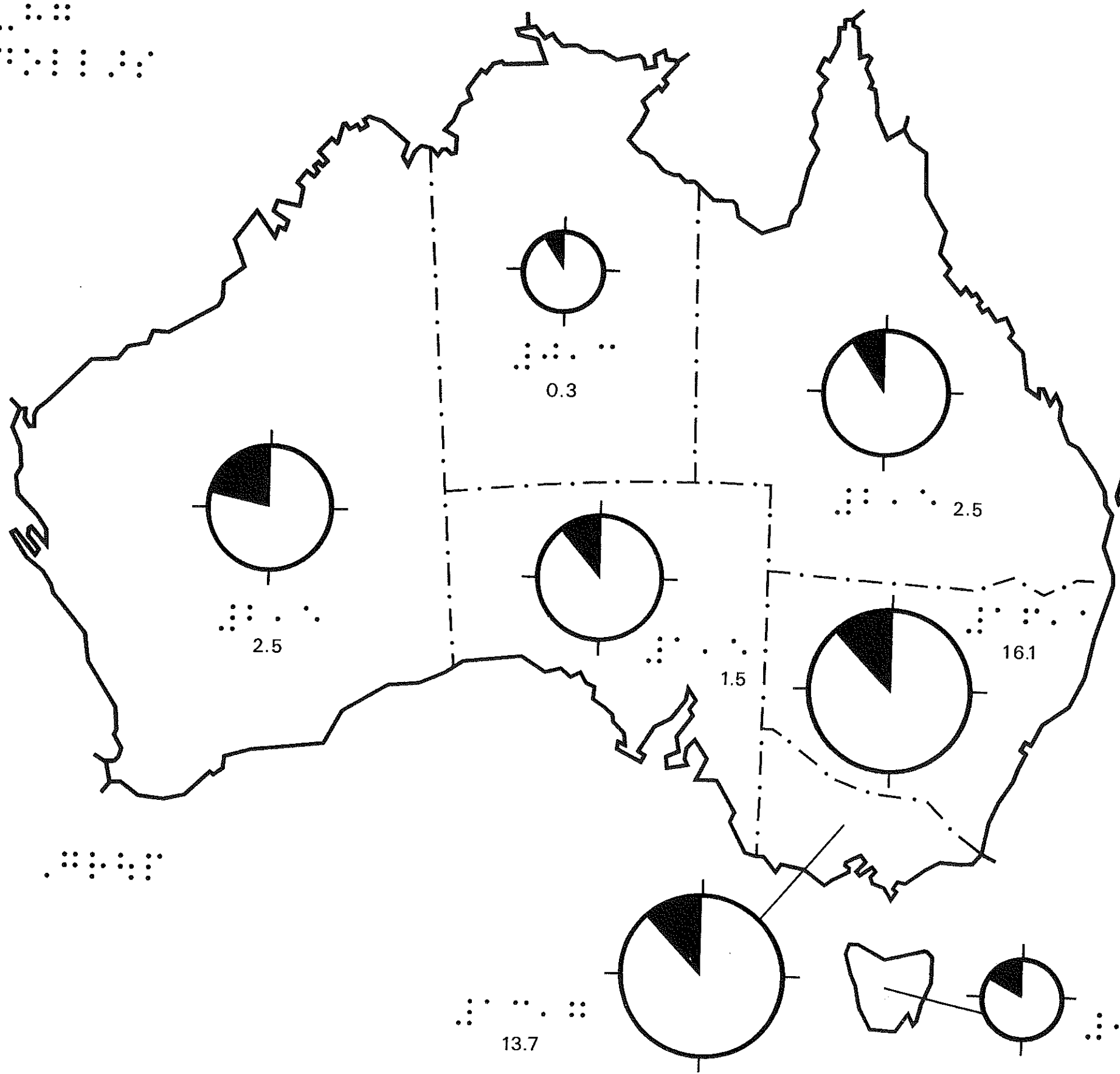
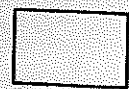
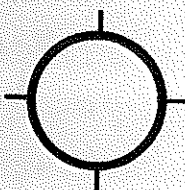
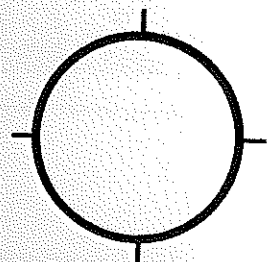
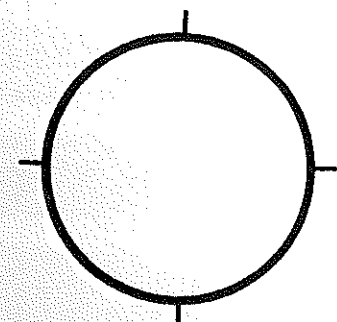
Value of Overseas Imports 1986-87

Billion dollars



Major Product Group





Overseas trade has played a major role in Australia's development. The value of exports has always had a strong influence on the economy, and the flow of imports likewise greatly affects living standards. In 1986-87 Australia's balance of trade showed an overall deficit of around \$2 billion. In world terms, Australia is a middle-level trading nation, ranked about 19th in value of international trade.

The graphs of 'International Trade', No. 45, show the value of the major components of Australia's international trade. The upper bar graph depicts exports and the lower, imports. Each horizontal bar represents a commodity and is coded with a letter. The legend to the right of each graph explains the code letters. Each bar can be traced across to determine the value of that commodity in billions of dollars from the scale on the horizontal axis.

Exports

Australia's export trade grew quickly during the 19th century to meet the increasing need for food and raw materials in Britain and other industrialising European countries. The demand for wool, wheat, other foodstuffs and minerals formed the basis of Australia's export industry.

After World War 2 the market for a new range of exports such as iron ore, nickel, bauxite and alumina was stimulated by the industrialisation of Japan and, later, other countries in eastern Asia. In 1960 mining accounted for less than 10% of Australia's export earnings, whereas today it accounts for more than 45%. Similarly, in 1960 agricultural products made up 80% of total export earnings; today this figure stands at less than 40%.

Significant changes have occurred in both the composition of Australia's export commodities and in their destinations. There has been a marked decline in exports to traditional European trading partners such as the UK and an increase in the importance of markets in Asian and Pacific countries. The most pronounced increase has been in exports to Japan, which now account for 21% of Australia's farm exports and 41% of mining exports. For some specific products, Japan is of even greater importance; for example 75% of iron ore exports and 65% of black coal exports go to Japan.

The upper of the two bar graphs shows the value of Australia's top seven export commodities in 1986-87. Total export earnings for 1986-87 were nearly \$36 billion, of which 15%, some \$5.4 billion, came from Australia's largest single export - black coal. Wool accounted for 10% of total export earnings, followed by alumina (aluminium oxide) and aluminium at almost 8% and wheat at 6%. In descending order of value, meat, iron ore and gold were the next highest export earners.

Imports

In the decades following European settlement Australia was dependent on foreign supplies for virtually all manufactured goods and even large quantities of foodstuffs. Prior to World War 2, imports came to include a growing proportion of machinery and other capital equipment needed for the establishment of manufacturing industries, for the extensive transport system of a sparsely populated continent and for the mining industry.

The most distinctive feature of Australia's imports is their composition relative to other industrial countries. Today Australia still relies heavily on imports of capital equipment though relatively little on imports of food and beverages.

Japan and the USA are Australia's two largest suppliers of imported goods, each accounting for just over 20% of the nation's total value of imports. As with the export market, Japan has strongly increased its role; in 1950 it supplied only 4% of all imports. The UK's share of imports has declined from 36% in the late 1950s to around 7% today.

The lower bar graph shows the value of Australia's top seven import commodities in 1986-87. Total imports in that year were valued at \$37 billion. The major imports were industrial machinery and transport equipment, which accounted for nearly 16% and 11% respectively of the total value of imports. These were followed by textiles, clothing and footwear at around 8% and office machines at 7%. Electrical machinery and appliances, petroleum and petroleum products, and chemicals were also major import items.

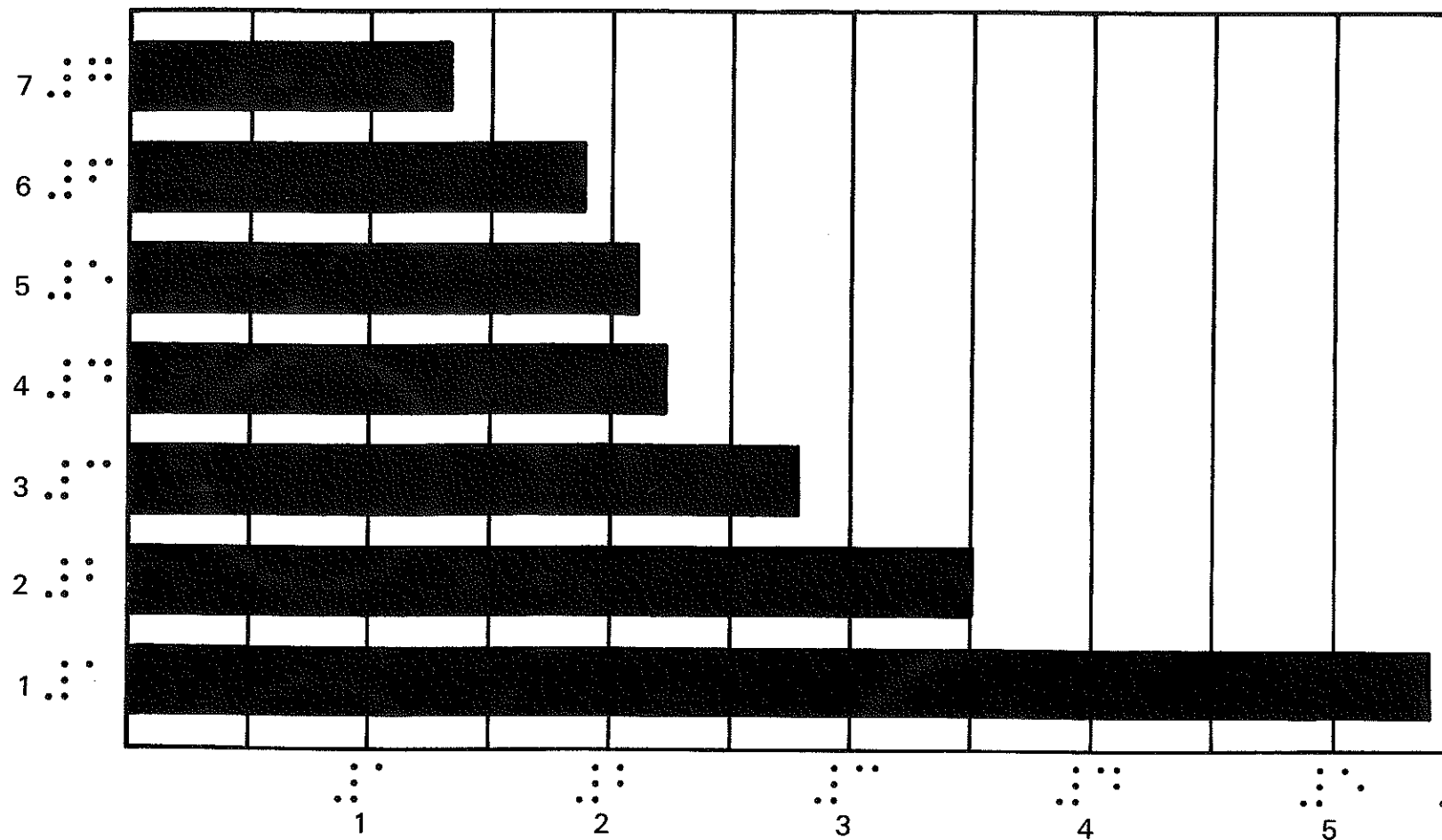
Value of Major Exports 1986 - 87

- 1 Coal
- 2 Wool
- 3 Alumina and aluminium
- 4 Wheat
- 5 Meat
- 6 Iron ore
- 7 Gold

Value of major imports 1986 - 87

- 1 Industrial machinery
- 2 Transport equipment
- 3 Textiles, clothing and footwear
- 4 Office machines
- 5 Electrical machinery and appliances
- 6 Petroleum and petroleum products
- 7 Chemicals

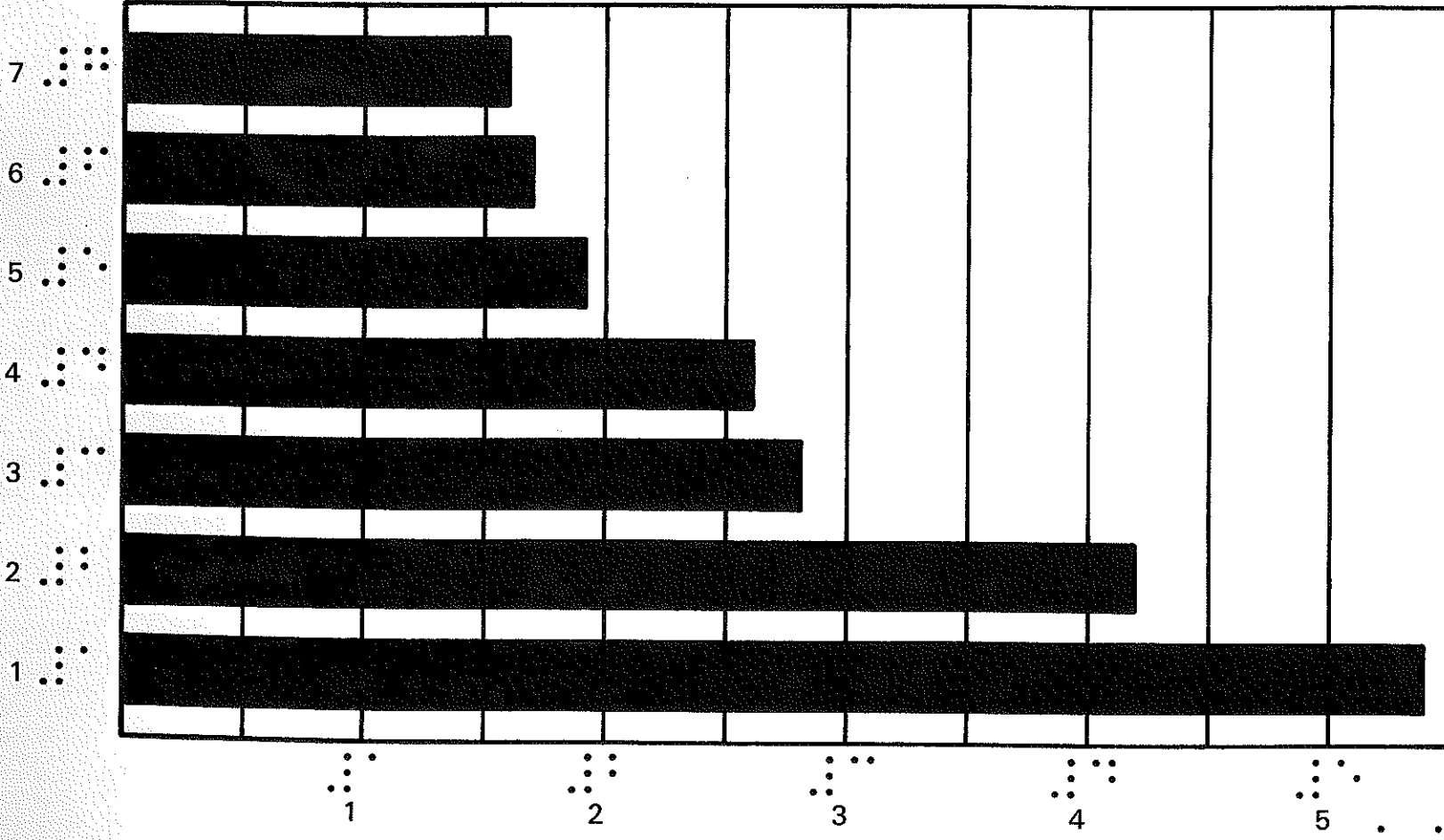
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Billion dollars



1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

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Billion dollars

SECTION H

Gazetteer

The gazetteer which follows lists all features named on the maps in this volume of the Tactual Atlas. It also provides the location reference for each, using an alpha-numeric system. This is a simple grid of letters running horizontally across the map-sheet and numbers running vertically down, which are used to pin-point a small area of the map in which a feature can be found. A detailed explanation of such grid systems can be found in 'A Map User Guide to Reading Tactual and Low Vision Maps' and also in the first volume of the Tactual Atlas.

The names are listed alphabetically and each is followed in turn by its map abbreviation, the number of the map on which it can be found, and its alpha-numeric location on the map-sheet.

Capital cities are indexed to the introductory map 'Australia: General Reference' and to the various State maps in Section C: People. All other names are indexed to each of the maps on which they occur.

The following notes will make it easier for you to locate features named on the maps:

- In general, the alpha-numeric codes refer to the centre of the braille name or to the braille abbreviation, not to the actual location of the feature.
- Each abbreviated name appearing on the State maps is distinguished in the gazetteer by the letter 's' in square brackets.
- Abbreviations are replaced by the symbol "" in cases where the name being referenced appears in full on the map.

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|------------------------------|--------------|---------------|----------------------|
| Abbot Point | ab | 41 | H2 |
| Abbot Point | ap | 35 | H2 |
| Adelaide | A | 1 | G5 |
| Adelaide [s] | A | 11 | H5 |
| Agnew | ag | 30 | E4 |
| Albany [s] | ay | 12 | G6 |
| Albany | ay | 39 | D5 |
| Albany | ay | 41 | D5 |
| Albury | ab | 40 | G5 |
| Albury-Wodonga [s] | aw | 8 | E5 |
| Albury-Wodonga [s] | aw | 9 | E3 |
| Alice Springs [s] | as | 13 | G5 |
| Alice Springs | as | 36 | F3 |
| Alice Springs | as | 38 | F3 |
| Alice Springs | as | 39 | F3 |
| Alice Springs | as | 40 | F3 |
| Alpine National Park | ap | 29 | H5 |
| Alyangula [s] | al | 13 | H2 |
| Argyle | ay | 30 | E2 |
| Armidale [s] | am | 8 | H2 |
| Arnhem Land | al | 1 | F1 |
| Aurukun | au | 33 | G2 |
| Australian Capital Territory | ACT | 1 | H5 |
| Bairnsdale [s] | bd | 9 | F5 |
| Ballarat [s] | ba | 9 | C5 |
| Ballina [s] | bl | 8 | I1 |

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|------------------|--------------|---------------|----------------------|
| Barkly Tableland | by | 1 | F2 |
| Barrow Island | bi | 36 | C3 |
| Bass Strait | 21 | 1 | H6 |
| Bass Strait | bs | 30 | H5 |
| Bass Strait | bs | 36 | H5 |
| Bathurst [s] | bt | 8 | F4 |
| Bell Bay | bb | 33 | H6 |
| Bendigo [s] | bn | 9 | D4 |
| Blair Athol | ba | 35 | G3 |
| Blina | bl | 36 | E2 |
| Bowen Basin | bb | 30 | H3 |
| Bowen Basin | bb | 35 | G3 |
| Boyer | br | 35 | G6 |
| Bridgewater [s] | bw | 10 | G5 |
| Brisbane | B | 1 | I4 |
| Brisbane [s] | B | 7 | H6 |
| Broken Hill [s] | bh | 8 | C3 |
| Broken Hill | bh | 30 | G4 |
| Broken Hill | bh | 34 | G4 |
| Broken Hill | bh | 39 | G4 |
| Broome [s] | br | 12 | G2 |
| Broome | br | 38 | D2 |
| Bunbury [s] | by | 12 | F6 |
| Bunbury | by | 41 | C5 |
| Bundaberg [s] | bg | 7 | H5 |
| Burnie [s] | bu | 10 | F2 |
| Burnie | bu | 38 | H5 |

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|-----------------------|--------------|---------------|----------------------|
| Burnie | bu | 39 | H6 |
| Burnie | bu | 41 | H6 |
| Busselton [s] | bs | 12 | F6 |
| Cadjebut | ct | 34 | E2 |
| Cairns [s] | cn | 7 | F3 |
| Cairns | cn | 38 | G2 |
| Cairns | cn | 39 | H2 |
| Cairns | cn | 40 | H2 |
| Cairns | cn | 41 | H2 |
| Callide | cd | 35 | H3 |
| Callide | cd | 37 | I3 |
| Canberra | C | 1 | H5 |
| Canberra [s] | C | 8 | F5 |
| Cape Bougainville | cbv | 33 | E2 |
| Cape Flattery | cf | 41 | H2 |
| Cape Howe | 2 | 1 | H5 |
| Capel | cl | 30 | C5 |
| Cape Leeuwin | 16 | 1 | C5 |
| Cape York | 6 | 1 | H1 |
| Cape York Peninsula | cyp | 1 | H2 |
| Carnarvon [s] | cr | 12 | E4 |
| Carnarvon | cr | 41 | C3 |
| Casino [s] | cs | 8 | H1 |
| Central Plateau [Tas] | cp | 37 | G6 |
| Cessnock [s] | ck | 8 | G3 |
| Challis | ch | 36 | E1 |

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|--|--------------|---------------|----------------------|
| Channel Country, The | cc | 1 | G3 |
| Charleville | cv | 38 | H3 |
| Charleville | cv | 39 | H3 |
| Cobar-Elura | ce | 30 | H4 |
| Cobar-Elura | ce | 34 | H4 |
| Cobourg Marine Park | cbg | 29 | E1 |
| Cobourg Peninsula | 10 | 1 | F1 |
| Cockle Creek | cc | 34 | I4 |
| Coffs Harbour [s] | ch | 8 | I2 |
| Coffs Harbour | ch | 40 | I4 |
| Colac [s] | cl | 9 | C6 |
| Collie [s] | co | 12 | F6 |
| Collie | co | 35 | C5 |
| Collie | co | 37 | D5 |
| Cooper Pedy | cp | 30 | F4 |
| Coolangatta | cg | 40 | I4 |
| Coringa-Herald National Nature Reserve | cd | 29 | I2 |
| Cranbourne [s] | cb | 9 | D5 |
| Dampier | dm | 39 | C3 |
| Dampier | dm | 41 | D3 |
| Darling Downs | dd | 1 | H3 |
| Darling Range | dl | 30 | D4 |
| Darling Range | dl | 33 | D4 |
| Darwin | D | 1 | F1 |
| Darwin [s] | D | 13 | F1 |
| Devonport [s] | de | 10 | G3 |

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|------------------------------|--------------|---------------|----------------------|
| Devonport | de | 40 | H6 |
| Dongara | dg | 36 | C4 |
| Dubbo [s] | du | 8 | F3 |
| Eneabba | eb | 30 | C4 |
| Esperance [s] | es | 12 | G6 |
| Esperance | es | 39 | E5 |
| Eyre Peninsula | ep | 1 | F4 |
| Fingal | fi | 35 | G6 |
| Flinders Island | 1 | 1 | H6 |
| Flinders Island [s] | * | 10 | H2 |
| Forster-Tuncurry [s] | ft | 8 | H3 |
| Fraser Island | 5 | 1 | I3 |
| Fremantle | fr | 41 | C4 |
| Galiwinku [s] | gk | 13 | H1 |
| Geelong [s] | ge | 9 | C5 |
| Geelong | ge | 41 | G5 |
| Geelong-Altona | ga | 36 | G5 |
| George Town [s] | gt | 10 | G3 |
| Geraldton [s] | gr | 12 | E5 |
| Geraldton | gr | 39 | C4 |
| Geraldton | gr | 41 | C4 |
| Gibson Desert Nature Reserve | gd | 29 | E3 |
| Gladstone [s] | gl | 7 | H5 |
| Gladstone | gl | 33 | H3 |
| Gladstone | gl | 35 | I2 |

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|--------------------------------------|--------------|---------------|----------------------|
| Gladstone | gl | 36 | I3 |
| Gladstone | gl | 37 | I3 |
| Gladstone | gl | 41 | I3 |
| Gold Coast | gc | 1 | I4 |
| Gold Coast-Tweed Heads [s] | gh | 7 | H6 |
| Gold Coast-Tweed Heads [s] | gh | 8 | I1 |
| Goldfields [WA] | gf | 1 | D4 |
| Gordon River | gr | 37 | G6 |
| Gosford-Central Coast [s] | gc | 8 | H4 |
| Goulburn [s] | gb | 8 | F4 |
| Gove | go | 30 | G1 |
| Gove | go | 33 | F1 |
| Gove | go | 41 | G1 |
| Gove Peninsula | 9 | 1 | G1 |
| Grafton [s] | gn | 8 | I2 |
| Great Australian Bight | 17 | 1 | F4 |
| Great Barrier Reef | gbr | 1 | H2 |
| Great Barrier Reef Marine Park | gbr | 29 | H2 |
| Great Victoria Desert Nature Reserve | gvd | 29 | E4 |
| Greenbushes | gu | 30 | D5 |
| Greenbushes | gu | 34 | D5 |
| Greenvale | gv | 30 | G2 |
| Griffith [s] | gf | 8 | E4 |
| Groote Eylandt | gy | 30 | G1 |
| Groote Eylandt | gy | 41 | G1 |
| Gulf of Carpentaria | 8 | 1 | G2 |

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|------------------------|--------------|---------------|----------------------|
| Hamilton Island | hi | 40 | I2 |
| Hay Point | hp | 35 | I2 |
| Hay Point | hp | 41 | I3 |
| Herberton | hn | 34 | H2 |
| Hervey Bay [s] | hb | 7 | H5 |
| Hobart | H | 1 | H6 |
| Hobart [s] | H | 10 | G5 |
| Horsham [s] | hs | 9 | B4 |
| Hunter Valley | hv | 1 | H4 |
| Hunter Valley | hv | 37 | H4 |
| Ipswich | ip | 35 | H4 |
| Ipswich | ip | 37 | I4 |
| Jabiru [NT] [s] | jb | 13 | G1 |
| Jabiru [Timor Sea] | ju | 36 | E1 |
| Jackson | jk | 30 | H3 |
| Jackson | jk | 36 | G3 |
| Joseph Bonaparte Gulf | 12 | 1 | E1 |
| Kakadu National Park | ku | 29 | F1 |
| Kalgoorlie | kg | 30 | D4 |
| Kalgoorlie | kg | 38 | E4 |
| Kalgoorlie | kg | 39 | E4 |
| Kalgoorlie | kg | 40 | E4 |
| Kalgoorlie-Boulder [s] | kb | 12 | G5 |
| Kambalda | km | 30 | E4 |

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|-----------------------------|--------------|---------------|----------------------|
| Kambalda | km | 34 | E4 |
| Kangaroo Island | 19 | 1 | F5 |
| Karratha [s] | ka | 12 | F3 |
| Karratha | ka | 40 | C3 |
| Katherine [s] | kt | 13 | G2 |
| Katherine | kt | 38 | F1 |
| Kidston | kd | 30 | G2 |
| Kimberley | ki | 1 | E2 |
| King Island | 20 | 1 | G6 |
| King Island [s] | * | 10 | E1 |
| King Island | kn | 30 | G5 |
| Kingston [s] | kg | 10 | G5 |
| Kosciusko National Park | ko | 29 | H5 |
| Kurri Kurri | kk | 33 | H4 |
| Kwinana | kw | 35 | C4 |
| Kwinana | kw | 36 | C5 |
| Kwinana | kw | 37 | C5 |
| Lake Eyre | le | 1 | G4 |
| Lake Eyre Conservation Park | le | 29 | F4 |
| Latrobe Valley | lv | 30 | H5 |
| Latrobe Valley | lv | 35 | G5 |
| Latrobe Valley | lv | 37 | H5 |
| Launceston [s] | la | 10 | H3 |
| Launceston | la | 40 | H6 |
| Launceston | la | 41 | H6 |
| Leigh Creek | lc | 30 | G4 |

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|------------------------------------|--------------|---------------|----------------------|
| Leigh Creek | lc | 35 | F4 |
| Lihou Reef National Nature Reserve | lr | 29 | I2 |
| Lismore [s] | li | 8 | H1 |
| Lithgow [s] | lg | 8 | G4 |
| Longford | lf | 36 | H5 |
| Long Island Point | li | 36 | H5 |
| Longreach | lr | 39 | H3 |
| Mackay [s] | mk | 7 | G4 |
| Mackay | mk | 40 | H3 |
| Mackay | mk | 41 | I3 |
| Maitland [s] | ml | 8 | H3 |
| Mallee [Vic] | * | 9 | A2 |
| Maryborough [Qld] [s] | mr | 7 | G5 |
| Melbourne | M | 1 | H5 |
| Melbourne [s] | M | 9 | D5 |
| Melton [s] | mt | 9 | C5 |
| Melville and Bathurst Islands | 11 | 1 | E1 |
| Mereenie | me | 36 | E3 |
| Mereenie-Palm Valley | mp | 30 | F3 |
| Middleback Ranges | mr | 30 | G4 |
| Middleback Ranges | mr | 32 | G4 |
| Mildura [s] | ma | 9 | A1 |
| Mildura | ma | 39 | G5 |
| Millicent [s] | mc | 11 | H6 |
| Mitchell Plateau | mt | 33 | E2 |
| Moe-Yallourn [s] | my | 9 | E5 |

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|-----------------------------|--------------|---------------|----------------------|
| Mooloolaba-Maroochydore [s] | mm | 7 | H6 |
| Moomba | mo | 30 | F4 |
| Moomba | mo | 36 | G3 |
| Moonie | mn | 36 | H4 |
| Moree [s] | me | 8 | G1 |
| Morwell [s] | mw | 9 | E6 |
| Mount Gambier [s] | mg | 11 | H6 |
| Mount Isa [s] | mi | 7 | D4 |
| Mount Isa | mi | 30 | G2 |
| Mount Isa | mi | 34 | G2 |
| Mount Isa | mi | 35 | F2 |
| Mount Isa | mi | 38 | G2 |
| Mount Isa | mi | 39 | G2 |
| Mount Tom Price | tp | 32 | C3 |
| Murray Bridge [s] | mb | 11 | I5 |
| Newcastle [s] | nc | 8 | H4 |
| Newcastle | nc | 32 | H4 |
| Newcastle | nc | 35 | H4 |
| Newcastle | nc | 37 | I4 |
| Newcastle | nc | 41 | I4 |
| Newman | nm | 32 | D3 |
| New Norfolk [s] | nn | 10 | G5 |
| New South Wales | NSW | 1 | H4 |
| Ningaloo Marine Park | ni | 29 | C3 |
| Nguiu [s] | ng | 13 | E1 |
| Nhulunbuy [s] | ny | 13 | H1 |

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|--------------------------------------|--------------|---------------|----------------------|
| Norseman | nr | 30 | E4 |
| Northam [s] | nt | 12 | F5 |
| Northern Territory | NT | 1 | F3 |
| North Stradbroke and Moreton Islands | 4 | 1 | I4 |
| North Stradbroke Island | nsi | 30 | I3 |
| North West Cape | 14 | 1 | C3 |
| North West Shelf | ns | 1 | C3 |
| North West Shelf | ns | 30 | C3 |
| North West Shelf | ns | 36 | D2 |
| Nowra-Bomaderry [s] | nb | 8 | G5 |
| Nullarbor Plain | np | 1 | E4,F4 |
| Olympic Dam | od | 30 | F4 |
| Olympic Dam | od | 34 | G4 |
| Orange [s] | or | 8 | G4 |
| Palm Valley | pv | 36 | F3 |
| Paraburdoo | pr | 32 | C3 |
| Perth | P | 1 | D4 |
| Perth [s] | P | 12 | F5 |
| Pilbara | pi | 1 | D3 |
| Pilbara | pi | 30 | C3 |
| Pine Creek | pc | 30 | F2 |
| Point Henry | py | 33 | H5 |
| Port Augusta [s] | pa | 11 | H4 |
| Port Augusta | pa | 35 | F4 |
| Port Augusta | pa | 37 | F4 |

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|--------------------|--------------|---------------|----------------------|
| Port Augusta | pa | 38 | G4 |
| Port Bonython | pb | 36 | F4 |
| Port Bonython | pb | 41 | F4 |
| Port Hedland [s] | ph | 12 | F3 |
| Port Hedland | ph | 38 | C3 |
| Port Hedland | ph | 39 | D2 |
| Port Hedland | ph | 41 | D2 |
| Port Jackson | 3 | 1 | I5 |
| Port Kembla | pk | 32 | H5 |
| Port Kembla | pk | 34 | I5 |
| Port Kembla | pk | 35 | I5 |
| Port Kembla | pk | 41 | I5 |
| Portland [s] | pd | 9 | A5 |
| Portland | pd | 33 | G5 |
| Portland | pd | 41 | G5 |
| Port Latta | pt | 41 | G6 |
| Port Lincoln [s] | pl | 11 | G5 |
| Port Lincoln | pl | 39 | F5 |
| Port Macquarie [s] | pm | 8 | H3 |
| Port Pirie [s] | pp | 11 | H4 |
| Port Pirie | pp | 34 | G4 |
| Port Pirie | pp | 39 | F4 |
| Port Pirie | pp | 41 | G4 |
| Port Stanvac | ps | 36 | G5 |
| Port Stanvac | ps | 41 | G5 |
| Port Walcott | pw | 41 | D3 |

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|--|--------------|---------------|----------------------|
| Queanbeyan [s] | qn | 8 | G5 |
| Queensland | Q | 1 | H3 |
| Railton | rn | 35 | G6 |
| Ranger | ra | 30 | F1 |
| Risdon | rs | 34 | H6 |
| Riverina | ri | 1 | H5 |
| Robe River | rr | 32 | D3 |
| Rockhampton [s] | rk | 7 | G5 |
| Rockhampton | rk | 37 | H3 |
| Rockhampton | rk | 38 | I3 |
| Rockhampton | rk | 39 | I3 |
| Rockhampton | rk | 40 | H3 |
| Roma | rm | 30 | H3 |
| Roma | rm | 36 | H3 |
| Rudall River National Park | rr | 29 | E3 |
| Sale [s] | sa | 9 | F5 |
| Savage River | sr | 32 | G6 |
| Shark Bay | 15 | 1 | C4 |
| Shay Gap-Sunrise Hill | sg | 32 | D3 |
| Shepparton-Mooroopna [s] | sh | 9 | E3 |
| Simpson Desert Conservation Park &
adjoining reserves | si | 29 | F4 |
| Singleton [s] | sg | 8 | G3 |
| Snowy Mountains | sm | 37 | H5 |
| South Australia | SA | 1 | F4 |
| South-west Tasmania | swt | 29 | G6 |

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|-------------------|--------------|---------------|----------------------|
| Spencer Gulf | 18 | 1 | F5 |
| Sunbury [s] | sb | 9 | D5 |
| Sydney | S | 1 | H4 |
| Sydney [s] | S | 8 | G4 |
| Sydney Basin | sb | 30 | H4 |
| Sydney Basin | sb | 35 | G4 |
| Tamworth [s] | tw | 8 | G3 |
| Taree [s] | te | 8 | H3 |
| Tarong | ta | 35 | H3 |
| Tarong | ta | 37 | H3 |
| Tasmania | T | 1 | H6 |
| Telfer | tf | 30 | E3 |
| Tennant Creek [s] | tc | 13 | G4 |
| Tennant Creek | tc | 30 | F2 |
| Tennant Creek | tc | 34 | F2 |
| Tennant Creek | tc | 38 | F2 |
| The Granites | tg | 30 | E2 |
| Thevenard | td | 41 | F4 |
| Thursday Island | 7 | 1 | G1 |
| Tomago | tm | 33 | H4 |
| Toowoomba [s] | to | 7 | G6 |
| Torres Strait | ts | 14 | G1 |
| Townsville | tv | 34 | H3 |
| Townsville | tv | 38 | H2 |
| Townsville | tv | 39 | H2 |
| Townsville | tv | 40 | H2 |

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|---------------------------|--------------|---------------|----------------------|
| Townsville | tv | 41 | H2 |
| Townsville-Thuringowa [s] | tt | 7 | F3 |
| Traralgon [s] | tr | 9 | E5 |
| Uluru (Ayers Rock) | ul | 1 | F3 |
| Uluru National Park | uu | 29 | F3 |
| Ulverstone [s] | uv | 10 | F3 |
| Victor Harbor [s] | vh | 11 | H5 |
| Victoria | V | 1 | G5 |
| Victorian Alps | * | 9 | F4 |
| Wagga Wagga [s] | ww | 8 | E5 |
| Wallerawang | wa | 37 | H4 |
| Wangaratta [s] | wg | 9 | E4 |
| Warrnambool [s] | wr | 9 | B6 |
| Weipa | we | 30 | G1 |
| Weipa | we | 33 | H1 |
| Weipa | we | 41 | G1 |
| West Coast [Tas] | wc | 30 | G6 |
| West Coast [Tas] | wc | 34 | G6 |
| Western Australia | WA | 1 | D3 |
| Western Port | wp | 41 | H5 |
| Whyalla [s] | wy | 11 | G4 |
| Whyalla | wy | 32 | G4 |
| Whyalla | wy | 35 | F4 |
| Whyalla | wy | 41 | F4 |

| Name | Abbreviation | Map
Number | Alphanumeric
Code |
|----------------|--------------|---------------|----------------------|
| Withnell Bay | wb | 36 | D3 |
| Wivenhoe | wi | 37 | H4 |
| Wollongong [s] | wl | 8 | G4 |
| Woodcutters | wt | 34 | F2 |
| Woodlawn | wd | 30 | H5 |
| Woodlawn | wd | 34 | H5 |
| Yampi Sound | 13 | 1 | D2 |
| Yampi Sound | ys | 30 | D2 |
| Yampi Sound | ys | 32 | E2 |
| Yampi Sound | ys | 41 | D2 |
| Yulara [s] | yl | 13 | F6 |