CHAPTER II.

PHYSIOGRAPHY.

§ 1. General Description of Australia.

1. **Geographical Position.**—(i) *General.* The Australian Commonwealth, which includes the island continent of Australia proper and the island of Tasmania, is situated in the Southern Hemisphere, and comprises in all an area of about 2,974,581 square miles, the mainland alone containing about 2,948,366 square miles. Bounded on the west and east by the Indian and Pacific Oceans respectively, it lies between longitudes 113° 9′ E. and 153° 39′ E., while its northern and southern limits are the parallels of latitude 10° 41′ S. and 43° 39′ S., or, excluding Tasmania, 39° 8′ S. On its north are the Timor and Arafura Seas and Torres Strait, on its south the Southern Ocean. The extreme points are Steep Point on the west, Cape Byron on the east, Cape York on the north, and South-East Cape or, if Tasmania be excluded, Wilson's Promontory, on the south.

(ii) *Tropical and Temperate Regions.* Of the total area of Australia, nearly 40 per cent. lies within the tropics. Assuming, as is usual, that the latitude of the Tropic of Capricorn is 23° 30′ S., the areas within the tropical and temperate zones are approximately as follows:—

AUSTRALIA: AREAS OF TROPICAL AND TEMPERATE REGIONS.

(Square miles.)

Area.	N.S.W. (a)	Vic.	Qld.	S. Aust.	W. Aust.	Tas.	N. Terr.	Total.
Within Tropical Zone ..	..	..	359,000	..	364,000	..	426,320	1,149,320
„ Temperate Zone	310,372	87,884	311,500	380,070	611,920	26,215	97,300	1,825,261
Total Area .	310,372	87,884	670,500	380,070	975,920	26,215	523,620	2,974,581

(*a*) Includes Australian Capital Territory (939 square miles).

Fifty-four per cent. of Queensland lies within the tropical zone and 46 per cent. in the temperate zone; 37 per cent. of Western Australia is tropical and 63 per cent. temperate; while 81 per cent. of the Northern Territory is tropical and 19 per cent. temperate. All of the remaining States lie within the temperate zone. The tropical part of Australia thus comprises about 39 per cent. of the whole of the continent, and about 53 per cent. of the three territories which have areas within the tropical zone.

2. **Area of Australia compared with Areas of other Countries.**—The area of Australia is almost as great as that of the United States of America, four-fifths of that of Canada, nearly three-quarters of the whole area of Europe, and about 25 times as large as Great Britain and Ireland. The areas of Australia and of certain other countries are shown in the table on the following page.

AREA OF AUSTRALIA AND OF OTHER COUNTRIES, *circa* 1954.

('000 square miles.)

Country.	Area.
Continental Divisions—	
Europe (*a*)	1,903
Asia (*a*)	10,443
U.S.S.R. (Europe and Asia)	8,599
Africa	11,693
North and Central America and West Indies	9,354
South America	6,892
Oceania	3,304
Total, excluding Arctic and Antarctic Conts.	*52,188*
Europe (*a*)—	
France	213
Spain (incl. possessions)	194
Sweden	173
Germany	136
Finland	130
Norway	125
Poland	120
Italy	116
Yugoslavia	99
United Kingdom	94
Romania	92
Other	411
Total (*a*)	*1,903*
Asia (*a*)—	
China and Dependencies	3,759
India and Nepal	1,231
Iran	629
Saudi Arabia	618
Mongolian People's Republic	591
Indonesia	576
Pakistan	364
Turkey	300
Burma	262
Afghanistan	251
Thailand	198
Iraq	172
Other	1,492
Total (*a*)	*10,443*
U.S.S.R.	*8,599*
Africa—	
French West Africa	1,831
French Equatorial Africa	969
Anglo-Egyptian Sudan	967
Belgian Congo	905
Algeria	846
Libya	679
Africa—*continued.*	
Rhodesia and Nyasaland Federation	490
Angola	481
Union of South Africa	472
Ethiopia and Eritrea	457
Egypt	386
Tanganyika Territory	363
Nigeria and Protectorate	339
South-West Africa	318
Mozambique	298
Bechuanaland Protectorate	275
Madagascar	228
Kenya Colony and Protectorate	225
Other	1,164
Total	*11,693*
North and Central America—	
Canada	3,845
United States of America	3,022
Greenland	840
Mexico	760
Alaska	586
Nicaragua	57
Cuba	44
Honduras	43
Other	157
Total	*9,354*
South America—	
Brazil	3,287
Argentina	1,084
Peru	506
Colombia (excl. of Panama)	439
Bolivia	424
Venezuela	352
Chile	286
Paraguay	157
Ecuador	105
Other	252
Total	*6,892*
Oceania—	
Commonwealth of Australia	2,975
New Zealand	103
New Guinea (*b*)	93
Papua	91
Other	42
Total	*3,304*

(*a*) Excludes U.S.S.R., shown below. (*b*) Australian Trust Territory.

The areas shown in the table are obtained from the *Demographic Yearbook*, 1955 published by the Statistical Office of the United Nations and the countries have been arranged in accordance with the continental groups used therein.

3. **Areas of States and Territories, Coastal Configuration and Standard Times.**—As already stated, Australia consists of six States and the Northern and Australian Capital Territories. Particulars of areas, coastline and standard times are shown in the following table:—

AUSTRALIA: AREAS OF STATES AND TERRITORIES, COASTLINE AND STANDARD TIMES.

State or Territory.	Area.	Proportion of Total Area.	Coastline.	Area per Mile of Coastline.	Standard Times. Meridian Selected.	Standard Times. Ahead of G.M.T.
	Sq. miles.	%	Miles.	Sq. miles.		Hours.
New South Wales ..	309,433	10.40	(a) 700	(a) 443	150° E.	10
Victoria	87,884	2.96	680	129	150° E.	10
Queensland	670,500	22.54	3,000	223	150° E.	10
South Australia ..	380,070	12.78	1,540	247	142°30′E.	9½
Western Australia ..	975,920	32.81	4,350	224	120° E.	8
Northern Territory ..	523,620	17.60	1,040	503	142°30′E.	9½
Australian Capital Territory	939	0.03	..	..	150° E.	10
Mainland	*2,948,366*	*99.12*	*11,310*	*261*	..	..
Tasmania	26,215	0.88	900	29	150° E.	10
Australia ..	**2,974,581**	**100.00**	**12,210**	**244**	..	..

(*a*) Includes Australian Capital Territory.

There are no striking features in the configuration of the coast; the most remarkable identations are the Gulf of Carpentaria on the north and the Great Australian Bight on the south. The Cape York Peninsula on the extreme north is the only other remarkable feature in the outline. In Official Year Book No. 1 an enumeration was given of the features of the coastline of Australia (*see* pp. 60–68).

Prior to 1895, the official time adopted in the several colonies was for most purposes the mean solar time of the capital city of each. In 1894 and 1895, after several conferences had been held, legislation was enacted by each of the colonies whereby the mean solar times of the meridians of east longitude 120° (Western Australia), 135° (South Australia and Northern Territory) and 150° (Queensland, New South Wales, Victoria and Tasmania) were adopted. In 1898, however, the South Australian legislature amended its earlier provision and adopted the mean solar time of the meridian 142° 30′ E. longitude as the standard time for that colony. For further information on this subject, *see* Official Year Book No. 39, p. 65.

4. **Geographical Features of Australia.**—(i) *General.* The following description is only a broad summarization of the main physical characteristics of the Australian continent. For greater detail of particular geographical elements, earlier issues of the Official Year Book should be consulted. The list of special articles, etc., at the end of this volume indicates the nature of the information available and its position in the various issues.

(ii) *Orography of Australia.* (*a*) *General Description of the Surface.* Owing to the absence of any very high mountain chains, and to the great depression in the centre of Australia, the average elevation of the Australian continent above the level of the surrounding oceans is less than that of any of the other continents. Three-quarters of the land-mass lies between the 600 and 1,500 feet contours in the form of a huge plateau.

A section through the continent from east to west, at the point of its greatest breadth, shows first a narrow belt of coastal plain. This plain, extending north and south along the whole eastern coast, is well watered by rivers. It is of variable width, seldom more than sixty or seventy miles, and occasionally only a few miles, the average being roughly about forty to fifty miles. From this plain, the Great Dividing Range, extending from the north of Queensland to the south of New South Wales, and thence sweeping westward through Victoria, rises, often abruptly, and frequently presents bold escarpments on its eastern face. The descent on its western slopes is gradual, until, in the country to the north of Spencer's Gulf, the plain is not above sea-level, and occasionally even below it. Thence there is another almost imperceptible rise until the mountain ranges of Western Australia are reached, and beyond these lies another coastal plain.

The great central plain or plateau is the most distinctive feature of the Australian continent and its climatic peculiarities can probably be largely ascribed thereto.

(*b*) *Mountain Systems.* The main mountain feature of Australia is the Great Dividing Range, which runs along the whole eastern coast of the continent and can be traced over the islands of Torres Strait to New Guinea, while in the south one branch sweeps westwards towards the boundary of Victoria and South Australia, and the other, the main branch, terminates in Tasmania.

This mountain system is at no place more than 250 miles from the eastern coastline and it approaches to less than 30 miles. On the whole, it is much closer to the coast in both New South Wales and Victoria than it is in Queensland, the corresponding average distances being about 70, 65 and 130 miles respectively. There is no connexion between the mountains of the eastern and other States of Australia.

The mountains of Australia are relatively low. Thus, in Queensland, the Great Dividing Range reaches a height above sea-level of less than 5,500 feet, the highest peak being Mount Bartle Frere. Mount Kosciusko, in New South Wales, is only about 7,300 feet, and Mount Bogong, in Victoria, about 6,500 feet high. In South Australia and Western Australia, heights of three and four thousand feet are attained. In Tasmania the greatest height is only a little more than 5,000 feet. This fact, that there are no high mountains in Australia, is also of considerable importance in considering the climate of Australia.

It may be of interest to observe that at one time Tasmania was probably connected with the mainland. As the Great Dividing Range can, in the north, be traced from Cape York across Torres Strait to New Guinea, so its main axis can be similarly followed across the shallow waters of Bass Strait and its islands from Wilson's Promontory to Tasmania, which may be said to be completely occupied by ramifications of the chain. The central part of the island is occupied by an elevated plateau, roughly triangular in shape, and presenting bold fronts to the east, west and north. This does not extend in any direction more than about 60 miles. The plateau rests upon a more extensive tableland, the contour of which closely follows the coastline, and occasionally broadens out into low-lying tracts not much above sea-level. The extreme south of the island is rugged in character.

(iii) *Hydrology of Australia.* (*a*) *Rainfall.* On the whole, Australia is a country with a limited rainfall. This is immediately evident on studying its river systems, its lakes, and its artesian areas. Its one large river system is that of the Murray and Darling Rivers, of which the former stream is the larger and more important. Many of the rivers of the interior run only after heavy rains. Depending almost entirely on rainfall, a consequence of the absence of high mountains, they drain large areas with widely varying relation as between rainfall and flow. Thus it has been estimated that not more than 10 per cent. of the rainfall on the catchment area of the Darling River above Bourke (New South Wales) discharges itself past that town. The rate of fall is often very slight.

(*b*) *Rivers.* The rivers of Australia may be divided into two major classes, those of the coastal plains with moderate rates of fall; and those of the central plains with very slight fall. Of the former not many are navigable for any distance from their mouths, and bars make many of them difficult of access or inaccessible from the sea.

The two longest rivers of the northern part of the eastern coast are the Burdekin, discharging into Upstart Bay, with a catchment area of 53,500 square miles, and the Fitzroy, which reaches the sea at Keppel Bay and drains about 55,600 square miles.

The Hunter is the largest coastal river of New South Wales, draining about 11,000 square miles before it reaches the sea at Newcastle. The Murray River, with its great tributary the Darling, drains a considerable part of Queensland, the major part of New South Wales and a large part of Victoria. It debouches into the arm of the sea known as Lake Alexandrina, on the eastern side of the South Australian coast. The total length of the Murray is about 1,600 miles, 400 being in South Australia and 1,200 constituting the boundary between New South Wales and Victoria. The total length of the Darling-Murray from the source of the Darling to the mouth of the Murray is about 2,300 miles. In good seasons the river is navigable for a considerable proportion of its length.

The rivers of the north-west coast of Australia (Western Australia) are of considerable size, e.g., the Murchison, Gascoyne, Ashburton, Fortesque, De Grey, Fitzroy, Drysdale and Ord. So also are those in the Northern Territory, e.g., the Victoria and Daly. The former of these, estimated to drain 90,000 square miles, is said to be navigable for 50 miles.

The rivers on the Queensland side of the Gulf of Carpentaria, such as the Gregory, Leichhardt, Cloncurry, Gilbert and Mitchell, are also of considerable size.

Owing to the small amount of fall of many of the interior rivers, they may flood hundreds of miles of country in wet seasons, while in dry seasons they form a mere succession of waterholes or are entirely dry. It is this fact that explains the apparently conflicting reports of the early explorers, one regarding the interior as an inland sea, and another as a desert.

The rivers of Tasmania have short and rapid courses, as might be expected from the configuration of the territory.

(*c*) *Lakes.* The " lakes " of Australia may be divided into three classes, true permanent lakes; lakes which, being very shallow, become mere morasses in dry seasons or even dry up and finally present a cracked surface of salt and dry mud; and lakes which are really inlets of the ocean, opening out into a lake-like expanse.

The second class is the only one which seems to demand special mention. These are a characteristic of the great central plain of Australia. Some of them, such as Lake Torrens, Gairdner, Eyre and Frome, are of considerable extent.

(*d*) *Artesian Areas.* A considerable tract of the plain country of New South Wales and Queensland carries a water-bearing stratum, usually at a great depth. A large number of artesian bores have been put down, from which there is a considerable flow. These are of great value and render usable large areas which otherwise would be difficult to occupy even for pastoral purposes.

For further information on this subject, *see* Chapter IX.—Water Conservation and Irrigation.

5. **Fauna, Flora, Geology and Seismology of Australia.**—Special articles dealing with these features have appeared in previous issues of the Official Year Book, but limits of space naturally preclude their repetition in each volume. The nature and location of these articles can be readily ascertained from the special index preceding the general index at the end of this issue.

§ 2. Climate and Meteorology of Australia.

NOTE.—This Section has been prepared by the Director, Commonwealth Meteorological Bureau, and the various States and Territories have been arranged in the standard order adopted by that Bureau.

1. **Introductory.**—Previous issues of the Official Year Book, notably No. 3, pp. 79–83, and No. 4, pp. 84 and 87, contained outlines of the history of Australian meteorology and the creation and organization of the Commonwealth Bureau of Meteorology. Official Year Book No. 38, pp. 30–32, contained paragraphs devoted to (i) Organization of the Meteorological Service ; (ii) Meteorological Publications ; (iii) Equipment ; and (iv) Meteorological Divisions.

By reason of its insular geographical position and the absence of striking physical features, whether in marine gulfs or in important mountains, Australia is, on the whole, less subject to extremes of weather than are regions of similar area in other parts of the globe, and latitude for latitude Australia is generally more temperate.

The average elevation of the surface of the land is low, probably close to 900 feet above the sea. The altitudes range up to a little more than 7,300 feet, hence the Australian climate displays a great many features, from the charactistically tropical to what is essentially alpine, a fact indicated in some measure by the name Australian Alps given to the southern portion of the Great Dividing Range.

On the coast, the rainfall is often abundant and the atmosphere moist, but in some portions of the interior it is very limited, and the atmosphere dry. The distribution of forest, therefore, with its climatic influence, is very uneven. In the interior, in places, there are fine belts of trees, but there are also large areas which are treeless, and here the air is hot and parching in summer. Again, on the coast, even so far south as latitude 35°, the vegetation is tropical in its luxuriance, and to some extent also in character.

2. **Temperature.**—(i) *Effective Temperature.* When a meteorologist speaks of temperature, he means the temperature of the air indicated by a thermometer sheltered from precipitation, from direct rays of the sun and from radiation of heat from the ground

and neighbouring objects, yet freely exposed to the circulation of the air. In other words, he means temperature measured under conditions standardized as near as possible in a Stevenson Screen, which is the standard housing for meteorological thermometers.

This shade temperature as measured by a " dry bulb " thermometer shows only the actual temperature experienced by dry inorganic substances, not the *sensible* temperatures felt by organic bodies. In the case of human beings, sensible temperature is affected by the rate of conduction of heat to or from the body by moving air and also by the rate of cooling due to evaporation from the skin and respiratory passages. The wind and humidity therefore determine the sensible temperature.

The humidity (relative humidity) is determined from the readings of the dry and wet bulb thermometers. Of late years, however, with increasing interest in human comfort in tropical climates, another term, *effective* temperature, has come into use. It may be defined as " the temperature of a still, saturated atmosphere which would on the average produce the same feeling of warmth or cold as the atmosphere in question ".*

The 80° F. isotherm is confined to a very narrow tract of country on the north-west coast of Western Australia. The 75° F. isotherm extends, broadly, from Onslow on the north-west coast of Western Australia to Daly Waters to Camooweal to Moreton in Cape York Peninsula following in a general way the coastline of Northern Australia but from 100 to 300 miles inland.

Later investigations have established " comfort zones "† bounded by limits of effective temperature within which people will feel comfortable. American research workers have determined the following figures ‡:—

COMFORT ZONES: EFFECTIVE TEMPERATURES.

Season.	No subjects feel comfortable below—	Fifty per cent. of subjects feel comfortable between—	No subjects feel comfortable above—
Winter..	60° F.	63° and 71° F.	74° F.
Summer	64° F.	66° and 75° F.	79° F.

Queensland investigators§ in recent years have divided some towns of Queensland into three classes on the basis of deviation from comfort:—

Class 1 (Sub-tropics).—Quite suitable for Caucasian habitation—Rockhampton, Bundaberg, Brisbane, Longreach, Charleville.

Class 2 (Marginal tropics).—Suitable for Caucasian habitation, but requires adaptation in summer—Mackay, Townsville.

Class 3 (Tropics).—(*a*) Permissible for Caucasian habitation but requires selection and marked adaptation—Cardwell, Cairns. Cloncurry. (*b*) Not suitable for continuous Caucasian habitation—Cape York, Burketown.

These results of recent years bear out investigations made previously in Australia‖ in which the atmospheric vapour pressure was used as a measure of comfort, its value for this purpose being that it has equal effect in both indoor and outdoor climates. The limits of comfort range from .2 to .5 inch of vapour pressure. After drawing isopleths for effective temperature (not corrected for altitude), mean vapour pressure reduced to a logarithmic scale, and mean wet bulb temperature, it is found that there is close agreement in defining zones of relative discomfort.

(ii) *Seasons.* The Australian seasons are:—Summer, December to February; autumn, March to May; winter, June to August; spring, September to November. In most parts of Australia, January is the hottest month, but in Tasmania and southern Victoria, February is the hottest; in the tropical north, probably because the cooling " monsoon " rains occur in late summer, December is the hottest month, and at Darwin, November.

On a rainfall basis, in the tropical north the year is divisible into " wet " and " dry " seasons, but on the basis of temperatures and physical comfort the " dry " season can be further sub-divided into two parts—" cool dry " and " warm dusty ".¶

(*a*) " *Cool dry* " *Season.* From May to August. The average maximum temperature ranges from 80° to 85° F., the relative humidity is low and in inland areas cold nights are experienced when the temperature drops to 40° F. The skies generally are cloudless, but in about one year in three during June or July one to two inches of rain fall.

* Houghton, F. C., Teague, W. W. and Miller, W. E. (1926) Amer. Soc. Heat. Vent. Engns. † Yaglou, C. P. (1926) J. Industr. Hyg. ‡ Yaglou, C. P. (1927) Ibid. § Lee, D. H. K. Trans. Roy. Soc. Trop. Med. and Hyg. (1940) Vol. XXXII. ‖ Barkley, H. Zones of Relative Physical Comfort in Australia, Met. Bull. 20, 1934. ¶ Maze, W. H. Austn. Geog. June, 1945. Settlement in E. Kimberleys.

(b) " *Warm dusty* " *Season.* From the end of August temperatures rise and reach a maximum in October or the beginning of November. Temperatures of over 120° F. have been recorded.

(c) " *Wet* " *Season.* After the first of the heavy storms, the maximum temperatures fall but still remain high with high relative humidity. At Wyndham during January, 1944 the minimum temperature did not drop below 75° F. for fourteen consecutive days. A maximum of over 100° F. was recorded on each rainless day.

In Central and Northern Australia, during the hottest months, the average temperatures range from 80° to 85° F., whereas in Southern Australia they vary from 65° to 70° (*see* maps pp. 33, 34).

Throughout Australia, the coldest month is July, when only a very narrow strip of the northern sea-board has an average temperature as high as 75°. Over the southern half of the continent, July temperatures range from 55° to 45° at elevations below 1,500 feet and fall as low as 35° on the Australian Alps (*see* maps pp. 35, 36). Here the temperature seldom, if ever, reaches 100° even in the hottest of seasons. Hotham Heights (6,100 feet above Mean Sea Level) recorded the highest maximum of 82.0° on 20th January, 1935. In winter, readings slightly below zero are occasionally recorded on the extreme heights.

Tasmania, as a whole, enjoys a moderate and equable range of temperature throughout the year, although occasionally hot winds may cause the temperature to rise to 100° in the eastern part of the State.

(iii) *Comparisons with other Countries.* In respect of Australian temperatures generally, it may be pointed out that the mean annual isotherm for 70° F. extends in South America and South Africa as far south as latitude 33°, while in Australia it reaches only as far south as latitude 30°, thus showing that, on the whole, Australia has, latitude for latitude, a more temperate climate than other places in the Southern Hemisphere.

The comparison is even more favourable when the Northern Hemisphere is included, for in the United States of America the 70° isotherm extends in several of the western States as far north as latitude 41°. In Europe, the same isotherm reaches almost to the southern shores of Spain, passing afterwards, however, along the northern shores of Africa till it reaches the Red Sea, when it bends northward along the eastern shore of the Mediterranean till it reaches Syria. In Asia, nearly the whole of the land area south of latitude 40° N. has a mean annual temperature higher than 70°.

The extreme range of temperature is less than 100° over practically the whole of Australia, that figure being only slightly exceeded at a very few places; it is mostly 70° to 90° over inland areas, and somewhat less on the coast. In parts of Asia and North America, the extreme range exceeds 130° and 150° in some localities.

Along the northern shores of Australia, the temperatures are very equable. At Darwin, for example, the difference in the means for the hottest and coldest month is only 8.4°, and the extreme readings for the year, or the highest maximum on record and the lowest minimum, show a difference of under 50°.

The highest temperature recorded in Australia was 127.5° F. at Cloncurry on 16th January, 1889. The world's highest (136° F.) was recorded at Azizia (Tripoli) on 13th August, 1922. The lowest temperature ever recorded in Australia was —8° F. at Charlotte Pass on 14th June, 1945, and again on 22nd July, 1947, as contrasted with the world's lowest recorded temperature of —90° F. at Verkhoyansk (Siberia) on 5th and 7th February, 1892.

A comparison of the mean temperatures and the range from the extreme maximum to the extreme minimum temperatures (in whole degrees) of the capital cities of Australia with those of the main cities of some other countries was presented in tabular form in Official Year Book No. 38, p. 42.

(iv) *Hottest and Coldest Parts.* A comparison of the temperatures recorded at coast and inland stations shows that, in Australia, as in other continents, the range increases, within certain limits, with increasing distance from the coast.

In the interior of Australia, and during exceptionally dry summers, the temperature occasionally reaches or exceeds 120° in the shade. The hottest area of the continent is situated in the northern part of Western Australia about the Marble Bar and Nullagine goldfields, where the maximum shade temperature during the summer sometimes exceeds 100° continuously for days and weeks. The longest recorded period was 160 days from 31st October, 1923 to 7th April, 1924.

The area affected and the period of duration of the longest heat waves in Australia are shown in the map and diagram on page 37.

(v) *Tabulated Data for Selected Climatological Stations in Australia.* Tables showing normal mean temperature, extreme temperatures and normal rainfall for each month for selected climatological stations in each State and the Northern Territory appeared in Official Year Book No. 40, pp. 16–23, and similar data for other selected stations in the Commonwealth in Official Year Book No. 39, pp. 41–48. Pages 53–60 of this issue contain this information in respect of Canberra, Darwin and the six State capitals.

(vi) *Frosts.** The Observer's Handbook of the Meteorological Office, London, gives the following definition:—" Injury to the tissues of growing plants is not caused until the temperature has fallen considerably below the freezing point of water (32° F.) and a 'ground frost' is regarded as having occurred when the thermometer on the grass has fallen to 30.4° F. or below ".

In Australia, this definition is adopted for stations equipped with terrestrial minimum thermometers. However, these are few in number, so although many rainfall observers record " hoar frost " when seen, for statistical purposes a screen temperature of 36° F. is taken as indicating light frosts at ground level. For heavy frosts, a screen temperature of 32° F. is taken.

In America, a " killing " frost is defined as a frost " that is generally destructive of vegetation ". A " black frost " is the phenomenon arising out of a combination of low temperature and low humidity causing rupturing of plant cells by expansion, when freezing takes place, of the water which they contain, though frost crystals are not formed on the ground.

The parts of Australia most subject to low temperature are the eastern highlands from about Omeo in Victoria northward to Cambooya and Bybera in Queensland. Most stations in this region experience more than ten nights per month with readings of 32° F. or under for three to five months of the year. In Tasmania, districts on the Central Plateau are subject to such conditions for three to six months of the year. Minimum temperatures of 32° F. are comparatively infrequent in Western Australia except in parts of the south and south-west. In South Australia, the Yongala district is much more subject to such temperatures than other parts of the State. Much of the south-east of Queensland has a higher frequency of such readings than South Australia. Generally speaking, the frequency is controlled mainly by altitude, latitude and, to a lesser degree, by proximity to the sea.

Frosts may occur within a few miles of the coastline over the whole continent, except in the Northern Territory and a considerable area of Northern Queensland. Regions subject to frost in all months of the year comprise portions of the tablelands of New South Wales, the Eastern Highlands and parts of the Central Divide and Western district in Victoria, practically the whole of Tasmania and a small area in the south-west of Western Australia.

A map showing the average annual number of frost-free days (i.e., days on which the temperature does not fall below 36° F.) appears on page 39.

Over most of the interior of the continent, and on the Highlands in Queensland as far north as the Atherton Plateau frosts appear in April and end in September, but they are infrequent in these months. Minimum temperatures of 32° F. are experienced in most of the sub-tropical interior in June and July.

3. **Humidity.**—After temperature, humidity is the most important element of climate particularly as regards its effects on human comfort, rainfall supply and conservation and related problems.

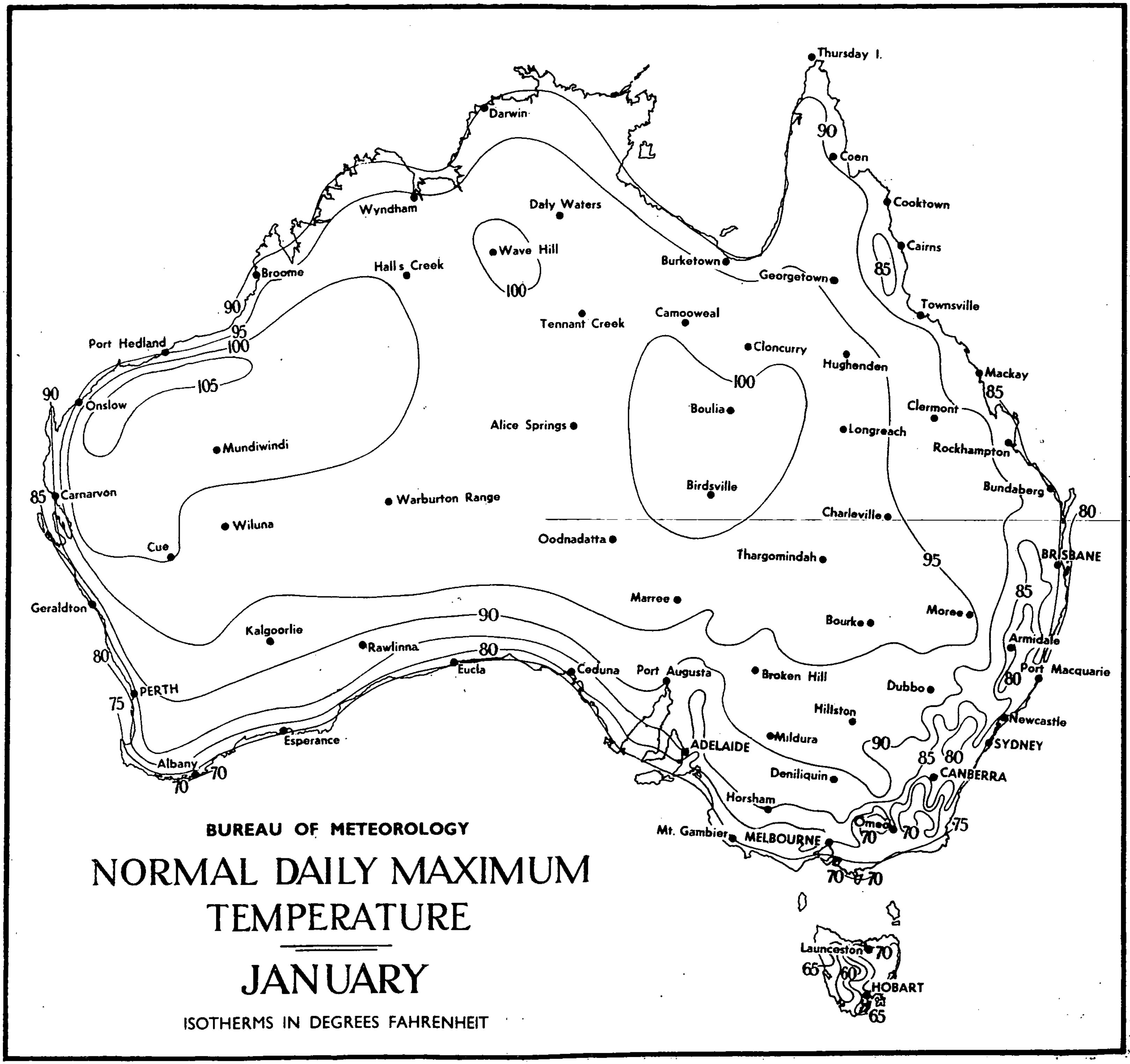
" Vapour pressure " is the pressure exerted by the water vapour in the atmosphere. At any given temperature there is a definite upper limit to the amount of water that can exist as vapour in the atmosphere. When this limit is reached, the air is said to be saturated and the pressure of the water vapour is equal to the " saturation vapour pressure ".

In this publication, the humidity of the air has been expressed by the relative humidity, which is the quotient of the vapour pressure divided by the saturation vapour pressure and multiplied by one hundred. The mean 9 a.m. relative humidity, as well as its highest and lowest recorded mean values at 9 a.m., are shown in the tables of climatological data for the capital cities (*see* pp. 53–60). The mean monthly vapour pressure has also been added to these tables.

The annual curve of vapour pressure derived from the normal monthly values for this element is comparable with the maximum and minimum temperature curves, but the relative humidities, consisting as they do of the extremes for each month, do not show the normal annual fluctuation which would be approximately midway between the extremes.

The order of stations in descending values of 9 a.m. vapour pressure is Darwin, Brisbane Sydney, Perth, Melbourne, Adelaide, Canberra, Hobart and Alice Springs, while the relative humidity at 9 a.m. diminishes in the order, Melbourne, Sydney, Darwin, Brisbane, Canberra, Hobart, Perth, Adelaide and Alice Springs.

* Foley, J. C. Frost in the Australian Region (Bull. 32, 1945).

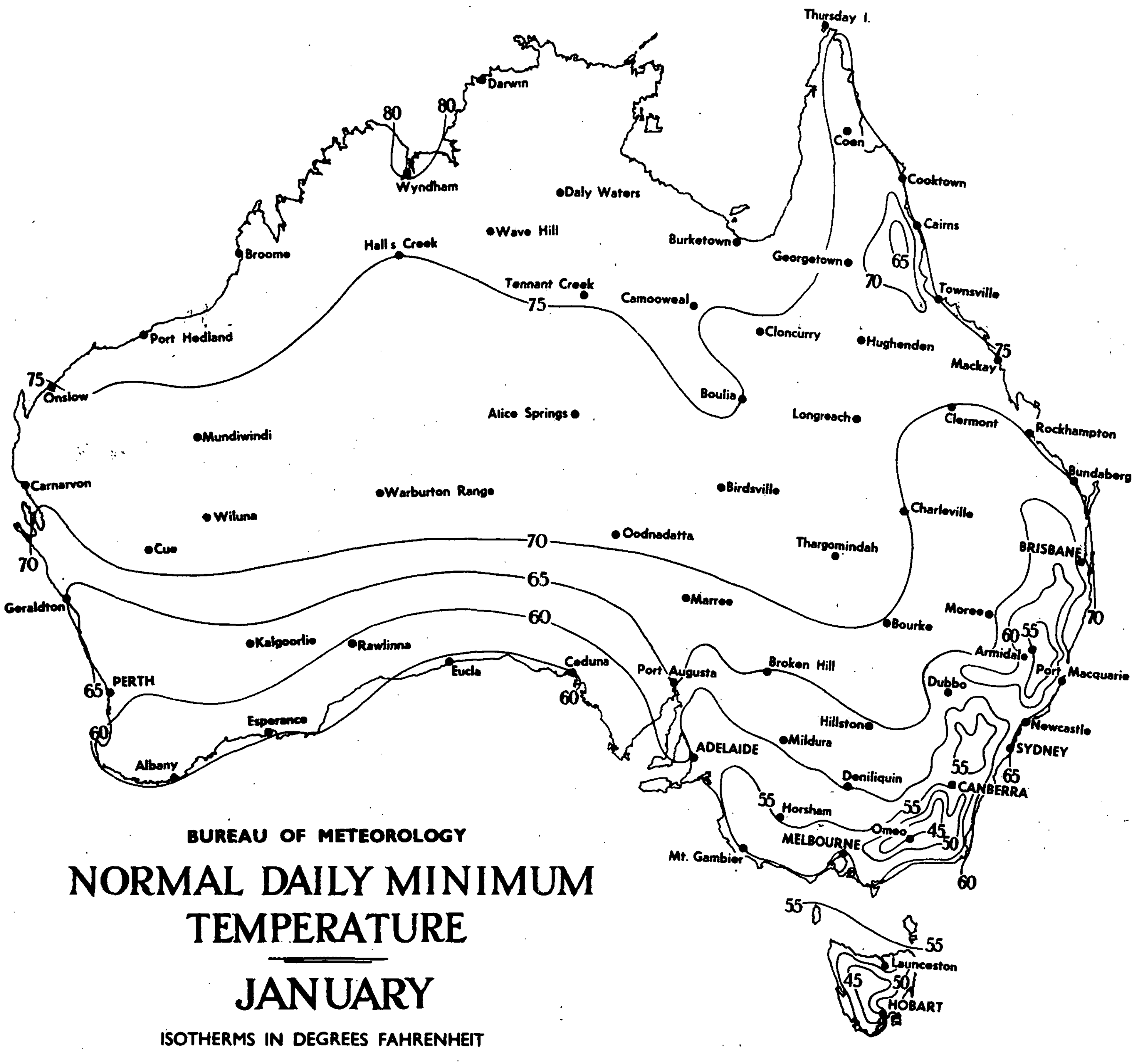


BUREAU OF METEOROLOGY

NORMAL DAILY MAXIMUM TEMPERATURE

JANUARY

ISOTHERMS IN DEGREES FAHRENHEIT

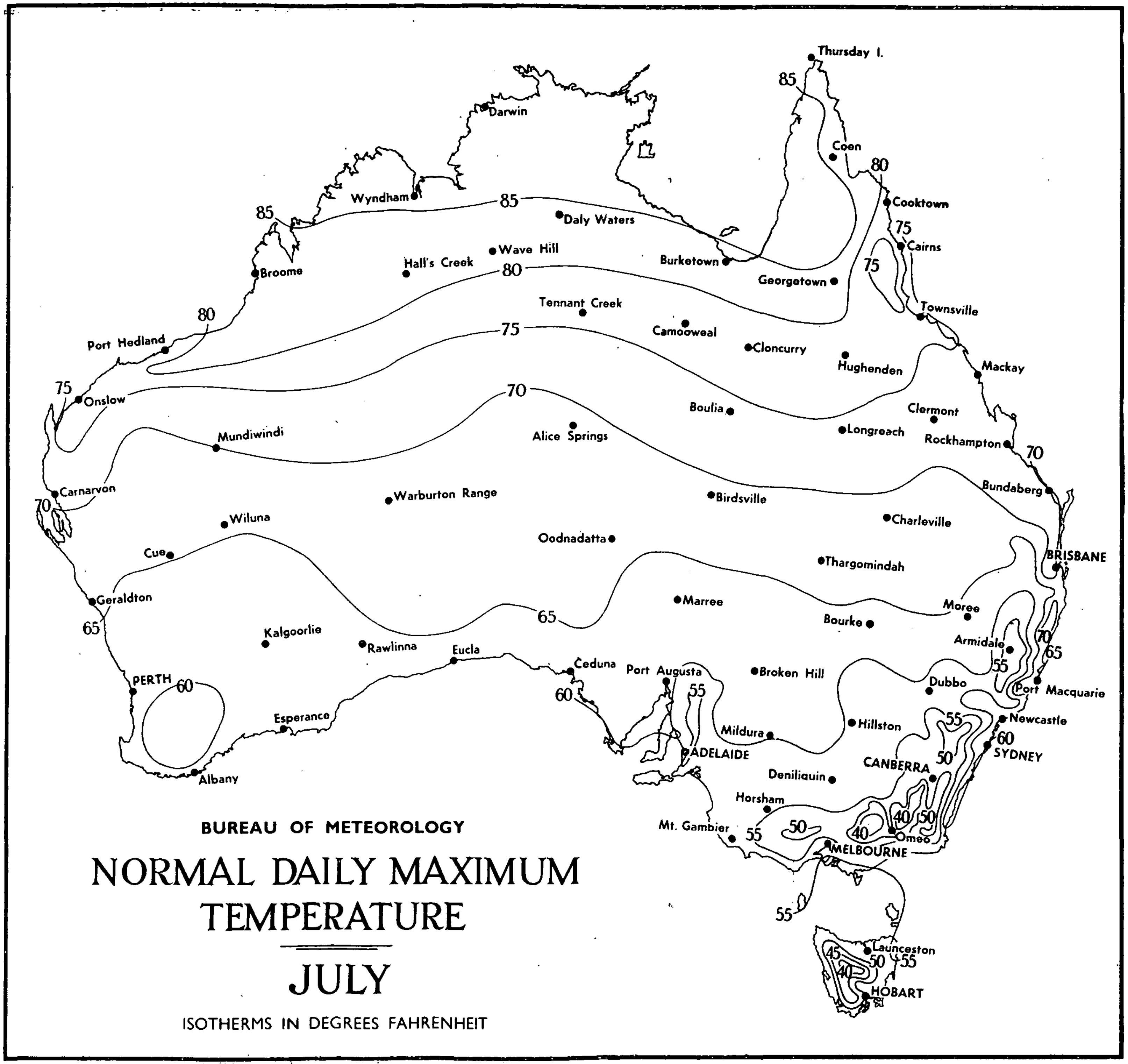


BUREAU OF METEOROLOGY

NORMAL DAILY MINIMUM TEMPERATURE

JANUARY

ISOTHERMS IN DEGREES FAHRENHEIT

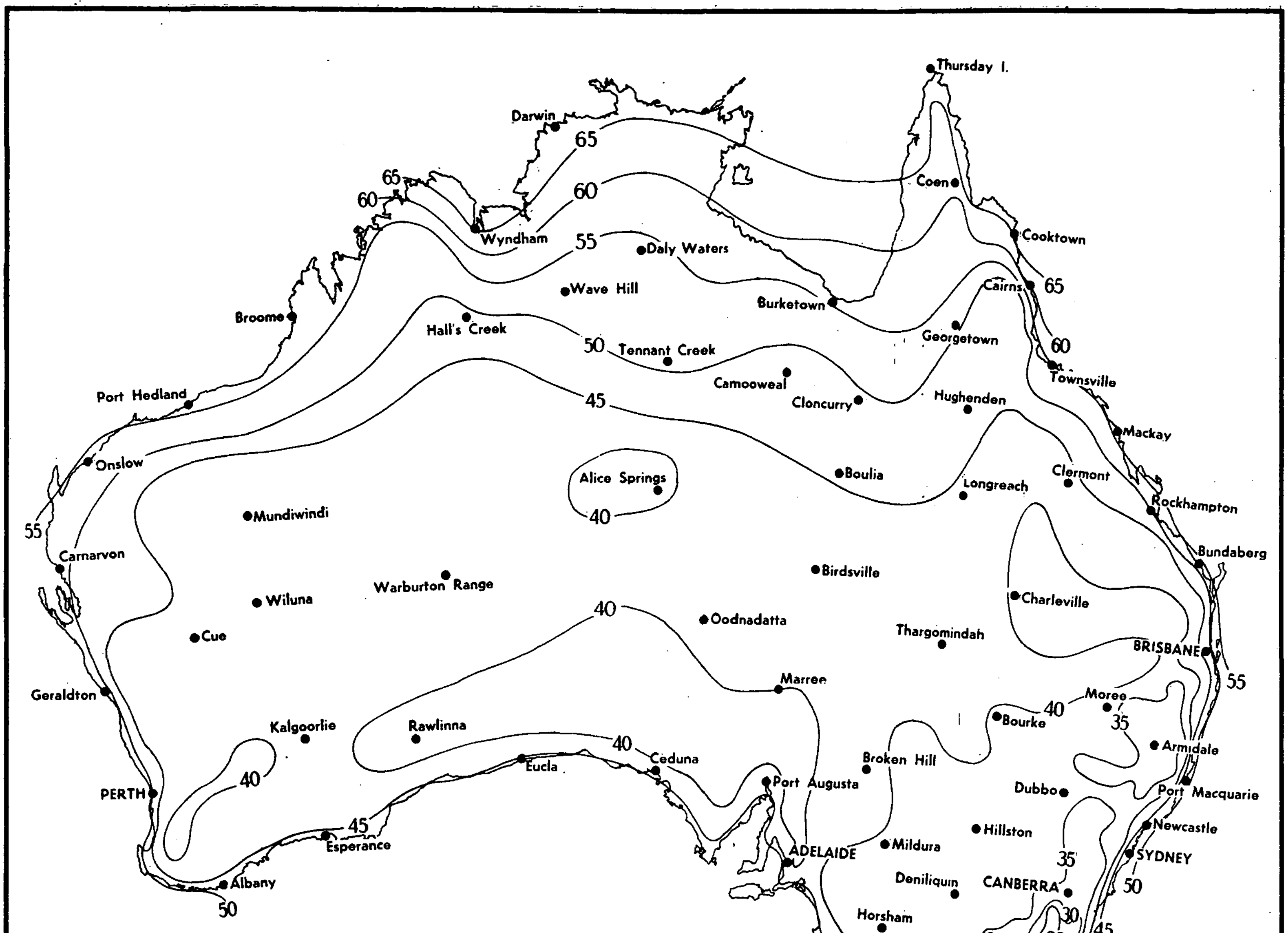


BUREAU OF METEOROLOGY

NORMAL DAILY MAXIMUM TEMPERATURE

JULY

ISOTHERMS IN DEGREES FAHRENHEIT



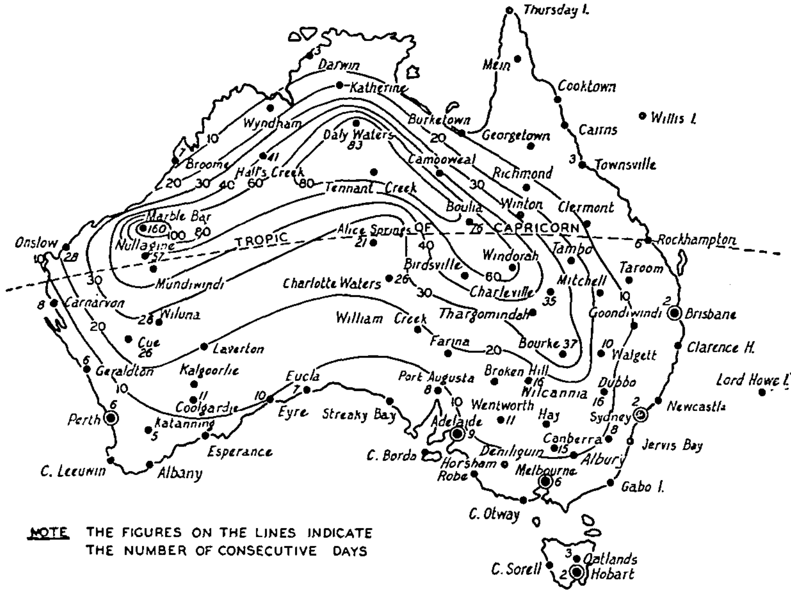
BUREAU OF METEOROLOGY

NORMAL DAILY MINIMUM TEMPERATURE

JULY

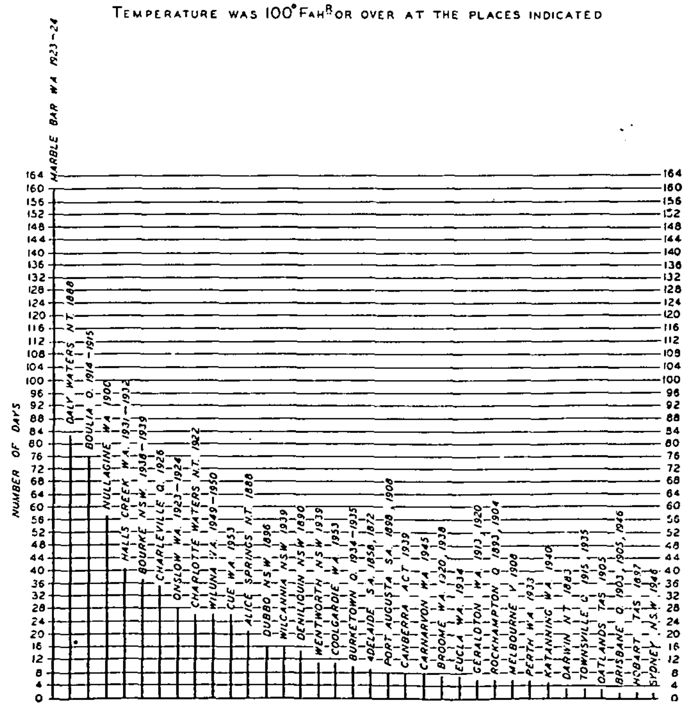
ISOTHERMS IN DEGREES FAHRENHEIT

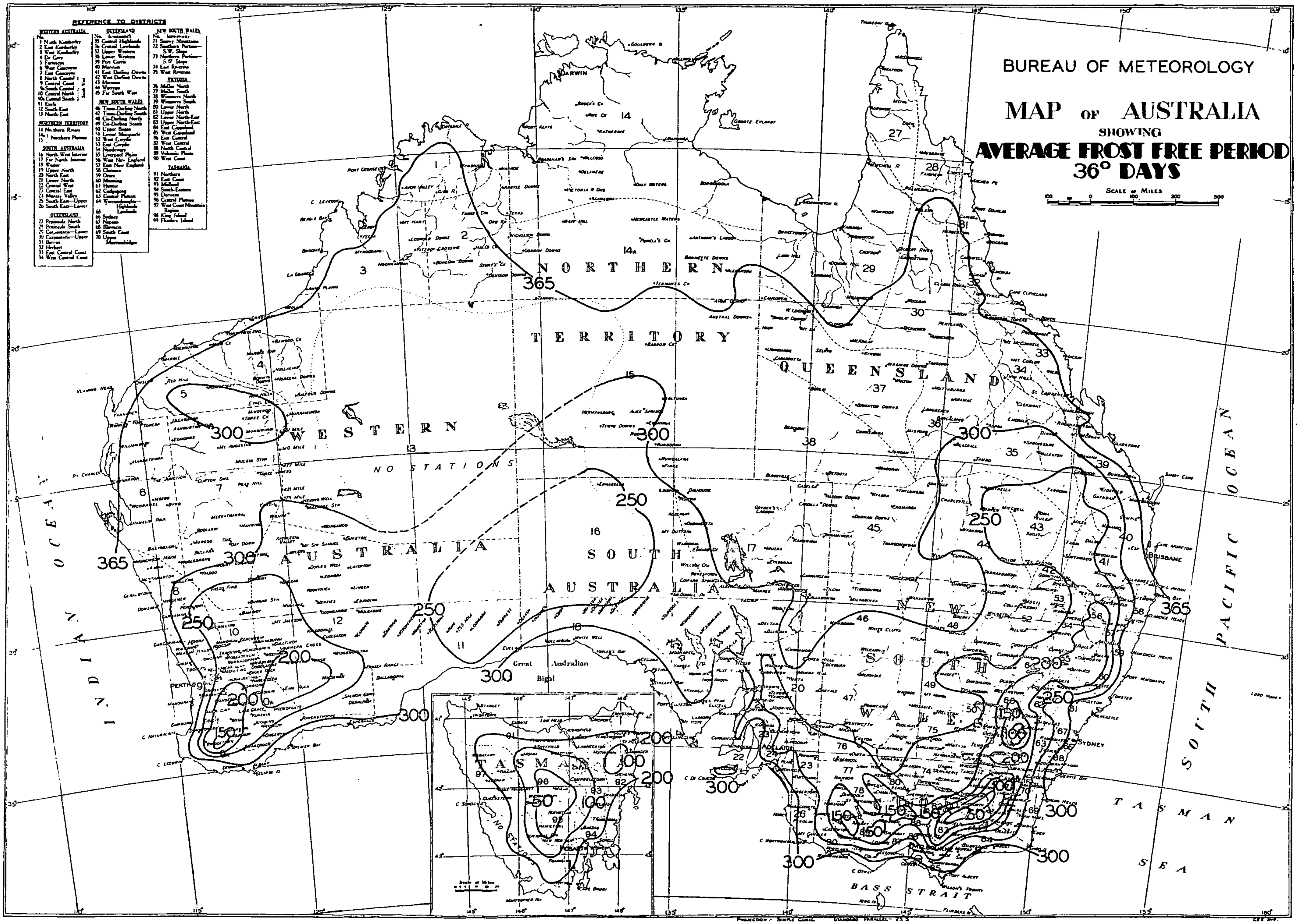
AREA AFFECTED AND PERIOD OF DURATION OF THE LONGEST HEAT WAVES WHEN THE MAXIMUM TEMPERATURE FOR CONSECUTIVE 24 HOURS REACHED OR EXCEEDED 100°F.

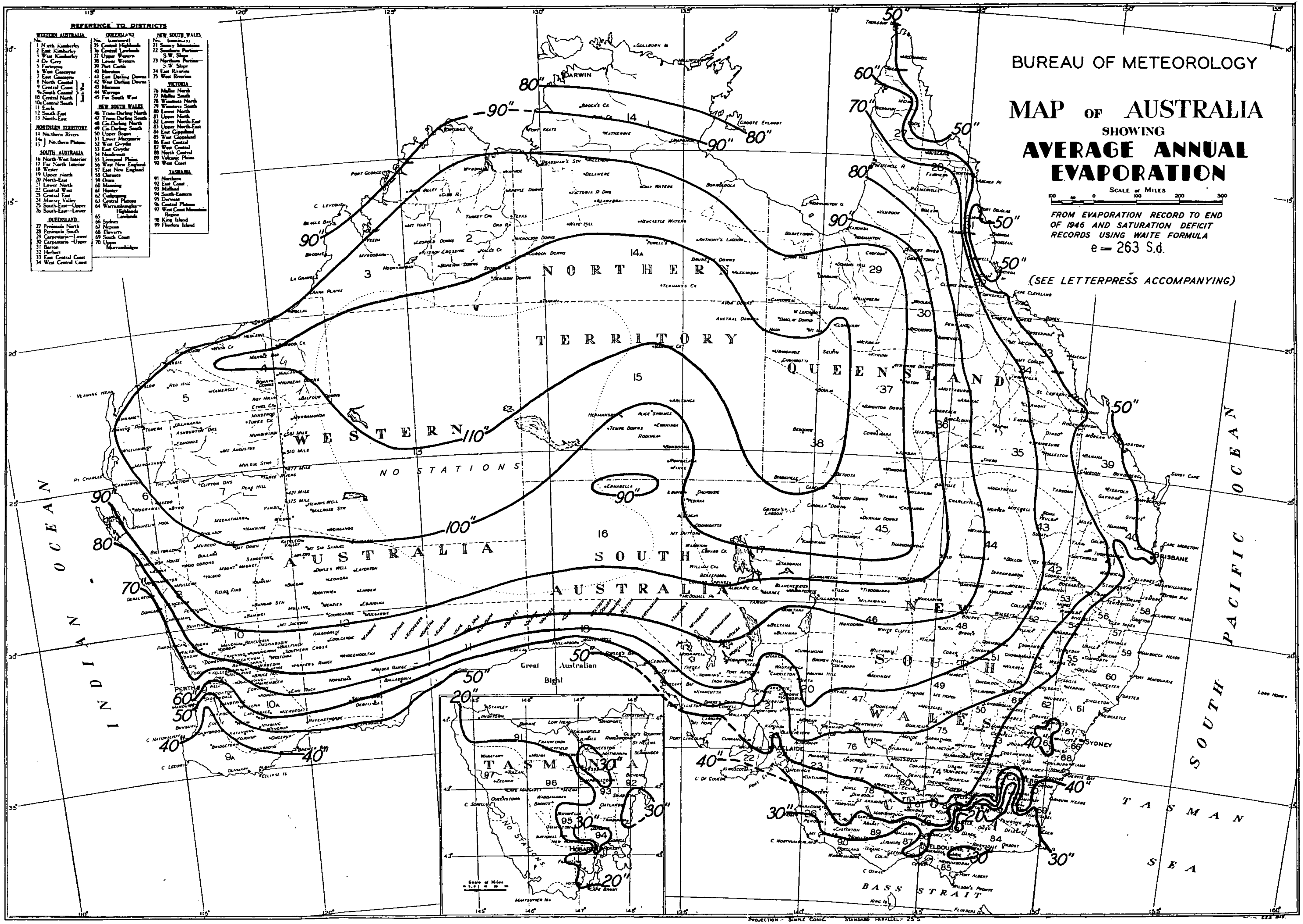


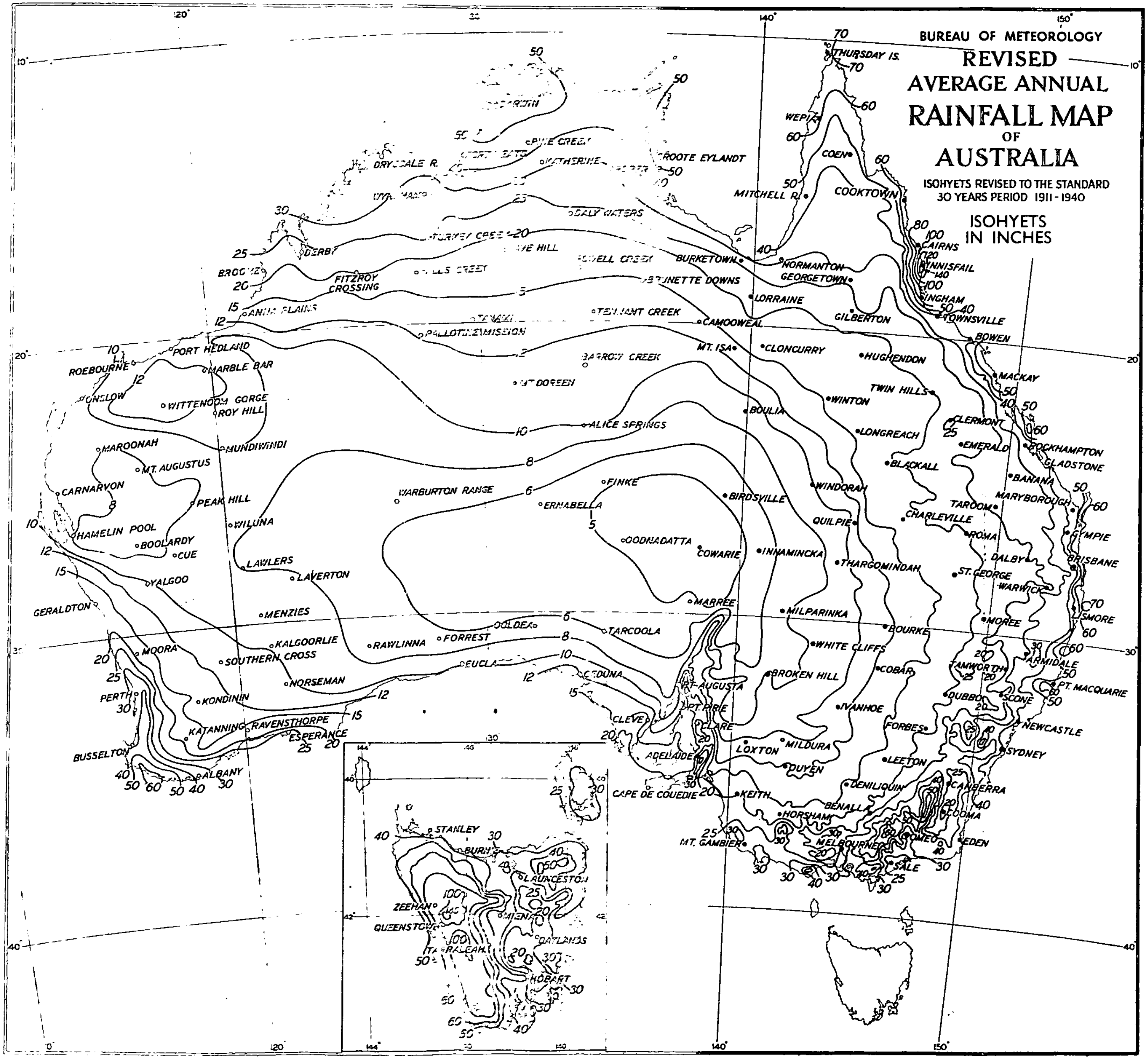
NOTE THE FIGURES ON THE LINES INDICATE THE NUMBER OF CONSECUTIVE DAYS

GREATEST NUMBER OF CONSECUTIVE DAYS ON WHICH THE SHADE TEMPERATURE WAS 100° FAHR. OR OVER AT THE PLACES INDICATED

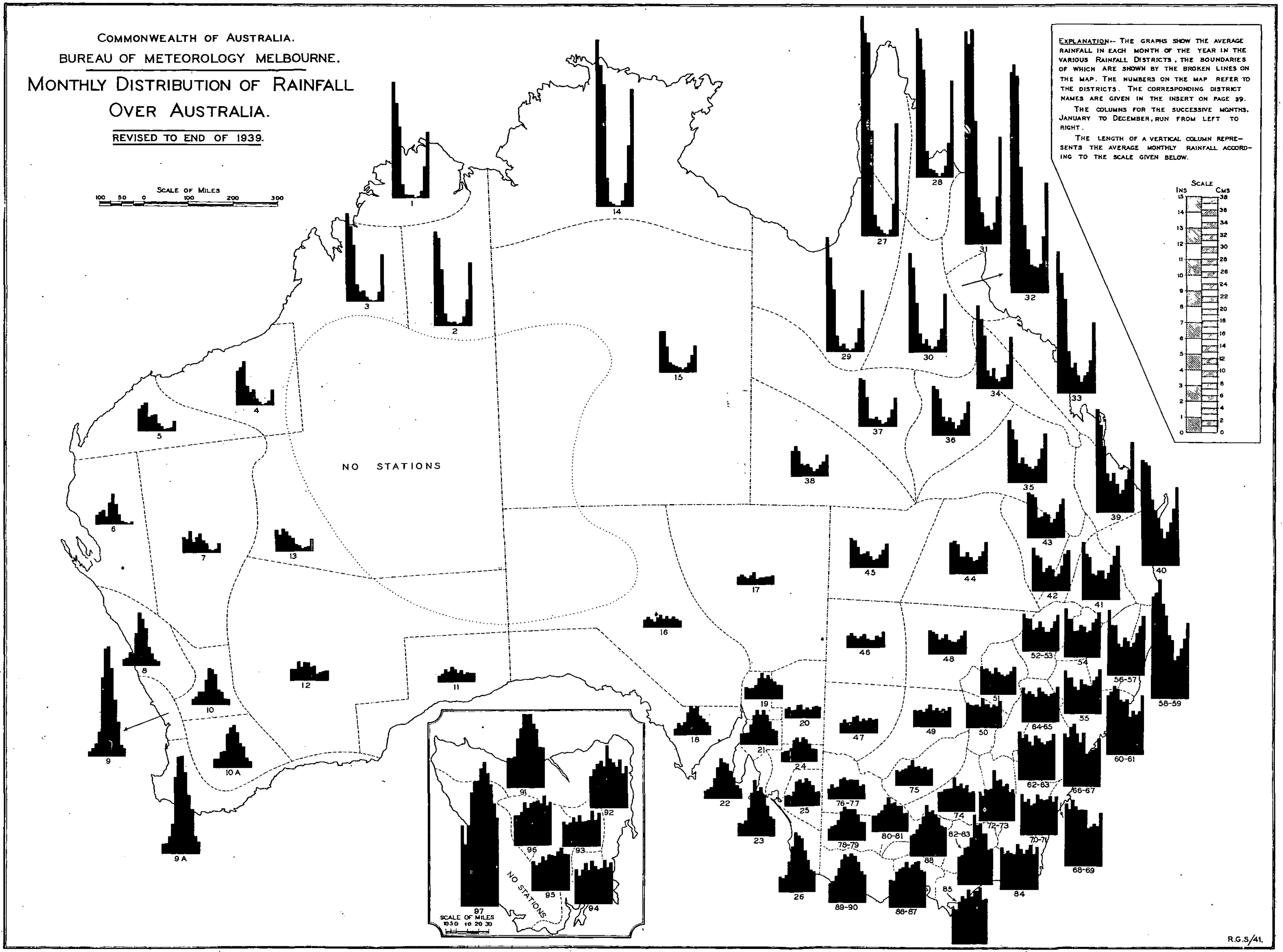


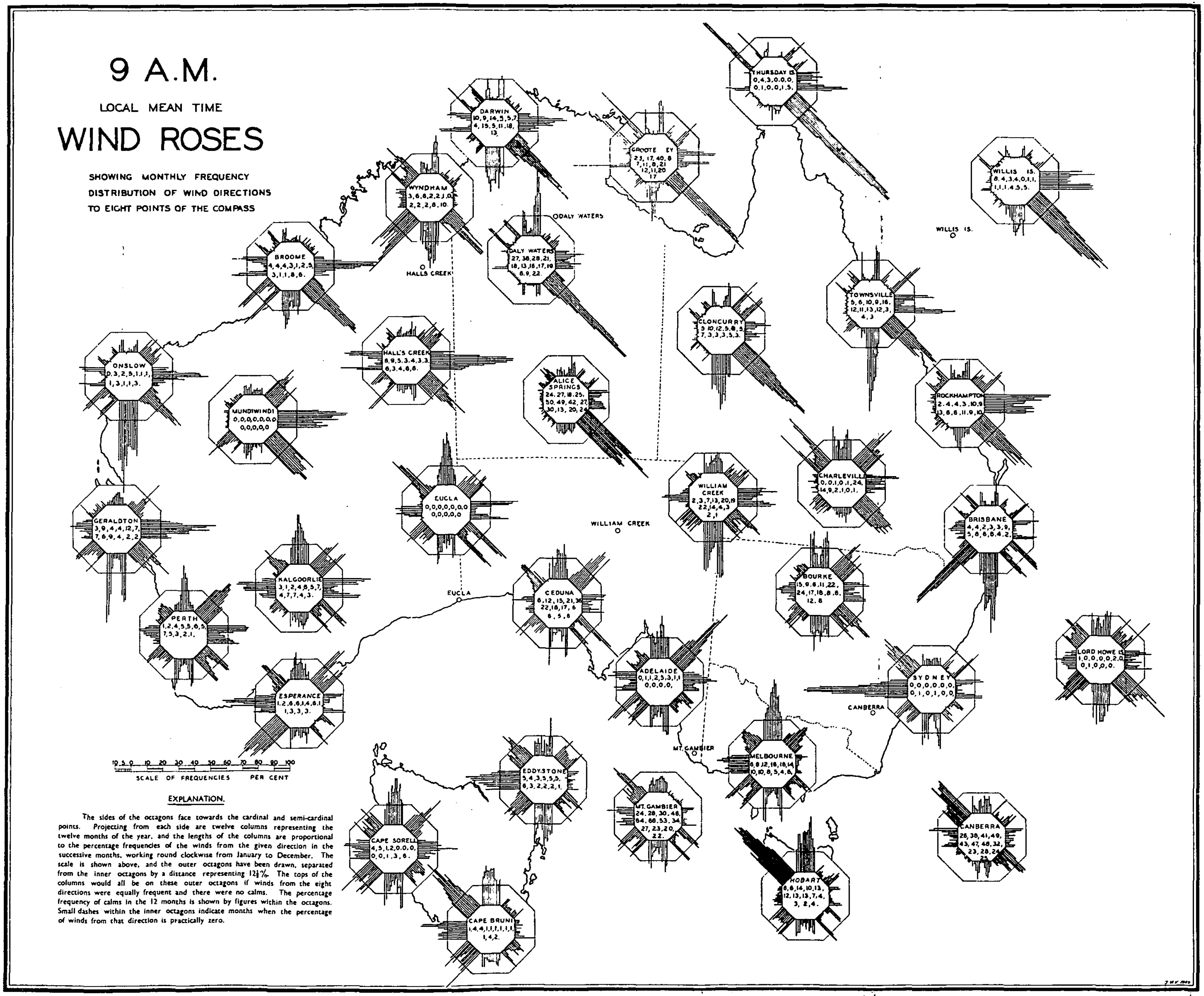

BUREAU OF METEOROLOGY
MAP OF AUSTRALIA
SHOWING
AVERAGE FROST FREE PERIOD
36° DAYS
SCALE OF MILES
REFERENCE TO DISTRICTS
NORTHERN TERRITORY
QUEENSLAND
WESTERN AUSTRALIA
NO STATIONS
SOUTH AUSTRALIA
NEW SOUTH WALES
TASMANIA
INDIAN OCEAN
SOUTH PACIFIC OCEAN
TASMAN SEA
BASS STRAIT
Great Australian Bight
DARWIN
BRISBANE
SYDNEY
ADELAIDE
PERTH
MELBOURNE

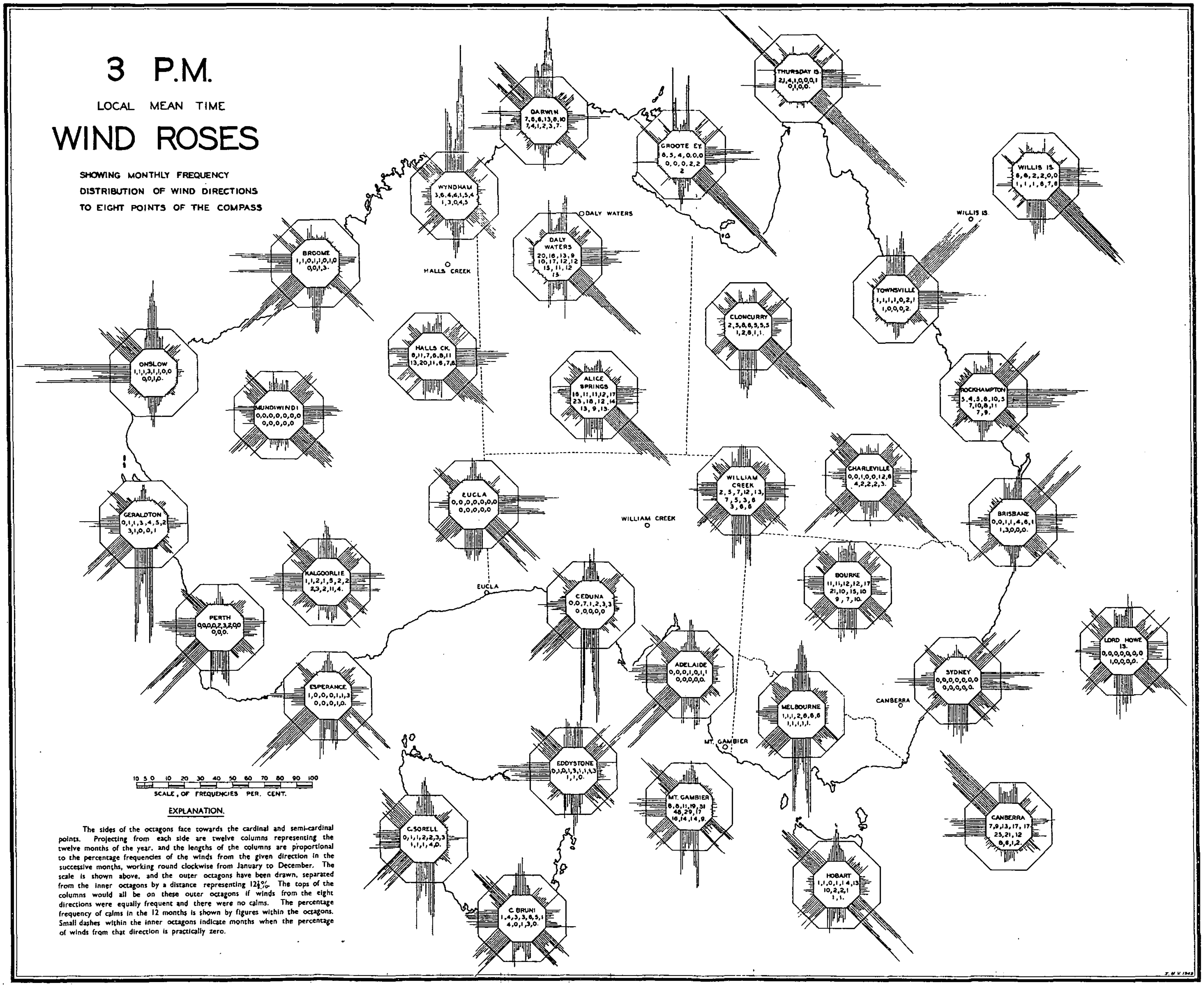

BUREAU OF METEOROLOGY
MAP OF AUSTRALIA
SHOWING
AVERAGE ANNUAL EVAPORATION
FROM EVAPORATION RECORD TO END OF 1946 AND SATURATION DEFICIT RECORDS USING WAITE FORMULA
e = 263 S.d.
(SEE LETTERPRESS ACCOMPANYING)
REFERENCE TO DISTRICTS
NORTHERN TERRITORY
WESTERN AUSTRALIA
SOUTH AUSTRALIA
QUEENSLAND
NEW SOUTH WALES
TASMANIA
INDIAN OCEAN
SOUTH PACIFIC OCEAN
TASMAN SEA
BASS STRAIT
Great Australian Bight
NO STATIONS
DARWIN
BRISBANE
SYDNEY
ADELAIDE
MELBOURNE
PERTH
HOBART
PROJECTION - SIMPLE CONIC. STANDARD PARALLEL 25 S



BUREAU OF METEOROLOGY
REVISED
AVERAGE ANNUAL
RAINFALL MAP
OF
AUSTRALIA
ISOHYETS REVISED TO THE STANDARD
30 YEARS PERIOD 1911 - 1940
ISOHYETS
IN INCHES
THURSDAY IS.
WEIPA
COEN
COOKTOWN
MITCHELL R.
CAIRNS
INNISFAIL
INGHAM
TOWNSVILLE
BOWEN
MACKAY
CLERMONT
EMERALD
ROCKHAMPTON
GLADSTONE
BANANA
MARYBOROUGH
GYMPIE
BRISBANE
TAROOM
CHARLEVILLE
ROMA
DALBY
ST. GEORGE
WARWICK
MOREE
ARMIDALE
TAMWORTH
PT. MACQUARIE
DUBBO
SCONE
NEWCASTLE
SYDNEY
FORBES
LEETON
CANBERRA
COOMA
EDEN
DENILIQUIN
BENALLA
MELBOURNE
SALE
HORSHAM
KEITH
MT. GAMBIER
CAPE DE COUEDIE
ADELAIDE
CLARE
PT. PIRIE
PT. AUGUSTA
CLEVE
CEDUNA
MILDURA
LOXTON
BROKEN HILL
IVANHOE
COBAR
BOURKE
WHITE CLIFFS
MILPARINKA
THARGOMINDAH
INNAMINCKA
QUILPIE
WINDORAH
BIRDSVILLE
BLACKALL
LONGREACH
WINTON
TWIN HILLS
HUGHENDON
BOULIA
CLONCURRY
MT. ISA
CAMOOWEAL
GILBERTON
GEORGETOWN
NORMANTON
BURKETOWN
LORRAINE
BRUNETTE DOWNS
TENNANT CREEK
BARROW CREEK
MT DOREEN
ALICE SPRINGS
FINKE
ERNABELLA
OODNADATTA
COWARIE
MARREE
TARCOOLA
OOLDEA
FORREST
RAWLINNA
EUCLA
WARBURTON RANGE
DALY WATERS
KATHERINE
PINE CREEK
GROOTE EYLANDT
DRYSDALE R.
DERBY
BROOME
FITZROY CROSSING
ANNA PLAINS
PORT HEDLAND
ROEBOURNE
MARBLE BAR
ONSLOW
WITTENOOM GORGE
ROY HILL
MUNDIWINDI
MAROONAH
MT. AUGUSTUS
CARNARVON
PEAK HILL
WILUNA
HAMELIN POOL
BOOLARDY
CUE
LAWLERS
LAVERTON
YALGOO
GERALDTON
MENZIES
KALGOORLIE
MOORA
SOUTHERN CROSS
NORSEMAN
PERTH
KONDININ
KATANNING
RAVENSTHORPE
ESPERANCE
BUSSELTON
ALBANY
STANLEY
BURNIE
LAUNCESTON
ZEEHAN
QUEENSTOWN
MIENA
OATLANDS
TARRALEAH
HOBART


COMMONWEALTH OF AUSTRALIA.
BUREAU OF METEOROLOGY MELBOURNE.
MONTHLY DISTRIBUTION OF RAINFALL OVER AUSTRALIA.
REVISED TO END OF 1939.
SCALE OF MILES
100 50 0 100 200 300
EXPLANATION.— THE GRAPHS SHOW THE AVERAGE RAINFALL IN EACH MONTH OF THE YEAR IN THE VARIOUS RAINFALL DISTRICTS, THE BOUNDARIES OF WHICH ARE SHOWN BY THE BROKEN LINES ON THE MAP. THE NUMBERS ON THE MAP REFER TO THE DISTRICTS. THE CORRESPONDING DISTRICT NAMES ARE GIVEN IN THE INSERT ON PAGE 39.
THE COLUMNS FOR THE SUCCESSIVE MONTHS, JANUARY TO DECEMBER, RUN FROM LEFT TO RIGHT.
THE LENGTH OF A VERTICAL COLUMN REPRESENTS THE AVERAGE MONTHLY RAINFALL ACCORDING TO THE SCALE GIVEN BELOW.
SCALE
INS
CMS
NO STATIONS
NO STATIONS
SCALE OF MILES
10 5 0 10 20 30
R.G.S./41.


9 A.M.
LOCAL MEAN TIME
WIND ROSES
SHOWING MONTHLY FREQUENCY
DISTRIBUTION OF WIND DIRECTIONS
TO EIGHT POINTS OF THE COMPASS
THURSDAY IS.
DARWIN
GROOTE EY
WILLIS IS.
WYNDHAM
DALY WATERS
BROOME
HALLS CREEK
TOWNSVILLE
CLONCURRY
HALL'S CREEK
ONSLOW
ALICE SPRINGS
ROCKHAMPTON
MUNDIWINDI
CHARLEVILLE
WILLIAM CREEK
EUCLA
GERALDTON
BRISBANE
KALGOORLIE
CEDUNA
BOURKE
PERTH
LORD HOWE IS.
ADELAIDE
SYDNEY
ESPERANCE
CANBERRA
MT. GAMBIER
MELBOURNE
EDDYSTONE
CAPE SORELL
HOBART
CAPE BRUNI
10 5 0 10 20 30 40 50 60 70 80 90 100
SCALE OF FREQUENCIES PER CENT
EXPLANATION.
The sides of the octagons face towards the cardinal and semi-cardinal points. Projecting from each side are twelve columns representing the twelve months of the year, and the lengths of the columns are proportional to the percentage frequencies of the winds from the given direction in the successive months, working round clockwise from January to December. The scale is shown above, and the outer octagons have been drawn, separated from the inner octagons by a distance representing 12½%. The tops of the columns would all be on these outer octagons if winds from the eight directions were equally frequent and there were no calms. The percentage frequency of calms in the 12 months is shown by figures within the octagons. Small dashes within the inner octagons indicate months when the percentage of winds from that direction is practically zero.


3 P.M.
LOCAL MEAN TIME
WIND ROSES
SHOWING MONTHLY FREQUENCY DISTRIBUTION OF WIND DIRECTIONS TO EIGHT POINTS OF THE COMPASS
THURSDAY IS.
DARWIN
GROOTE EY.
WILLIS IS.
WYNDHAM
DALY WATERS
BROOME
HALLS CREEK
TOWNSVILLE
CLONCURRY
ONSLOW
HALLS CK.
ALICE SPRINGS
ROCKHAMPTON
MUNDIWINDI
CHARLEVILLE
WILLIAM CREEK
EUCLA
GERALDTON
BRISBANE
KALGOORLIE
BOURKE
CEDUNA
PERTH
LORD HOWE IS.
ADELAIDE
SYDNEY
ESPERANCE
MELBOURNE
CANBERRA
MT. GAMBIER
EDDYSTONE
C. SORELL
HOBART
C. BRUNI
10 5 0 10 20 30 40 50 60 70 80 90 100
SCALE, OF FREQUENCIES PER. CENT.
EXPLANATION.
The sides of the octagons face towards the cardinal and semi-cardinal points. Projecting from each side are twelve columns representing the twelve months of the year, and the lengths of the columns are proportional to the percentage frequencies of the winds from the given direction in the successive months, working round clockwise from January to December. The scale is shown above, and the outer octagons have been drawn, separated from the inner octagons by a distance representing 12½%. The tops of the columns would all be on these outer octagons if winds from the eight directions were equally frequent and there were no calms. The percentage frequency of calms in the 12 months is shown by figures within the octagons. Small dashes within the inner octagons indicate months when the percentage of winds from that direction is practically zero.

Further reference to humidity will be found in the section on effective temperature (*see* page 29).

4. **Evaporation.**—(i) *General.* The rate and quantity of evaporation in any territory is influenced by the prevailing temperature, and by atmospheric humidity, pressure and wind movement. In Australia, the question is, perhaps, of more than ordinary importance, since in its drier regions water has often to be conserved in tanks and dams. The magnitude of the economic loss by evaporation will be appreciated from the map reproduced herein (*see* page 40) which shows that the yearly amount varies from about 20 inches over western Tasmania to more than 100 inches over the central and north-western parts of Australia. Over an area of 70 per cent. of the continent, comprising most inland districts and extending to the coast in the North-West and Eucla divisions of Western Australia, the rainfall does not exceed the evaporation during any month of the year. The central and north-western portions of the continent, comprising 46 per cent. of the total land mass, experience evaporation more than twice as great as their rainfall ; it is noteworthy that the vegetation over most of this region is characterized by acacia, semi-desert, shrub steppe and porcupine grass. Since the loss by evaporation depends largely on the exposed area, tanks and dams so designed that the surface shall be a minimum are advantageous. Further, the more they are protected from the direct rays of the sun and from winds by means of suitable tree planting, the less will be the loss by evaporation. These matters are naturally of more than ordinary concern in the drier districts of Australia.

(ii) *Comments on Map of Average Annual Evaporation.* The map of average annual evaporation in Australia (*see* page) has been compiled on the basis of records obtained from a number of evaporimeters supplemented by estimates derived from records of saturation deficit by applying the Waite Institute factor of 263.* Some modification of the latter values was found to be necessary in comparison with recordings of evaporimeters.

The standard evaporation tank used in Australia is cylindrical in form and is 36 inches in diameter and 36 inches deep. It is surrounded by a 6-inch water jacket and the whole is sunk into the ground so that the water surface is approximately at ground level.

Saturation deficit is obtained from readings of dry and wet bulb thermometers exposed in a standard Stevenson thermometer shelter. Saturation deficit is the difference between the vapour pressure indicated by the dry and wet bulb readings, and the saturation vapour pressure corresponding to the dry bulb temperature.

The Waite formula, e = 263 s.d., is not an exact relationship, but it takes account of one of the major factors in evaporation, i.e., the difference between saturation vapour pressures at the mean dew point and at the mean air temperature. Errors in the formula are found to be fairly consistent in considerable areas of Australia and corrections have been applied accordingly. No evaporation records are available north of latitude 20°, and corrections have been extrapolated for these areas. The evaporation stations on which estimates for the tropics have been based are Alice Springs (Northern Territory) and Winton (Queensland), and to a lesser degree Blackall (Queensland) and Marble Bar (Western Australia).

The map thus presents an estimate of evaporation for which allowance should be made for a certain margin of error (perhaps 10 per cent. or so) on the conservative side. In the absence of definite information, such a map should serve a useful purpose as a basis for many climatic studies.

For graphs and tables of mean monthly evaporation and rainfall at certain selected stations, *see* Official Year Book No. 37, pp. 34–35.

5. **Rainfall.**—(i) *General.* The rainfall of any region is determined mainly by the direction and route of the prevailing winds, by the varying temperatures of the earth's surface over which they blow, and by its physiographical features.

Australia lies within the zones of the south-east trades and " prevailing " westerly winds. The southern limit of the south-east trades strikes the eastern shores at about 30° south latitude, and, with very few exceptions, the heaviest rains of the Australian continent are precipitated along the Pacific slopes to the north of that latitude, the varying quantities being more or less regulated by the differences in elevation of the shores and of the chain of mountains from the New South Wales northern border to Thursday Island, upon which the rain-laden winds blow. The converse effect is exemplified on the north-west coast of Western Australia, where the prevailing winds, blowing from the interior of the continent instead of from the ocean, result in the lightest coastal rain in Australia.

The westerly winds, which skirt the southern shores, are responsible for the reliable, generally light to moderate rains enjoyed by the south-western portion of Western Australia, the agricultural areas of South Australia, a great part of Victoria, and the whole of Tasmania.

* Prescott, J. A. " Atmospheric Saturation Deficit in Australia " (Trans. Royal Society, S.A. Vol. LV., 1931).

(ii) *Distribution of Rainfall.* The average annual rainfall map of Australia (*see* page 41) shows that the heaviest yearly falls occur on the north coast of Queensland (up to more than 160 inches) and in western Tasmania (up to 140 inches), while from 50 to over 60 inches are received on parts of the eastern seaboard from Jervis Bay to the northern part of Cape York Peninsula, also around Darwin, on the West Kimberley coast, near Cape Leeuwin, about the Australian Alps in eastern Victoria and New South Wales, and on the north-eastern highlands in Tasmania. A great part of the interior of the continent, stretching from the far west of New South Wales and the south-west of Queensland to the vicinity of Shark Bay in Western Australia, has a very low average rainfall of less than 10 inches a year. Between these two regions of heavy and very low rainfall are the extensive areas which experience useful to good rains, and in the southern and eastern parts of which are found the best country and most of the population and primary production.

(iii) *Factors Determining Occurrence, Intensity and Seasonal Distribution of Rainfall.* Reference has already been made to the frequent rains occurring in the north-eastern coastal districts of Queensland with the prevailing south-east trade winds and to similar rains in the west of Tasmania with the prevailing westerly winds. Other rains in Australia are associated mainly with tropical and southern depressions.

The former chiefly affect the northern, eastern, and to some extent the central parts of the continent and operate in an irregular manner during the warmer half of the year, but principally from December to March. They vary considerably in activity and scope from year to year, occasionally developing into severe storms off the east and north-west coasts. Tropical rainstorms sometimes cover an extensive area, half of the continent on occasions receiving moderate to very heavy falls during a period of a few days. Rain is also experienced, with some regularity, with thunderstorms in tropical areas, especially near the coast. All these tropical rains, however, favour mostly the northern and eastern parts of the area referred to; the other parts further inland receive lighter, less frequent and less reliable rainfall. With the exception of districts near the east coast, where some rain falls in all seasons, the tropical parts of the continent receive useful rains only on rare occasions from May to September.

The southern depressions are most active in the winter—June to August—and early spring months. The rains associated with them are fairly reliable and frequent over southern Australia and Tasmania, and provide during that period the principal factor in the successful growing of wheat. These depressions also operate with varying activity during the remainder of the year, but the accompanying rains are usually lighter. The southern rains favour chiefly the south-west of Western Australia, the agricultural districts of South Australia, Victoria, Tasmania, and the southern parts of New South Wales. They sometimes extend into the drier regions of the interior, but only infrequently and irregularly.

The map showing mean monthly distribution of rainfall over Australia (*see* page 42) gives, in graphic form, information on the amount and occurrence of rain.

(iv) *Wettest and Driest Regions.* The wettest known part of Australia is on the north-east coast of Queensland, between Port Douglas and Cardwell, where Deeral on the north coast-line has an average annual rainfall of 172.26 inches and Tully on the Tully River 179.26 inches. In addition, three stations situated on, or adjacent to, the Johnstone and Russell Rivers have an average annual rainfall of between 144 and 169 inches. The maximum and minimum annual amounts there, in inches, are:—Deeral, 287.18 in 1945 and 94.65 in 1951, a range of 192.53 inches; Tully, 310.92 in 1950 and 104.98 in 1943, a range of 205.94 inches; Goondi, 241.53 in 1894 and 67.88 in 1915, a range of 173.65 inches; Innisfail, 232.06 in 1950 and 69.87 in 1902, a range of 162.19 inches; Harvey Creek, 254.77 in 1921 and 80.47 in 1902, a range of 174.30 inches.

On five occasions, more than 200 inches have been recorded at Goondi, the last of these being in 1950, when 204.97 inches were registered. The records at this station cover a period of 67 years.

In twenty-seven years of record, Tully has exceeded 200 inches on ten occasions, and in 28 complete years of record Harvey Creek has exceeded this figure four times.

In Tasmania, the wettest part is in the West Coast region, the average annual rainfall at Lake Margaret being 146.51 inches, with a maximum of 177.30 inches in 1948.

The driest known part of the continent is in an area of approximately 180,000 square miles surrounding Lake Eyre in South Australia, where the annual average is between 4 and 6 inches and where the fall rarely exceeds 10 inches in twelve months.

Records at stations have at times been interrupted, but of the 23 stations in this region which have an annual average of less than 5 inches, six have complete records extending from 30 to 55 years. Of these Mulka has the lowest average of 4.05 inches (34 years), followed by Troudaninna with an average of 4.15 inches in 42 years. Troudaninna in the period 1893 to 1936 had only one year in which the total exceeded 9 inches (11.07 inches in 1894). There have been protracted periods when the average has even been less than 3 inches. From 1895 to 1903 Troudaninna received the following annual totals:— 2.78, 0.99, 5.71, 3.04, 3.18, 2.83, 1.80, 1.11, 4.87, an average of 2.91 inches. From 1918 to 1929 the average was only 2.65 inches, and in this period from December, 1924 to November, 1929 the average was only 1.70 inches.

Mulka since 1918 has only once exceeded 10 inches for the annual total (11.72 inches in 1920), and on 16 occasions in 34 years the annual total has been less than 3 inches. In one particular period from October, 1926 to September, 1930, the average was only 1.26 inches (505 points in 48 months). However, at Kanowana, an even lower four-year average of 1.12 inches was recorded between 1896 and 1899 with yearly totals of 43, 225, 87 and 94 points. An even smaller yearly total was recorded at Mungeranie in 1889 when only 39 points were recorded on five days.

The average number of days of rain per month in this region is only 1 to 2 and the annual number ranges between 10 and 20. Oodnadatta (standard 30 years' average rainfall equal to 4.44 inches) has an average of 20 days of rain per year, while Cordillo Downs in the extreme north-east corner of the State of South Australia receives 5.16 inches on twelve days per year, averaging about one day of rain each month in the thirty years period 1911–1940.

No part of the earth, so far as is known, is absolutely rainless, and although at Arica, in northern Chile, the rainfall over a period of 15 years was nil, a further two years in which there were three measurable showers made the " average " for 17 years 0.02 inches.

(v) *Quantities and Distribution of Rainfall.* The general distribution is best seen from the rainfall map (*see* page 41) which shows the areas subject to average annual rainfalls lying between certain limits. The proportions of the total area of each State and of Australia as a whole enjoying varying quantities of rainfall determined from the latest available information are shown in the following table:—

AVERAGE ANNUAL RAINFALL DISTRIBUTION.

(Per Cent.)

Average Annual Rainfall.	W. Aust.	N. Terr.	S. Aust.	Q'land.	N.S.W. (a)	Vic.	Tas. (b)	Total.
Under 10 inches ..	58.0	24.7	82.8	13.0	19.7	Nil	Nil	37.6
10 and under 15 ins.	22.4	32.4	9.4	14.4	23.5	22.4	Nil	19.9
15 and under 20 „	6.8	9.7	4.5	19.7	17.5	15.2	0.7	10.9
20 and under 25 „	3.7	6.6	2.2	18.8	14.2	17.9	11.0	9.1
25 and under 30 „	3.7	9.3	0.8	11.6	9.1	18.0	11.4	7.3
30 and under 40 „	3.3	4.7	0.3	11.1	9.9	16.1	20.4	6.6
40 inches and over ..	2.1	12.6	Nil	11.4	6.1	10.4	56.5	8.6
Total ..	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(*a*) Includes Australian Capital Territory. (*b*) Over an area of 2,777 square miles no records are available.

Referring first to the capital cities, the records of which are given in the next table, it will be seen that Sydney, with an average rainfall of 44.80 inches, occupies the chief place ; Brisbane, Perth, Melbourne, Hobart and Canberra follow in that order, Adelaide with 21.09 inches being the driest. The extreme range from the wettest to the driest year is greatest at Brisbane (72.09 inches) and least at Adelaide (19.46 inches).

In order to show how the rainfall is distributed throughout the year in various parts of the continent, average figures for the various climatological districts have been selected (*see* map on page 42). The figures for Northern Rivers (District 14), show that nearly the whole of the rainfall occurs there in the summer months, while little or none falls in the middle of the year. The figures for the Central Coast, south-west of Western Australia (District 9), are the reverse, for while the summer months are dry, the winter months are very wet. In the districts containing Melbourne and Hobart, the rain is fairly well distributed throughout the twelve months, with a maximum in October for both districts. In Queensland, the heaviest rains fall in the summer months, but good averages are also maintained during the other seasons in eastern parts.

On the coast of New South Wales, the first half of the year is the wettest, with heaviest falls in the autumn; the averages during the last six months are fair, and moderately uniform. Generally, it may be said that approximately one-third of the area of the continent, principally in the eastern and northern parts, enjoys an annual average rainfall of from 20 to 50 inches or more, the remaining two-thirds averaging from 5 to 20 inches.

(vi) *Tables of Rainfall.* The following table of rainfall for a fairly long period of years for each of the Australian capitals affords information as to the variability of the fall in successive years, and the list which follows in the next paragraph of the more remarkable falls furnishes information as to what may be expected on particular occasions.

RAINFALL: AUSTRALIAN CAPITAL CITIES.

Year.	Perth. Amount.	Perth. No. of Days.	Adelaide. Amount.	Adelaide. No. of Days.	Brisbane. Amount.	Brisbane. No. of Days.	Sydney. Amount.	Sydney. No. of Days.	Canberra.(a) Amount.	Canberra.(a) No. of Days.	Melbourne. Amount.	Melbourne. No. of Days.	Hobart.(b) Amount.	Hobart.(b) No. of Days.
	in.		in.		in.		in		in.		in.		in.	
1925 ..	31.41	126	21.91	118	53.10	139	50.35	145	..	..	17.57	144	22.67	170
1926 ..	49.22	167	22.20	116	30.82	111	37.07	127	..	..	20.51	149	25.79	187
1927 ..	36.59	133	16.92	101	62.08	130	48.56	138	..	..	17.98	135	20.13	185
1928 ..	44.88	140	19.43	107	52.64	145	40.07	130	18.59	90	24.09	151	30.23	205
1929 ..	36.77	132	17.51	119	39.78	118	57.90	129	23.12	70	28.81	168	26.55	194
1930 ..	39.80	129	18.65	116	41.22	144	44.47	141	17.33	82	25.41	145	19.38	152
1931 ..	39.18	118	22.26	145	66.72	136	49.22	153	24.02	103	28.63	164	27.17	179
1932 ..	39.40	121	25.04	141	24.79	97	37.47	146	20.18	118	31.08	179	30.29	155
1933 ..	32.47	116	22.12	130	49.71	118	42.71	153	20.78	96	22.28	136	23.18	182
1934 ..	40.61	120	20.24	125	54.26	117	64.91	183	35.58	131	33.53	157	23.17	194
1935 ..	32.28	129	23.45	140	34.64	111	30.97	131	23.78	95	29.98	183	32.22	196
1936 ..	30.64	118	19.34	121	21.77	101	30.22	130	26.24	108	24.30	187	19.60	178
1937 ..	35.28	120	23.01	128	34.79	113	52.00	157	20.46	82	21.45	144	20.65	160
1938 ..	29.64	111	19.26	119	43.49	110	39.17	132	19.26	79	17.63	131	31.32	169
1939 ..	45.70	123	23.29	139	41.43	122	33.67	127	27.63	116	33.11	166	27.23	188
1940 ..	20.00	98	16.16	116	42.37	93	39.34	125	17.38	64	19.83	126	17.17	135
1941 ..	34.74	122	22.56	126	31.50	105	26.74	129	19.55	91	31.78	157	23.49	145
1942 ..	39.24	140	25.44	133	44.01	125	48.29	121	25.76	104	29.79	148	19.42	163
1943 ..	31.46	117	17.84	135	50.68	126	50.74	136	24.59	123	18.80	150	20.84	149
1944 ..	27.39	123	17.13	114	27.85	100	31.04	115	12.05	75	21.32	143	26.23	151
1945 ..	52.67	137	17.85	105	48.16	130	46.47	136	22.35	100	19.22	152	16.92	157
1946 ..	41.47	122	22.59	135	38.66	83	36.05	111	22.31	94	29.80	177	39.45	193
1947 ..	43.42	137	21.89	146	60.30	146	41.45	137	27.95	135	30.47	163	38.61	181
1948 ..	34.75	126	21.40	122	41.54	106	38.83	131	32.11	101	20.98	155	23.42	178
1949 ..	27.15	126	18.23	119	47.18	121	66.26	149	27.71	100	31.41	163	22.85	157
1950 ..	32.27	122	16.06	91	63.93	152	86.33	183	43.35	132	26.18	147	19.25	131
1951 ..	34.14	127	25.44	135	33.89	87	53.15	143	22.00	103	29.85	155	24.57	163
1952 ..	39.28	123	19.99	128	33.49	122	59.19	130	37.87	141	34.39	177	30.35	165
1953 ..	37.14	119	20.00	121	43.60	101	40.86	110	19.40	102	28.38	148	28.06	162
1954 ..	28.05	112	16.73	109	61.36	142	41.29	134	18.81	82	33.53	139	27.20	143
1955 ..	46.52	138	24.58	134	50.41	136	72.46	160	30.85	124	30.70	160	22.32	168
Average	35.04	122	21.00	121	44.91	125	42.70	151	24.32	102	25.90	143	24.70	167
No. of Years	80	80	117	117	104	104	97	97	28	28	100	100	73	73
Standard 30 years' Normal(c)	35.99	128	21.09	122	40.09	117	44.80	143	..	..	25.89	156	25.03	180

(a) Commonwealth Forestry Bureau; records in issues of the Official Year Book prior to No. 36 were for the station at Acton which closed down in 1939. (b) Records taken from present site commenced 1883. (c) 1911–1940.

6. **Remarkable Falls of Rain.**—The following are the most notable falls of rain which have occurred within a period of twenty-four hours in the various States and Territories. For other very heavy falls at various localities, reference may be made to Official Year Book No. 14, pp. 60–64, No. 22, pp. 46–48 and No. 29, pp. 43, 44 and 51.

HEAVY RAINFALLS: WESTERN AUSTRALIA, UP TO 1955 INCLUSIVE.

Name of Town or Locality.	Date.	Amt.	Name of Town or Locality.	Date.	Amt.
		in.			in.
Whim Creek ..	3 Apr., 1898	29.41	Pilbara ..	2 Apr., 1898	14.04
Fortesque ..	3 May, 1890	23.36	Roebuck Plains ..	5 Jan., 1917	14.01
Roebuck Plains ..	6 Jan., 1917	22.36	Broome ..	6 Jan., 1917	14.00
Widjip	1 Apr., 1934	19.54	Carlton Hill ..	7 Feb., 1942	12.75
Derby	7 Jan., 1917	16.47	Towrana ..	1 Mar., 1943	12.16
Boodarie ..	21 Mar., 1899	14.53	Marble Bar ..	2 Mar., 1941	12.00
Balla Balla ..	21 Mar., 1899	14.40	Jimba Jimba ..	1 Mar., 1943	11.54
Winderrie ..	17 Jan., 1923	14.23			

HEAVY RAINFALLS: NORTHERN TERRITORY, UP TO 1955, INCLUSIVE.

Name of Town or Locality.	Date.	Amt.	Name of Town or Locality.	Date.	Amt.
		in.			in.
Brocks Creek ..	24 Dec., 1915	14.33	Cape Don ..	13 Jan., 1935	13.58
Groote Eylandt ..	9 Apr., 1931	14.29	Bathurst Island Mission ..	7 Apr., 1925	11.85
Borroloola ..	14 Mar., 1899	14.00	Darwin ..	7 Jan., 1897	11.67
Timber Creek ..	5 Feb., 1942	13.65			

HEAVY RAINFALLS: SOUTH AUSTRALIA, UP TO 1955, INCLUSIVE.

Name of Town or Locality.	Date.	Amt.	Name of Town or Locality.	Date.	Amt.
		in.			in.
Ardrossan ..	18 Feb., 1946	8.10	Wilmington ..	1 Mar., 1921	7.12
Carpa	18 Feb., 1946	7.83	Port Victoria ..	18 Feb., 1946	7.08
Wynbring ..	28 Feb., 1921	7.70	Mannum ..	25 Jan., 1941	6.84
Edithburg ..	18 Feb., 1946	7.46	Wirrabarra ..	7 Mar., 1910	6.80
Hesso	18 Feb., 1946	7.36	Cape Willoughby	18 Feb., 1946	6.80
Maitland ..	18 Feb., 1946	7.21	Torrens Vale ..	25 Jan., 1941	6.77

HEAVY RAINFALLS: QUEENSLAND, UP TO 1955, INCLUSIVE.

Name of Town or Locality.	Date.	Amt.	Name of Town or Locality.	Date.	Amt.
		in.			in.
Crohamhurst ..	2 Feb., 1893	35.71	Flat Top Island ..	21 Jan., 1918	25.18
Port Douglas ..	1 Apr., 1911	31.53	Landsborough ..	2 Feb., 1893	25.15
Yarrabah ..	2 Apr., 1911	30.65	Babinda (Cairns)	2 Mar., 1935	24.14
Kuranda ..	2 Apr., 1911	28.80	Goondi ..	30 Jan., 1913	24.10
Harvey Creek ..	3 Jan., 1911	27.75	Banyan (Cardwell)	12 Feb., 1927	24.00
Sarina	26 Feb., 1913	27.75	Carruchan ..	24 Jan., 1934	24.00
Plane Ck. (Mackay)	26 Feb., 1913	27.73	Tully Mill ..	12 Feb., 1927	23.86
Deeral	2 Mar., 1935	27.60	Macnade Mill ..	6 Feb., 1901	23.33
Springbrook ..	24 Jan., 1947	27.07	Woodlands (Yeppoon) ..	3 Jan., 1893	23.07
Buderim Mountain	11 Jan., 1898	26.20			

HEAVY RAINFALLS: NEW SOUTH WALES, UP TO 1955, INCLUSIVE.

Name of Town or Locality.	Date.	Amt.	Name of Town or Locality.	Date.	Amt.
		in.			in.
Dorrigo.. ..	24 June, 1950	25.04	Viaduct Creek ..	15 Mar., 1936	20.00
Cordeaux River ..	14 Feb., 1898	22.58	Buladelah ..	16 Apr., 1927	19.80
Morpeth ..	9 Mar., 1893	21.52	Madden's Creek..	13 Jan., 1911	18.68
Broger's Creek ..	13 Jan., 1911	20.83	Condong ..	27 Mar., 1887	18.66
South Head (Sydney Harbour) ..	16 Oct., 1844	20.41	Candelo ..	27 Feb., 1919	18.58
,, ,,	29 Apr., 1841	20.12	Mt. Kembla ..	13 Jan., 1911	18.25
Mount Pleasant ..	5 May, 1925	20.10	Bega	27 Feb., 1919	17.88
Broger's Creek ..	14 Feb., 1898	20.05	Kembla Heights	13 Jan., 1911	17.46
Towamba ..	5 Mar., 1893	20.00	Foxground ..	11 Sept., 1950	17.04
			Orara Upper ..	22 Feb., 1954	16.56

HEAVY RAINFALL: AUSTRALIAN CAPITAL TERRITORY, UP TO 1955, INCLUSIVE.

Name of Town or Locality.	Date.	Amt.	Name of Town or Locality.	Date.	Amt.
		in.			in.
Cotter Junction ..	27 May, 1925	7.13	Uriarra (Woodside)	27 May, 1925	6.57
Canberra (Acton)	27 May, 1925	6.84	Land's End ..	27 May, 1925	6.35

HEAVY RAINFALLS: VICTORIA, UP TO 1955, INCLUSIVE.

Name of Town or Locality.	Date.	Amt.	Name of Town or Locality.	Date.	Amt.
		in.			in.
Balook	18 Feb., 1951	10.81	Blackwood (Green-hill)	26 Jan., 1941	8.98
Hazel Park ..	1 Dec., 1934	10.50	Tambo Crossing	13 July, 1925	8.89
Kalorama ..	1 Dec., 1934	10.05	Corinella ..	28 June, 1948	8.75
Cann River ..	16 Mar., 1938	9.94	Erica	1 Dec., 1934	8.66
Tonghi Creek ..	27 Feb., 1919	9.90	Mt. Buffalo ..	6 June, 1917	8.53
Cann River ..	27 Feb., 1919	9.56	Korumburra ..	1 Dec., 1934	8.51
Olinda	1 Dec., 1934	9.10			

HEAVY RAINFALLS: TASMANIA, UP TO 1955, INCLUSIVE.

Name of Town or Locality.	Date.	Amt.	Name of Town or Locality.	Date.	Amt.
		in.			in.
Mathinna ..	5 Apr., 1929	13.25	Riana	5 Apr., 1929	11.08
Cullenswood ..	5 Apr., 1929	11.12	Triabunna ..	5 June, 1923	10.20

7. **Snowfall.**—Light snow has been known to fall occasionally as far north as latitude 31° S., and from the western to the eastern shores of the continent. During exceptional seasons, it has fallen simultaneously over two-thirds of New South Wales, and has extended at times along the whole of the Great Dividing Range, from its southern extremity in Victoria as far north as Toowoomba in Queensland. During the winter, for several months, snow covers the ground to a great extent on the Australian Alps, where the temperature falls below zero Fahrenheit during the night. In the ravines around Mt. Kosciusko and similar localities the snow never entirely disappears after a severe winter.

8. **Hail.**—Hail falls most frequently along the southern shores of the continent in the winter, and over eastern Australia during the summer months. The size of the hailstones generally increases with distance from the coast. A summer rarely passes without some station experiencing a fall of stones exceeding in size an ordinary hen egg and many riddled sheets of light-gauge galvanized iron bear evidence of the weight and penetrating power of the stones.

The hailstones occur most frequently when the barometric readings indicate a flat and unstable condition of pressure. Tornadoes or tornadic tendencies are almost invariably accompanied by hail, and on the east coast the clouds from which the stones fall are frequently of a remarkable sepia-coloured tint.

9. **Barometric Pressures.**—The mean annual barometric pressure (corrected to sea level and standard gravity) in Australia varies from 29.80 inches on the north coast to 29.92 inches over the central and 30.03 inches in the southern parts of the continent. In January, the mean pressure ranges from 29.70 inches in the northern and central areas to 29.95 inches in the southern. The July mean pressure ranges from 29.90 inches at Darwin to 30.12 inches at Alice Springs. Barometer readings corrected to mean sea level and standard gravity have, under anticyclonic conditions, ranged as high as 30.935 inches (at Hobart on 13th July, 1846) and have fallen as low as 27.55 inches. This record low was registered at Mackay during a tropical hurricane on 21st January, 1918. An almost equally abnormal reading of 27.88 inches was recorded at Innisfail during a similar storm on 10th March, 1918. For graphs of Mean Barometric Pressure at Capital Cities, *see* Official Year Book No. 37, p. 35.

10. **Wind.**—(i) *Trade Winds.* The two distinctive wind currents in Australia are, as previously stated, the south-east trade and the " prevailing " westerly winds. As the belt of the earth's atmosphere in which they blow apparently follows the sun's ecliptic path north and south of the equator, so the area of the continent affected by these winds varies at different seasons of the year. During the summer months, the anticyclonic belt travels in high latitudes, thereby bringing the south-east trade winds as far south

as 30° south latitude. The " prevailing " westerly winds retreat a considerable distance to the south of Australia, and are less in evidence in the hot months. When the sun passes to the north of the equator, the south-east trade winds follow it, and only operate to the north of the tropics for the greater part of the winter. The westerly winds come into lower latitudes during the same period of the year. They sweep across the southern areas of the continent from Cape Leeuwin to Cape Howe, and during some seasons are remarkably persistent and strong, and occasionally penetrate to almost tropical latitudes.

(ii) *North-west Monsoon.* As the belt of south-east trade winds retreats southward during the summer, it is replaced in the north and north-west of Australia first by a sequence of light variable winds and then by the north-west monsoon. In Australia, the north-west monsoon has not the persistence nor regularity of the Indian south-west monsoon but is sufficiently characteristic for the summer in the north of Australia to be called the " North-west Season ". In central and eastern Queensland, the north-west monsoon in the summer has comparatively little effect and the trade winds, albeit weakened, are still dominant winds. With the migration of the sun northward in the autumn, the north-west monsoon is replaced first by light variable winds and then by the trade winds.

Further particulars of Australian wind conditions and meteorology will be found in Official Year Book No. 38, pp. 58–61.

(iii) *Cyclones and Storms.* The " elements " in Australia are ordinarily peaceful, and while destructive cyclones have visited various parts, more especially coastal areas, such visitations are rare, and may be properly described as erratic.

During the winter months, the southern shores of the continent are subject to deep depressions of the southern low-pressure belt. They are felt most severely over the south-western parts of Western Australia, to the south-east of South Australia, in Bass Strait, including the coastline of Victoria, and on the west coast of Tasmania. Apparently the more violent wind pressures from these disturbances are experienced in their northern half, or in that part of them which has a north-westerly to a south-westerly circulation.

The north-east coast of Queensland is occasionally visited by hurricanes from the north-east tropics. During the first four months of the year, these hurricanes appear to have their origin in the neighbourhood of the South Pacific Islands, their path being a parabolic curve first to the south-west and finally towards the south-east.

Very severe cyclones, locally known as " willy willies," are peculiar to the north-west coast of Western Australia from the months of November to April, inclusive. They usually originate over the ocean to the north or north-west of Australia, and travel in a south-westerly direction with continually increasing force, displaying their greatest energy near Cossack and Onslow, between latitudes 20° and 22° South. The winds in these storms, like those from the north-east tropics, are very violent and destructive. The greatest velocities are usually to be found in the south-eastern quadrant of the cyclones, with north-east to east winds. After leaving the north-west coast, these storms either travel southwards, following the coast-line, or cross the continent to the Great Australian Bight. When they take the latter course, their track is marked by torrential rains, as much as 29.41 inches, for example, being recorded in 24 hours at Whim Creek from one such occurrence. Falls of 10 inches and over have frequently been recorded in the northern interior of Western Australia from similar storms.

Some further notes on severe cyclones and on " southerly bursters ", a characteristic feature of the eastern part of Australia, appeared in early issues of the Official Year Book (*see* No. 6, pp. 84–86), and a special article dealing with " Australian Hurricanes and Related Storms " appeared in Official Year Book No. 16, pp. 80–84.

Depressions vary considerably in their isobaric forms, intensity and other characteristics. Some bring rain in variable quantities, some heat and others mainly wind. A common type in southern Australia is the " ʌ " shaped trough with an abrupt " backing " of the wind or " line squall " as it passes. The cold front is most frequently found through the centre of the " trough " because it is along this line, and extending into the upper levels of the atmosphere, that the demarcation of different air masses is so well defined. The best rains in inland Australia occur when extensive masses of warm moist tropical air move into the interior and are forced to rise by convergence of flow or by impact with a cold air stream.

The speed of low pressure systems is very variable, but in general in southern latitudes the movement is of the order of 500 to 700 miles per day.

11. **Influences affecting Australian Climate.**—(i) *General.* Australian history does not cover a sufficient period, nor is the country sufficiently occupied, to ascertain whether or not the advance of settlement has materially affected the climate as a whole. Local changes have, however, taken place, a fact which suggests that settlement and the treatment of the land have a distinct effect on local conditions. For example, low-lying lands on the north coast of New South Wales, which originally were seldom subject to frosts, have, with the deforestation of the surrounding hills experienced annual visitations, the probable explanation being that through the absence of trees the cold air of the highlands now flows unchecked and untempered down the sides of the hills to the valleys and lower lands.

(ii) *Influence of Forests on Climate.* As already indicated, forests doubtless exercise a great influence on local climate, and hence, to the extent that forestal undertakings will allow, the weather can be controlled by human agency. The direct action of forests is an equalizing one; thus, especially in equatorial regions, and during the warmest portion of the year, they considerably reduce the mean temperature of the air. They also reduce the diurnal extremes of shade temperatures by altering the extent of radiating surface by evaporation, and by checking the movement of air, and while decreasing evaporation from the ground, they increase the relative humidity. Vegetation greatly diminishes the rate of flow-off of rain and the washing away of surface soil, and when a region is protected by trees a steadier water supply is ensured, and the rainfall is better conserved. In regions of snowfall, the supply of water to rivers is similarly regulated, and without this and the sheltering influence of ravines and "gullies," watercourses supplied mainly by melting snow would be subject to alternate periods of flooding and dryness. This is borne out in the case of the inland rivers, the River Murray, for example, which has never been known to become dry, deriving its steadiness of flow mainly through the causes indicated.

(iii) *Direct Influence of Forests on Rainfall.* Whether forests have a direct influence on rainfall is a debatable question, some authorities alleging that precipitation is undoubtedly induced by forests, while others take the opposite view.

Sufficient evidence exists, however, to prove that, even if the rainfall is not increased, the beneficial climatic effect of forest lands more than warrants their protection and extension. Rapid rate of evaporation, induced by both hot and cold winds, injures crops and makes life uncomfortable on the plains, and, while it may be doubted that the forest aids in increasing precipitation, it must be admitted that it does check winds and the rapid evaporation due to them. Trees as wind-breaks have been successfully planted in central parts of the United States of America, and there is no reason why similar experiments should not be successful in many parts of the treeless interior of Australia. The belts should be planted at right angles to the direction of the prevailing parching winds, and if not more than half a mile apart will afford shelter to the enclosed areas.

12. **Rainfall and Temperatures, Various Cities.**—Official Year Book No. 34, p. 28, shows rainfall and temperature and No. 38, p. 42, temperature, for various important cities throughout the world and for the Australian capitals.

13. **Climatological Tables.**—The averages and extremes for a number of climatological elements, which have been determined from long series of observations at the Australian capitals up to and including the year 1955, are given on the following eight pages.

NOTE.—The following points apply throughout:—

(i) Where records are available, mean or average values have been calculated on a standard period of 30 years from 1911 to 1940.

(ii) Extreme values have been extracted from all available years of actual record, but the number of years quoted does not include intervening periods when observations were temporarily discontinued.

CLIMATOLOGICAL DATA: PERTH, WESTERN AUSTRALIA.

(LAT. 31° 57′ S., LONG. 115° 51′ E. HEIGHT ABOVE M.S.L. 210 FT.)

Barometer, Wind, Evaporation, Lightning, Clouds and Clear Days.

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. (Height of Anemometer 71 feet.) Average Miles per Hour.	Highest Mean Speed in One Day (miles per hour).	Highest Gust Speed (miles per hour).	Prevailing Direction. 9 a.m.	Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days of Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m., 9 p.m.(a)	No. of Clear Days.
No. of years of observations.	30(b)	30(b)	56	42	30(b)	30(b)	30(b)	30(b)	30(b)	30(b)
January ..	29.897	10.1	33.2 27/98	49	E	SSW	10.37	2	2.9	14
February ..	29.922	9.9	27.1 6/08	54	ENE	SSW	8.63	2	3.1	13
March ..	29.976	9.4	27.1 6/13	66	E	SSW	7.52	2	3.5	12
April	30.071	7.9	39.8 25/00	61	ENE	SSW	4.62	2	4.2	9
May	30.062	7.8	34.4 29/32	73	NE	WSW	2.80	3	5.4	6
June	30.068	7.8	38.1 17/27	80	N	NW	1.82	2	5.9	5
July	30.082	8.2	42.3 20/26	73	NNE	W	1.76	2	5.6	5
August ..	30.084	8.7	40.3 15/03	77	N	WNW	2.37	2	5.6	6
September ..	30.073	8.7	36.0 11/05	75	ENE	SSW	3.44	1	4.9	8
October ..	30.033	9.3	33.7 6/16	65	SE	SW	5.38	1	4.8	8
November ..	29.989	9·9	32.4 18/97	63	E	SW	7.65	2	3.9	9
December ..	29.923	10.2	32.3 6/22	64	E	SSW	9.69	2	3.2	13
Year *Totals* ..	—	—	—	—	—	—	*66.05*	*23*	—	*108*
Year *Averages*	*30.015*	*9.0*	—	—	*E*	*SSW*	—	—	*4.4*	—
Year *Extremes*	—	—	*42.3 20/7/26*	*80*	—	—	—	—	—	—

(a) Scale 0–10. (b) Standard 30 years' normal (1911–1940).

Temperature and Sunshine.

Month.	Mean Temperature (°Fahr.). Mean Max.	Mean Min.	Mean	Extreme Shade Temperature (°Fahr.). Highest.	Lowest.	Extreme Range.	Extreme Temperature (°Fahr.). Highest in Sun.	Lowest on Grass.	Mean Daily Hours of Sunshine.
No. of years over which observation extends.	30(a)	30(a)	30(a)	59	59	59	57	57	30(a)
January	84.6	63.3	73.9	110.2 12/34	48.6 20/25	61.6	177.3 22/14	39.5 20/25	10.4
February	85.1	63.5	74.3	112.2 8/33	47.7 1/02	64.5	173.7 4/34	39.8 1/13	9.8
March	81.3	61.5	71.4	106.4 14/22	45.8 8/03	60.6	175.9 23/47	36.7 8/03	8.8
April	76.3	57.4	66.8	99.7 9/10	39.3 20/14	60.4	157.0 8/16	31.0 20/14	7.5
May	69.0	52.8	60.9	90.4 2/07	34.3 11/14	56.1	146.0 4/25	25.3 11/14	5.7
June	64.4	49.8	57.1	81.7 2/14	34.9 22/55	46.8	135.5 9/14	26.3 11/37	4.8
July	62.8	48.0	55.4	76.4 21/21	34.2 7/16	42.2	133.2 13/15	25.1 30/20	5.4
August	63.8	48.4	56.1	82.0 21/40	35.3 31/08	46.7	145.1 29/21	26.7 24/35	6.0
September	66.8	50.4	58.6	90.9 30/18	37.6 8/52	53.3	153.6 29/16	27.2 8/52	7.2
October	69.7	52.6	61.1	95.3 30/22	40.0 16/31	55.3	157.5 31/36	29.8 16/31	8.1
November	76.7	57.3	67.0	104.6 24/13	42.0 1/04	62.6	167.0 30/25	35.5 (b)	9.6
December	81.2	60.9	71.0	107.9 20/04	47.9 10/55	60.0	168.8 11/27	39.0 12/20	10.4
Year *Averages* ..	*73.5*	*55.5*	*64.5*	—	—	—	—	—	*7.8*
Year *Extremes* ..	—	—	—	*112.2 8/2/33*	*34.2 7/7/16*	*78.0*	*177.3 22/1/14*	*25.1 30/7/20*	—

(a) Standard 30 years' normal (1911–1940). (b) 6/10 and 14/12.

Humidity, Rainfall and Fog.

Month.	Vapour Pressure (inches) Mean 9 a.m.	Rel. Hum. (%) at 9 a.m. Mean.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days of Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Fog. Mean No. of Days of Fog.
No. of years over which observation extends.	30(a)	30(a)	59	59	30(a)	30(a)	80	80	80	30(a)
January	0.438	51	61	41	0.33	3	2.17 1879	Nil (b)	1.74 27/79	0
February	0.434	51	65	43	0.50	3	6.55 1955	Nil (b)	3.43 17/55	0
March	0.432	57	66	46	0.90	5	5.71 1934	Nil (b)	3.03 9/34	0
April	0.397	61	73	51	1.75	8	5.85 1926	Nil 1920	2.62 30/04	1
May	0.365	70	81	61	5.14	15	12.13 1879	0.98 1903	3.00 17/42	2
June	0.337	75	83	68	7.55	17	18.75 1945	2.16 1877	3.90 10/20	2
July	0.322	76	84	69	7.08	19	12.28 1926	2.42 1876	3.00 4/91	2
August	0.316	71	83	62	5.78	19	12.53 1945	0.46 1902	2.91 14/45	1
September	0.341	66	75	58	3.37	15	7.84 1923	0.34 1916	1.82 4/31	0
October	0.345	60	75	52	2.30	12	7.87 1890	0.15 1946	1.73 3/33	0
November	0.374	52	63	41	0.75	7	2.78 1916	Nil 1891	1.40 15/48	0
December	0.409	51	63	44	0.54	5	3.05 1888	Nil (c)	1.72 1/83	0
Year *Totals* ..	—	—	—	—	*35.99*	*128*	—	—	—	*8*
Year *Averages* ..	*0.370*	*62*	—	—	—	—	—	—	—	—
Year *Extremes* ..	—	—	*84*	*41*	—	—	*18.75 6/1945*	*Nil Various months*	*3.90 10/6/20*	—

(a) Standard 30 years' normal (1911–1940). (b) Various years. (c) 1886 and 1924.

CLIMATOLOGICAL DATA; DARWIN, NORTHERN TERRITORY.

(LAT. 12° 28′ S., LONG. 130° 51′ E. HEIGHT ABOVE M.S.L. 97 FT.)

Barometer, Wind, Evaporation, Lightning, Clouds and Clear Days.

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. Average Miles per Hour.	Wind. Highest Mean Speed in One Day (miles per hour).	Wind. Highest Gust Speed (miles per hour).	Wind. Prevailing Direction. 9 a.m.	Wind. Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days of Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m., 9 p.m.(a)	No. of Clear Days.
No. of years of observations.	30	14	—	—	—	—	—	30	30	30
January ..	29.706	6.1	—	—	NW & S	W & NW	—	16	7.1	1
February ..	29.728	6.7	—	—	W & S	W & NW	—	16	7.0	1
March ..	29.751	5.3	—	—	SE	W & NW	—	14	6.2	3
April	29.809	6.1	—	—	SE	E	—	6	3.5	11
May	29.859	6.5	—	—	SE	E	—	1	2.1	19
June	29.892	6.5	—	—	SE	E & SE	—	0	1.6	22
July	29.911	6.2	—	—	SE	E & SE	—	0	1.4	23
August ..	29.914	5.9	—	—	SE	NW & N	—	0	1.3	23
September ..	29.886	6.2	—	—	SE & S	NW & N	—	1	2.0	18
October ..	29.850	6.2	—	—	S	NW & N	—	8	3.2	10
November ..	29.797	5.5	—	—	W & S	NW & N	—	17	4.8	4
December ..	29.738	6.2	—	—	NW & S	NW & N	—	17	6.0	2
Year: *Totals* ..	—	—	—	—	—	—	—	*96*	—	*137*
Year: *Averages*	*29.820*	*6.1*	—	—	*SE*	*NW*	—	—	*3.9*	—
Year: *Extremes*	—	—	—	—	—	—	—	—	—	—

(a) Scale 0–10.

Temperature and Sunshine.

Month.	Mean Temperature (°Fahr.). Mean Max.	Mean Temperature (°Fahr.). Mean Min.	Mean Temperature (°Fahr.). Mean	Extreme Shade Temperature (°Fahr.). Highest.	Extreme Shade Temperature (°Fahr.). Lowest.	Extreme Range.	Extreme Temperature (°Fahr.). Highest in Sun.	Extreme Temperature (°Fahr.). Lowest on Grass.	Mean Daily Hours of Sunshine.
No. of years over which observation extends.	30	30	30	39(a)	39(a)	—	25	—	—
January	89.9	77.3	83.6	99.1 8/28	69.2 21/44	—	168.0 26/42	—	—
February	89.8	77.1	83.4	97.0 13/37	63.0 25/49	—	163.6 23/38	—	—
March	90.2	77.1	83.6	100.0 8/31	66.6 31/45	—	165.6 23/38	—	—
April	91.9	75.9	83.9	98.0 19/24	60.8 11/43	—	163.0 1/38	—	—
May	90.9	72.6	81.4	96.8 (b)	59.2 8/49	—	160.0 5/20	—	—
June	87.5	69.5	78.5	98.6 17/37	55.3 18/49	—	155.2 2/16	—	—
July	86.6	67.8	77.2	94.0 16/21	50.7 29/42	—	156.0 28/17	—	—
August	88.5	69.7	79.1	96.0 30/36	58.0 (c)	—	156.2 28/16	—	—
September	91.0	73.9	82.5	99.0 25/28	63.8 1/46	—	157.0 (d)	—	—
October	92.6	77.2	84.9	99.0 14/33	68.5 26/45	—	160.5 30/38	—	—
November	93.2	78.2	85.7	101.0 27/24	67.4 12/45	—	170.4 14/37	—	—
December	92.0	78.1	85.0	100.4 13/31	68.5 24/41	—	169.0 26/23	—	—
Year: *Averages* ..	*90.3*	*74.5*	*82.4*	—	—	—	—	—	—
Year: *Extremes* ..	—	—	—	*101.0 7/11/24*	*50.7 29/7/42*	—	*170.4 14/11/37*	—	—

(a) Years 1918–41 at Post Office, 1942–55 at aerodrome; sites not strictly comparable. (b) 2/37 and 2/42. (c) 9/42 and 12/42. (d) 28/16 and 3/21.

Humidity, Rainfall and Fog.

Month.	Vapour Pressure (inches) Mean 9 a.m.	Rel. Hum. (%) at 9 a.m. Mean.	Rel. Hum. (%) at 9 a.m. Highest Mean.	Rel. Hum. (%) at 9 a.m. Lowest Mean.	Rainfall (inches). Mean Monthly.	Rainfall (inches). Mean No. of Days of Rain.	Rainfall (inches). Greatest Monthly.	Rainfall (inches). Least Monthly.	Rainfall (inches). Greatest in One Day.	Fog. Mean No. of Days of Fog.
No. of years over which observation extends.	58	58	58	58	30	22	87	87	87	30
January	0.925	78	89	69	16.18	20	27.86 1906	2.25 1930	11.67 7/97	0
February	0.920	79	88	71	12.37	18	25.74 1955	0.44 1931	5.25 15/49	0
March	0.912	78	84	69	11.18	17	21.88 1898	0.81 1911	7.18 6/19	0
April	0.800	69	80	60	3.08	6	23.74 1891	Nil (a)	5.51 1/29	0
May	0.652	63	76	49	0.33	1	14.00 1953	Nil (a)	2.19 6/22	0
June	0.545	61	75	52	0.09	1	1.53 1902	Nil (a)	1.32 10/02	0.4
July	0.522	59	71	47	0.01	0	2.56 1900	Nil (a)	1.71 2/00	1.1
August	0.613	63	73	53	0.02	0	3.00 1870	Nil (a)	1.06 14/09	0.7
September	0.732	65	73	54	0.60	2	2.72 1950	Nil (a)	2.00 26/50	0.2
October	0.832	65	72	60	1.93	5	13.34 1954	Nil (a)	3.60 15/16	0
November	0.868	68	75	62	4.32	10	15.72 1938	0.40 1870	4.73 9/51	0
December	0.890	73	83	65	8.57	15	22.38 1910	0.98 1934	7.87 28/10	0
Year: *Totals* ..	—	—	—	—	*58.68*	*95*	—	—	—	*2.4*
Year: *Averages* ..	*0.764*	*68*	—	—	—	—	—	—	—	—
Year: *Extremes* ..	—	—	*89*	*47*	—	—	*27.86 1/06*	*Nil (b)*	*11.67 7/1/97*	—

(a) Various years. (b) April to October, various years.

CLIMATOLOGICAL DATA; ADELAIDE, SOUTH AUSTRALIA.

(LAT. 34° 56′ S., LONG. 138° 35′ E. HEIGHT ABOVE M.S.L. 140 FT.)

Barometer, Wind, Evaporation, Lightning, Clouds and Clear Days.

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. (Height of Anemometer 75 feet.) Average Miles per Hour.	Highest Mean Speed in One Day (miles per hour).	Highest Gust Speed (miles per hour).	Prevailing Direction. 9 a.m.	Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days of Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m., 9 p.m.(a)	No. of Clear Days.
No. of years of observations.	30(b)	30(b)	77	38	30(b)	30(b)	30(b)	30(b)	30(b)	30(b)
January ..	29.917	9.9	31.6 19/99	72	SW	SW	9.27	2.3	3.6	12.9
February ..	29.953	8.8	28.8 22/96	64	NE	SW	7.56	2.0	3.7	11.2
March ..	30.037	8.3	26.2 9/12	63	S	SW	6.39	1.8	4.0	10.6
April	30.119	8.0	32.2 10/96	81	NE	SW	3.78	1.5	5.2	7.2
May	30.131	8.1	31.7 9/80	67	NE	NW	2.27	1.3	5.8	4.9
June	30.119	8.3	31.3 12/78	67	NE	N	1.37	1.3	6.1	4.1
July	30.111	8.5	28.1 25/82	60	NE	NW	1.34	1.5	6.0	4.3
August ..	30.084	9.2	32.2 31/97	57	NE	SW	1.99	2.0	5.5	5.6
September ..	30.050	9.2	30.0 2/87	69	NNE	SW	3.05	2.0	5.3	5.8
October ..	30.007	9.8	32.0 28/98	73	NNE	SW	5.03	2.8	5.3	5.7
November ..	29.990	9.9	32.2 7/48	79	SW	SW	6.89	3.3	4.9	7.2
December ..	29.922	9.9	28.1 12/91	75	SW	SW	8.74	2.2	4.2	9.5
Year: *Totals* ..	—	—	—	—	—	—	*57.68*	*24.0*	—	*89.0*
Year: *Averages*	*30.037*	*9.0*	—	—	*NE*	*SW*	—	—	*5.0*	—
Year: *Extremes*	—	—	*32.2* (c)	*81*	—	—	—	—	—	—

(a) Scale 0–10. (b) Standard 30 years' normal (1911–1940). (c) 10/4/1896, 31/8/1897 and 7/11/1948.

Temperature and Sunshine.

Month.	Mean Temperature (°Fahr.). Mean Max.	Mean Min.	Mean	Extreme Shade Temperature (°Fahr.). Highest.	Lowest.	Extreme Range.	Extreme Temperature (°Fahr.). Highest in Sun.	Lowest on Grass.	Mean Daily Hours of Sunshine.
No. of years over which observation extends.	30(a)	30(a)	30(a)	99	99	99	54(b)	95	30(a)
January	84.8	61.0	72.9	117.7 12/39	45.1 21/84	72.6	180.0 18/82	36.5 14/79	10.0
February	85.7	61.8	73.7	113.6 12/99	45.5 23/18	68.1	170.5 10/00	35.8 23/26	9.3
March	81.3	59.1	70.2	110.5 9/34	43.9 21/33	66.6	174.0 17/83	32.1 21/33	7.9
April	73.0	54.4	63.7	98.6 5/38	39.6 15/59	59.0	155.0 1/83	30.2 16/17	6.0
May	66.8	50.8	58.8	89.5 4/21	36.9 26/95	52.6	148.2 12/79	25.6 19/28	4.8
June	61.0	46.6	53.8	76.0 23/65	32.5 (c)	43.5	138.8 18/79	21.0 24/44	4.2
July	59.9	45.4	52.7	74.0 11/06	32.0 24/08	42.0	134.5 26/90	22.1 30/29	4.3
August	62.3	46.2	54.3	85.0 31/11	32.3 17/59	52.7	140.0 31/92	22.8 11/29	5.4
September	66.8	48.3	57.5	91.3 29/44	32.7 4/58	58.6	160.5 23/82	25.0 25/27	6.3
October	72.5	51.7	62.1	102.9 21/22	36.0 —/57	66.9	162.0 30/21	27.8 (d)	7.3
November	78.1	55.4	66.7	113.5 21/65	40.8 2/09	72.7	166.9 20/78	31.5 2/09	8.6
December	82.6	58.9	70.7	114.6 29/31	43.0 (e)	71.6	175.7 7/99	32.5 4/84	9.5
Year: *Averages* ..	*72.9*	*53.3*	*63.1*	—	—	—	—	—	*7.0*
Year: *Extremes* ..	—	—	—	*117.7 12/1/39*	*32.0 24/7/08*	*85.7*	*180.0 18/1/82*	*21.0 24/6/44*	—

(a) Standard 30 years' normal (1911–1940). (b) Records incomplete, 1931–34. Discontinued, 1934. (c) 27/1876 and 24/1944. (d) 4/1931 and 2/1918. (e) 16/1861 and 4/1906.

Humidity, Rainfall and Fog.

Month.	Vapour Pressure (inches) Mean 9 a.m.	Rel. Hum. (%) at 9 a.m. Mean.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days of Rain	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Fog. Mean No. of Days of Fog.
No. of years over which observation extends.	30(a)	30(a)	99	99	30(a)	30(a)	117	117	117	30(a)
January	0.327	39	59	29	0.76	5	4.00 1850	Nil (b)	2.30 2/89	0.0
February	0.352	41	56	30	1.10	5	6.09 1925	Nil (b)	5.57 7/25	0.0
March	0.332	44	58	29	0.87	5	4.60 1878	Nil (b)	3.50 5/78	0.0
April	0.329	55	72	37	1.45	10	6.78 1853	Nil 1945	3.15 5/60	0.0
May	0.313	64	76	49	2.49	13	7.75 1875	0.10 1934	2.75 1/53	0.6
June	0.294	75	84	67	2.93	15	8.58 1916	0.42 1886	2.11 1/20	1.1
July	0.282	75	87	66	2.49	16	5.38 1865	0.37 1899	1.75 10/65	1.4
August	0.282	68	78	54	2.58	16	6.24 1852	0.33 1944	2.23 19/51	0.4
September	0.289	59	72	44	2.39	13	5.83 1923	0.27 1951	1.59 20/23	0.2
October	0.287	48	67	29	1.54	10	4.38 1948	0.17 1914	2.24 16/08	0.0
November	0.292	41	57	31	1.22	8	4.10 1934	0.04 1885	2.08 7/34	0.0
December	0.322	40	50	31	1.27	6	3.98 1861	Nil 1904	2.42 23/13	0.0
Year: *Totals* ..	—	—	—	—	*21.09*	*122*	—	—	—	*3.7*
Year: *Averages* ..	*0.304*	*52*	—	—	—	—	—	—	—	—
Year: *Extremes* ..	—	—	*87*	*29*	—	—	*8.58 6/1916*	*Nil* (c)	*5.57 7/2/25*	—

(a) Standard 30 years' normal (1911–1940). (b) Various years. (c) December to April, various years.

CLIMATOLOGICAL DATA; BRISBANE, QUEENSLAND.

(LAT. 27° 28′ S., LONG. 153° 2′ E. HEIGHT ABOVE M.S.L. 134 FT.)

Barometer, Wind, Evaporation, Lightning, Clouds and Clear Days.

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. (Height of Anemometer 105 feet.) Average Miles per Hour.	Highest Mean Speed in One Day (miles per hour).	Highest Gust Speed (miles per hour).	Prevailing Direction. 9 a.m.	Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days of Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m., 9 p.m. (a)	No. of Clear Days.
No. of years of observations.	30(b)	30(b)	41	40	30(b)	30(b)	30(b)	30(b)	30(b)	30(b)
January ..	29.865	6.8	19.7 23/47	58	SE	NE	6.74	9.8	5.7	3.5
February ..	29.912	7.0	23.2 21/54	67	SE	NE	5.49	6.5	5.6	2.4
March ..	29.975	6.5	20.3 1/29	50	S	E	5.05	5.9	5.1	5.4
April	30.035	5.9	16.7 3/25	57	S	E	4.05	5.0	4.3	7.8
May	30.083	5.8	17.9 17/26	49	SW	SE	3.09	4.1	4.3	8.3
June	30.091	5.7	19.0 14/28	58	SW	W & SW	2.45	2.9	4.4	9.2
July	30.090	5.6	22.0 13/54	52	SW	W & SW	2.69	2.8	3.8	12.4
August ..	30.105	5.8	14.8 4/35	56	SW	NE	3.51	3.8	3.1	13.1
September ..	30.067	5.9	16.1 1/48	57	SW	NE	4.51	5.8	3.3	13.0
October ..	30.019	6.3	15.7 1/41	62	S	NE	5.81	7.1	4.2	8.5
November ..	29.958	6.7	15.5 10/28	62	SE & N	NE	6.32	9.5	4.9	5.9
December ..	29.890	7.0	19.5 15/26	79	SE	NE	7.02	10.6	5.3	3.8
Year — *Totals* ..	—	—	—	—	—	—	*56.73*	*73.8*	—	*93.3*
Year — *Averages*	*30.007*	*6.3*	—	—	*SW*	*NE*	—	—	*4.5*	—
Year — *Extremes*	—	—	*23.2 21/2/54*	*79*	—	—	—	—	—	—

(a) Scale 0–10. (b) Standard 30 years' normal (1911–1940).

Temperature and Sunshine.

Month.	Mean Temperature (°Fahr.). Mean Max.	Mean Min.	Mean	Extreme Shade Temperature (°Fahr.). Highest.	Lowest.	Extreme Range.	Extreme Temperature (°Fahr.). Highest in Sun.	Lowest on Grass.	Mean Daily Hours of Sinshine.
No. of years over which observation extends.	30(a)	30(a)	30(a)	69	69	69	51(b)	69	30(a)
January	85.5	69.1	77.3	109.8 26/40	58.8 4/93	51.0	169.0 2/37	49.9 4/93	7.6
February	84.6	68.7	76.6	105.7 21/25	58.5 23/31	47.2	165.2 6/10	49.1 22/31	7.4
March	82.3	66.2	74.3	99.4 5/19	52.4 29/13	47.0	162.5 6/39	45.4 29/13	7.0
April	79.1	61.5	70.3	95.2 (c)	44.4 25/25	50.8	153.8 11/16	36.7 24/25	7.1
May	73.7	55.6	64.7	90.3 21/23	40.6 30/51	49.7	147.0 1/10	29.8 8/97	6.6
June	69.4	51.5	60.5	88.9 19/18	36.3 29/08	52.6	136.0 3/18	25.4 23/88	6.3
July	68.6	49.4	59.0	84.3 23/46	36.1 (d)	48.2	146.1 20/15	23.9 11/90	6.8
August	71.1	50.0	60.6	91.0 14/46	37.4 6/87	53.6	141.9 20/17	27.1 9/99	7.9
September	75.5	54.8	65.1	100.9 22/43	40.7 1/96	60.2	155.5 26/03	30.4 1/89	8.2
October	79.2	60.3	69.8	101.4 18/93	43.3 3/99	58.1	157.4 31/18	34.9 8/89	8.4
November	82.3	64.6	73.4	106.1 18/13	48.5 2/05	57.6	162.3 7/89	38.8 1/05	8.2
December	84.5	67.5	76.0	105.9 26/93	56.4 13/12	49.5	165.9 28/42	49.1 3/94	8.2
Year — *Averages* ..	*78.0*	*59.9*	*69.0*	—	—	—	—	—	*7.5*
Year — *Extremes* ..	—	—	—	*109.8 26/1/40*	*36.1 (d)*	*73.7*	*169.0 2/1/37*	*23.9 11/7/90*	—

(a) Standard 30 years' normal (1911–1940). (b) From 1887 to March, 1947, excluding 1927 to 1936. (c) 9/1896 and 5/1903. (d) 12/7/1894 and 2/7/1896.

Humidity, Rainfall and Fog.

Month.	Vapour Pressure (inches) Mean 9 a.m.	Rel. Hum. (%) at 9 a.m. Mean.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days of Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Fog. Mean No. of Days of Fog.
No. of years over which observation extends.	30(a)	30(a)	69	69	30(a)	30(a)	104	104(b)	104	30(a)
January	0.636	66	79	53	5.72	12	27.72 1895	0.32 1919	18.31 21/87	0.6
February	0.644	69	82	55	5.47	12	40.39 1893	0.58 1849	10.61 6/31	0.9
March	0.606	72	85	56	4.97	14	34.04 1870	Nil 1849	11.18 14/08	1.6
April	0.512	71	80	56	3.68	11	15.28 1867	0.04 1944	5.46 5/33	4.0
May	0.420	71	85	59	2.35	9	13.85 1876	Nil 1846	5.62 9/79	5.4
June	0.357	73	84	54	2.75	8	14.03 1873	Nil 1847	6.41 15/48	4.5
July	0.331	71	88	53	1.88	8	8.60 1950	Nil 1841	3.54 (c)	4.9
August	0.338	67	80	53	1.07	7	14.67 1879	Nil (d)	4.89 12/87	5.9
September	0.396	62	76	47	1.69	7	5.43 1886	0.10 1907	2.46 2/94	2.8
October	0.459	59	72	48	2.27	8	11.41 1949	0.03 1948	5.34 25/49	1.6
November	0.533	61	73	45	4.00	10	12.40 1917	Nil 1842	4.46 16/86	0.7
December	0.589	62	70	51	4.24	11	17.36 1942	0.35 1865	6.60 28/71	0.4
Year — *Totals* ..	—	—	—	—	*40.09*	*117*	—	—	—	*33.3*
Year — *Averages* ..	*0.485*	*67*	—	—	—	—	—	—	—	—
Year — *Extremes* ..	—	—	*85*	*45*	—	—	*40.39 2/1893*	*Nil (e)*	*18.31 21/1/87*	—

(a) Standard 30 years' normal (1911–1940). (b) Records incomplete for various years between 1846 and 1859. (c) 15/1876 and 16/1889. (d) 1862, 1869, 1880. (e) Various months in various years.

CLIMATOLOGICAL DATA: SYDNEY, NEW SOUTH WALES.
(LAT. 33° 52′ S., LONG. 151° 12′ E. HEIGHT ABOVE M.S.L. 138 FT.)

Barometer, Wind, Evaporation, Lightning, Clouds and Clear Days.

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. (Height of Anemometer 58 feet.) Average Miles per Hour.	Highest Mean Speed in One Day (miles per hour).	Highest Gust Speed (miles per hour).	Prevailing Direction. 9 a.m.	Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days of Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m., 9 p.m.(a)	No. of Clear Days.
No. of years of observations.	30(b)	26(c)	40(d)	36(e)	26(c)	26(c)	26(c)	30(f)	30(b)	30(b)
January	29.875	8.9	24.9 2/22	74	S	ENE	5.71	4.8	5.7	4.8
February	29.942	8.1	20.1 14/18	61	NE	ENE	4.68	3.3	5.5	5.4
March	30.009	7.5	20.7 10/44	58	W	ENE	4.05	2.8	5.3	5.8
April	30.063	7.0	23.4 19/27	72	W	NE	2.91	2.4	5.0	7.0
May	30.098	6.8	19.6 2/26	63	W	S	2.17	1.6	4.9	7.4
June	30.078	7.1	24.5 17/14	70	W	W	1.61	1.5	4.8	8.3
July	30.070	7.2	26.6 6/31	68	W	W	1.69	1.1	4.5	10.1
August	30.060	7.4	24.6 9/51	68	W	NE	2.30	2.1	3.9	11.1
September	30.018	8.0	22.3 19/17	70	W	NE	3.00	3.0	4.2	10.0
October	29.976	8.2	21.1 18/44	95	W	ENE	4.17	3.9	4.9	7.4
November	29.935	8.5	22.6 14/30	71	W & E	ENE	4.97	4.5	5.5	5.7
December	29.881	8.9	24.9 10/20	75	S	ENE	5.64	5.4	5.8	4.8
Year *Totals*	—	—	—	—	—	—	*42.90*	*36.4*	—	*87.8*
Year *Averages*	*30.000*	*7.8*	—	—	*W*	*NE*	—	—	*5.0*	—
Year *Extremes*	—	—	*26.6 6/7/31*	*95*	—	—	—	—	—	—

(a) Scale 0–10. (b) Standard 30 years' normal (1911–1940). (c) 1915–1940. (d) 1914–1953. (e) 1917–1954. (f) 1921–1950.

Temperature and Sunshine.

Month.	Mean Temperature (°Fahr.). Mean Max.	Mean Min.	Mean	Extreme Shade Temperature (°Fahr.). Highest.	Lowest.	Extreme Range.	Extreme Temperature (°Fahr.). Highest in Sun.	Lowest on Grass.	Mean Daily Hours of Sunshine.
No. of years over which observation extends.	30(a)	30(a)	30(a)	97	97	97	84	96	30(b)
January	78.6	65.1	71.8	113.6 14/39	51.1 18/49	62.5	164.3 26/15	43.7 6/25	7.5
February	78.7	65.5	72.1	107.8 8/26	49.3 28/63	58.5	168.3 14/39	42.8 22/33	7.0
March	76.6	62.9	69.8	102.6 3/69	48.8 14/86	53.8	158.3 10/26	39.9 17/13	6.4
April	72.0	57.7	64.9	91.4 1/36	44.6 27/64	46.8	144.1 10/77	33.3 24/09	6.1
May	67.0	52.4	59.7	86.0 1/19	40.2 22/59	45.8	129.7 1/96	29.3 25/17	5.7
June	62.8	48.1	55.5	80.4 11/31	35.7 22/32	44.7	125.5 2/23	28.0 22/32	5.3
July	61.8	46.4	54.1	78.3 22/26	35.9 12/90	42.4	124.7 19/77	24.0 4/93	6.1
August	64.3	47.6	56.0	82.8 12/46	36.8 3/72	46.0	149.0 30/78	26.1 4/09	7.0
September	68.3	51.4	59.9	92.3 27/19	40.8 2/45	51.5	142.2 12/78	30.1 17/05	7.3
October	71.7	55.9	63.8	99.4 4/42	42.2 6/27	57.2	152.2 20/33	32.7 9/05	7.5
November	74.5	59.8	67.1	104.5 6/46	45.8 1/05	61.3	158.5 28/99	36.0 6/06	7.5
December	76.9	63.2	70.1	107.5 (c)	48.4 3/24	59.1	164.5 27/89	41.4 3/24	7.5
Year *Averages*	*71.1*	*56.3*	*63.7*	—	—	—	—	—	*6.8*
Year *Extremes*	—	—	—	*113.6 14/1/39*	*35.7 22/6/32*	*77.9*	*168.3 14/2/39*	*24.0 4/7/93*	—

(a) Standard 30 years' normal (1911–1940). (b) 1921–1950 (different exposure prior to 1921). (c) 31/04 and 21/53.

Humidity, Rainfall and Fog.

Month.	Vapour Pressure (inches) Mean 9 a.m.	Rel. Hum. (%) at 9 a.m. Mean.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days of Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Fog. Mean No. of Days of Fog.
No. of years over which observation extends.	30(a)	30(a)	80	80	30(a)	30(a)	97	97	97	30(b)
January	0.537	65	78	58	3.86	13	15.26 1911	0.25 1932	7.08 13/11	0.4
February	0.560	68	81	60	3.15	12	18.56 1873	0.12 1939	8.90 25/73	0.8
March	0.527	71	85	62	4.44	13	20.52 1942	0.42 1876	11.05 28/42	1.8
April	0.441	73	87	63	5.65	14	24.49 1861	0 06 1868	7.52 29/60	2.8
May	0.362	75	90	63	4.98	12	23.03 1919	0.18 1860	8.36 28/89	3.7
June	0.303	76	89	63	3.68	11	25.30 1950	0.19 1904	5 17 16/84	3.3
July	0.282	74	88	63	4.89	12	13.23 1950	0.10 1946	7.80 7/31	2.9
August	0.288	68	84	54	2.41	10	14.89 1899	0.04 1885	5.33 2/60	2.3
September	0.325	62	79	49	2.77	11	14.05 1879	0.08 1882	5.69 10/79	1.0
October	0.378	60	77	46	2.80	11	11.13 1916	0.21 1867	6.37 13/02	0.6
November	0.433	60	79	42	2.54	11	9.88 1865	0.07 1915	4.23 19/00	0.6
December	0.501	63	77	51	3.63	13	15.82 1920	0.23 1913	4.75 13/10	0 4
Year *Totals*	—	—	—	—	*44.80*	*143*	—	—	—	*20 6*
Year *Averages*	*0.393*	*68*	—	—	—	—	—	—	—	—
Year *Extremes*	—	—	*90*	*42*	—	—	*25.30 6/1950*	*0.04 8/1885*	*11.05 28/3/42*	—

(a) Standard 30 years' normal (1911–1940). (b) 1921–1950.

CLIMATOLOGICAL DATA; CANBERRA, AUSTRALIAN CAPITAL TERRITORY.

(LAT. 35° 18′ S., LONG. 149° 6′ E. HEIGHT ABOVE M.S.L., 1,906 FT.)

Barometer, Wind, Evaporation, Lightning, Clouds and Clear Days.

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. (Height of Anemometer 20 feet.) Average Miles per Hour.	Highest Mean Speed in One Day (miles per hour).	Highest Gust Speed (miles per hour).	Prevailing Direction. 9 a.m.	Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days of Lightning.	Mean Amount of Clouds, 9 a.m. and 3 p.m., (a).	No. of Clear Days.
No. of years of observations.	25	25	26	(b)	27	27	27	19	26	26
January	29.856	4.9	14.9 23/33	—	NW	NW	8.37	1.4	4.7	7.3
February	29.902	4.4	15.3 24/33	—	E	NW	6.51	2.4	4.9	6.5
March	30.008	3.9	18.2 28/42	—	E	NW	5.30	0.2	5.0	7.1
April	30.065	3.7	18.6 8/45	—	NW	NW	3.31	0.4	5.4	4.9
May	30.137	3.1	12.6 3/30	—	NW	NW	1.97	0.2	5.5	6.0
June	30.127	3.7	16.1 2/30	—	NW	NW	1.30	0.1	6.1	4.4
July	30.137	3.6	23.4 7/31	—	NW	NW	1.28	0.0	5.7	5.6
August	30.067	4.1	15.7 25/36	—	NW	NW	1.82	0.1	5.5	5.7
September	30.057	4.5	17.4 28/34	—	NW	NW	2.90	0.4	5.1	6.1
October	29.959	4.4	12.4 27/40	—	NW	NW	4.48	1.0	5.3	5.3
November	29.886	4.8	17.2 28/42	—	NW	NW	5.91	1.2	5.5	4.5
December	29.840	4.8	16.1 11/38	—	NW	NW	7.65	0.7	5.1	6.0
Year *Totals*	—	—	—	—	—	—	*50.80*	*8.1*	—	*69.4*
Year *Averages*	*30.002*	*4.2*	—	—	*NW*	*NW*	—	—	*5.3*	—
Year *Extremes*	—	—	*23.4 7/7/31*	—	—	—	—	—	—	—

(a) Scale 0–10. (b) No record.

Temperature and Sunshine.

Month.	Mean Temperature (°Fahr.). Mean Max.	Mean Min.	Mean	Extreme Shade Temperature (°Fahr.). Highest.	Lowest.	Extreme Range.	Extreme Temperature (°Fahr.). Highest in Sun.	Lowest on Grass.	Mean Daily Hours of Sunshine.
No. of years over which observation extends.	28	28	28	28	28	28	(a)	28	26
January	82.5	56.1	69.3	107.4 11/39	39.4 18/49	68.0	—	30.1 10/50	8.3
February	80.8	56.0	68.4	99.8 13/33	35.0 (b)	64.8	—	26.5 23/43	7.6
March	76.3	52.5	64.4	99.1 6/38	34.8 31/49	64.3	—	26.4 26/35	7.2
April	66.8	45.4	56.1	89.7 6/38	29.0 29/34	60.7	—	19.0 18/44	6.7
May	59.3	39.0	49.2	72.6 1/36	22.5 9/29	50.1	—	15.6 (c)	5.2
June	52.6	35.6	44.1	64.9 1/54	18.1 20/35	43.9	—	8.9 25/44	4.2
July	51.9	33.8	42.8	63.5 16/34	20.0 (d)	43.5	—	10.8 9/37	4.8
August	55.2	35.5	45.3	71.0 24/54	21.0 3/29	49.5	—	10.1 6/44	5.8
September	61.4	39.0	50.2	81.5 16/34	25.2 6/46	56.3	—	13.0 6/45	7.2
October	67.2	44.3	55.7	90.0 13/46	29.0 24/28	61.0	—	18.2 2/45	7.8
November	73.1	48.9	61.0	101.4 19/44	32.2 11/36	69.2	—	25.9 6/40	8.2
December	79.5	53.4	66.4	103.5 27/38	36.0 24/28	67.5	—	30.2 (e)	8.4
Year *Averages*	*67.2*	*45.0*	*56.1*	—	—	—	—	—	*6.8*
Year *Extremes*	—	—	—	*107.4 11/1/39*	*18.1 20/6/35*	*89.3*	—	*8.9 25/6/44*	—

(a) No record. (b) 22/31 and 23/31. (c) 13/37 and 15/46. (d) 19/29, 9/37 and 27/43. (e) 2/39 and 20/48

Humidity, Rainfall and Fog.

Month.	Vapour Pressure (inches) Mean 9 a.m.	Rel. Hum. (%) at 9 a.m. Mean.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days of Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Fog. Mean No. of Days of Fog.
No. of years over which observation extends.	26	27	27	27	28	28	28	28	28	24
January	0.370	53	69	39	2.09	7	6.69 1941	0.02 1932	2.47 19/50	0.1
February	0.388	58	71	40	2.17	7	6.03 1948	0.01 1933	3.24 17/28	0.2
March	0.378	65	79	48	2.24	7	12.69 1950	0.01 1940	2.53 20/52	0.7
April	0.315	71	81	54	2.12	7	5.19 1952	0.07 1942	2.52 9/45	1.3
May	0.254	79	87	67	1.98	7	6.13 1948	0.06 1935	3.88 3/48	4.8
June	0.212	81	90	72	1.78	9	6.09 1931	0.18 1944	1.65 24/31	6.0
July	0.196	81	87	73	1.56	10	4.09 1933	0.27 1940	2.02 13/33	5.1
August	0.213	75	88	60	1.99	11	4.71 1939	0.36 (a)	2.07 12/29	2.2
September	0.239	66	74	51	1.62	9	3.03 1937	0.13 1946	1.75 3/47	1.4
October	0.273	60	72	46	2.70	11	6.59 1934	0.34 1940	2.51 25/34	0.3
November	0.301	54	67	38	2.15	9	4.45 1950	0.28 1936	2.45 9/50	0.0
December	0.338	51	70	37	1.92	8	8.80 1947	0.16 1938	2.29 28/29	0.0
Year *Totals*	—	—	—	—	*24.32*	*102*	—	—	—	*22.1*
Year *Averages*	*0.286*	*66*	—	—	—	—	—	—	—	—
Year *Extremes*	—	—	*90*	*37*	—	—	*12.69 3/50*	*0.01 2/33,3/40*	*3.88 3/5/48*	—

(a) 1944 and 1949.

CLIMATOLOGICAL DATA; MELBOURNE, VICTORIA.

(LAT. 37° 49′ S., LONG. 144° 58′ E. HEIGHT ABOVE M.S.L. 114 FT.)

Barometer, Wind, Evaporation, Lightning, Clouds and Clear Days.

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. (Height of Anemometer 93 feet.) Average Miles per Hour.	Highest Mean Speed in One Day (miles per hour).	Highest Gust Speed (miles per hour).	Prevailing Direction. 9 a.m.	Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days of Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m., 9 p.m.(a)	No. of Clear Days.
No. of years of observations.	30(b)	15(c)	42	45	30(b)	30(b)	30(b)	30(b)	30(b)	30(b)
January ..	29.897	8.8	21.1 27/41	66	S & SW	S	6.55	1.8	4.9	6.8
February ..	29.950	8.4	19.0 13/47	74	N & S	S	5.10	2.3	4.8	6.4
March ..	30.025	7.8	17.2 19/50	66	N	S	4.26	1.8	5.3	5.5
April	30.092	7.1	19.9 16/43	67	N	S	2.53	1.2	5.9	4.6
May	30.113	7.4	20.0 4/44	72	N	N	1.57	0.5	6.1	3.4
June	30.097	7.2	22.8 16/47	62	N	N	1.18	0.4	6.5	2.7
July	30.079	8.7	20.9 9/44	68	N	N	1.16	0.3	6.3	2.9
August ..	30.048	8.2	21.3 20/42	65	N	N	1.54	0.9	6.0	3.1
September ..	30.001	8.5	19.4 6/53	69	N & W	N & S	2.41	1.3	5.9	3.3
October ..	29.968	8.4	18.6 12/52	69	N	S	3.54	1.8	6.1	3.8
November ..	29.951	8.6	19.4 4/50	71	S & SW	S	4.62	2.3	6.0	3.6
December ..	29.896	8.7	21.0 11/52	61	S & SW	S	5.85	1.9	5.6	4.5
Year: *Totals* ..	—	—	—	—	—	—	*40.31*	*16.5*	—	*50.6*
Year: *Averages*	*30.010*	*8.1*	—	—	*N*	*S*	—	—	*5.8*	—
Year: *Extremes*	—	—	*22.8 16/6/47*	*74*	—	—	—	—	—	—

(a) Scale 0–10. (b) Standard 30 years' normal (1911–1940). (c) Early records not comparable.

Temperature and Sunshine.

Month.	Mean Temperature (°Fahr.). Mean Max.	Mean Min.	Mean	Extreme Shade Temperature (°Fahr.). Highest.	Lowest.	Extreme Range.	Extreme Temperature (°Fahr.). Highest in Sun.	Lowest on Grass.	Mean Daily Hours of Sunshine.
No. of years over which observation extends.	30(a)	30(a)	30(a)	100	100	100	86(b)	95	35(c)
January	77.7	56.9	67.3	114.1 13/39	42.0 28/85	72.1	178.5 14/62	30.2 28/85	7.8
February	78.6	58.0	68.3	109.5 7/01	40.2 24/24	69.3	167.5 15/70	30.9 6/91	7.4
March	74.9	55.2	65.1	107.0 11/40	37.1 17/84	69.9	164.5 1/68	28.9 (d)	6.5
April	67.9	50.8	59.3	94.8 5/38	34.8 24/88	60.0	152.0 8/61	25.0 23/97	5.0
May	62.0	46.9	54.5	83.7 7/05	29 9 29/16	53.8	142.6 2/59	21.1 26/16	4.1
June	56.8	43.8	50.3	72.2 1/07	28.0 11/66	44.2	129.0 11/61	19.9 30/29	3.4
July	56.2	42.6	49.4	69.3 22/26	27.0 21/69	42.3	125.8 27/80	20.5 12/03	3.7
August	58.7	43.7	51.2	77.0 20/85	28.3 11/63	48.7	137.4 29/69	21.3 14/02	4.6
September	63.3	46.0	54.7	88.6 28/28	31.0 3/40	57.6	142.1 20/67	22.8 8/18	5.5
October	67.9	48.7	58.3	98.4 24/14	32.1 3/71	66.3	154.3 28/68	24.8 22/18	5.8
November	71.3	51.8	61.5	105.7 27/94	36.5 2/96	69.2	159.6 29/65	24.6 2/96	6.2
December	75.4	55.3	65.3	110.7 15/76	40.0 4/70	70.7	170.3 20/69	33.2 1/04	7.0
Year: *Averages* ..	*67.6*	*50.0*	*58.8*	—	—	—	—	—	*5.6*
Year: *Extremes* ..	—	—	—	*114.1 13/1/39*	*27.0 21/7/69*	*87.1*	*178.5 14/1/62*	*19.9 30/6/29*	—

(a) Standard 30 years' normal (1911–1940). (b) Records discontinued, 1946. (c) 1916–1950. (d) 17/1884 and 20/1897.

Humidity, Rainfall and Fog.

Month.	Vapour Pressure (inches) Mean 9 a.m.	Rel. Hum. (%) at 9 a.m. M.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days of Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Fog. Mean No. of Days of Fog.
No. of years over which observation extends.	30(a)	30(a)	48	48	30(a)	30(a)	100	100	100	30(a)
January	0.382	58	68	50	1.88	9	6.66 1941	0.01 1932	2.97 9/97	0.1
February	0.417	62	77	48	2.00	8	7.72 1939	0.03 1870	3.44 26/46	0.3
March	0.385	64	79	50	2.22	9	7.50 1911	0.14 1934	3.55 5/19	1.1
April	0.351	72	82	66	2.30	13	6.71 1901	Nil 1923	2.28 22/01	2.3
May	0.311	79	88	70	1.94	14	5.60 1942	0.14 1934	1.85 7/91	6.8
June	0.276	83	92	75	2.06	16	4.51 1859	0.73 1877	1 74 21/04	6.5
July	0.264	82	86	75	1.93	17	7.02 1891	0.57 1902	2.71 12/91	6.5
August	0.271	76	82	65	2.02	17	4.35 1939	0.48 1903	1.94 26/24	3.7
September	0.288	68	76	60	2.20	15	7.93 1916	0.52 1907	2.62 12/80	1.3
October	0.307	62	67	52	2.63	14	7.61 1869	0.29 1914	3.00 17/69	0.3
November	0.336	60	69	52	2.33	13	8.11 1954	0.25 1895	2.86 21/54	0.3
December	0.373	59	69	48	2.38	11	7.18 1863	0.11 1904	3.92 4/54	0.2
Year: *Totals* ..	—	—	—	—	*25.89*	*156*	—	—	—	*29.4*
Year: *Averages* ..	*0.323*	*69*	—	—	—	—	—	—	—	—
Year: *Extremes* ..	—	—	*92*	*48*	—	—	*8 11 11/1954*	*Nil 4/1923*	*3 92 4/12/54*	—

(a) Standard 30 years' normal (1911–1940).

CLIMATOLOGICAL DATA; HOBART, TASMANIA.

(LAT. 42° 53′ S., LONG. 147° 20′ E. HEIGHT ABOVE M.S.L. 177 FT.)

Barometer, Wind, Evaporation, Lightning, Clouds and Clear Days.

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. (Height of Anemometer 40 feet.) Average Miles per Hour.	Highest Mean Speed in One Day (miles per hour).	Highest Gust Speed (miles per hour).	Prevailing Direction. 9 a.m.	Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days of Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m., 9 p.m.(a)	No. of Clear Days.
No. of years of observations.	30(b)	30(b)	64	64	30(b)	30(b)	30(b)	30(b)	30(b)	30(b)
January ..	29.819	8.0	20.8 30/16	76	NNW	SSE	4.84	0.9	6.4	1.9
February ..	29.913	7.2	25.2 4/27	65	NNW	SSE	3.71	1.0	6.2	2.3
March ..	29.961	6.8	21.4 13/38	75	NW	SSE	3.10	1.2	6.1	2.4
April	29.997	6.7	24.1 9/52	74	NW	W	1.98	0.7	6.5	1.7
May	30.009	6.3	20.2 20/36	79	NNW	NW	1.37	0.4	6.1	2.4
June	29.986	6.2	23.7 27/20	71	NW	NW	0.91	0.4	6.2	2.4
July	29.958	6.5	22.9 22/53	78	NNW	NNW	0.94	0.3	6.1	2.0
August ..	29.906	6.8	25.5 19/26	87	NNW	NW	1.28	0.4	6.1	2.1
September ..	29.860	7.9	21.5 26/15	84	NNW	NW	1.97	0.7	6.3	1.5
October ..	29.833	8.2	19.2 8/12	74	NNW	SW	3.05	0.6	6.6	1.0
November ..	29.831	7.9	21.2 18/15	73	NNW	S	3.77	0.7	6.4	1.3
December ..	29.816	7.6	23.4 1/34	70	NNW	SSE	4.37	0.5	6.8	1.1
Year — *Totals* ..	—	—	—	—	—	—	*31.29*	*7.8*	—	*22.1*
Year — *Averages*	*29.907*	*7.2*	—	—	*NNW*	*W*	—	—	*6.3*	—
Year — *Extremes*	—	—	*25.5 19/8/26*	*87*	—	—	—	—	—	—

(a) Scale 0–10. (b) Standard 30 years' normal (1911–1940).

Temperature and Sunshine.

Month.	Mean Temperature (°Fahr.). Mean Max.	Mean Min.	Mean	Extreme Shade Temperature (°Fahr.). Highest.	Lowest.	Extreme Range.	Extreme Temperature (°Fahr.). Highest in Sun.	Lowest on Grass.	Mean Daily Hours of Sunshine.
No. of years over which observation extends.	30(a)	30(a)	30(a)	72(b)	72(b)	72(b)	57(c)	72(b)	30
January	69.8	52.4	61.0	105.0 1/00	40.1 (d)	64.9	160.0 (e)	30.6 19/97	7.7
February	70.6	53.7	62.2	104.4 12/99	39.0 20/87	65.4	165.0 24/98	28.3 —/87	7.1
March	67.5	51.3	59.4	99.1 13/40	35.2 31/26	63.9	150.9 26/44	27.5 30/02	6.4
April	62.2	48.0	55.1	87.1 1/41	33.3 24/88	53.8	142.0 18/93	25.0 —/86	5.0
May	57.8	44.6	51.2	77.8 5/21	29.2 20/02	48.6	128.0 (f)	20.0 19/02	4.4
June	52.8	41.2	47.0	69.2 1/07	29.2 28/44	40.0	122.0 12/94	21.0 6/87	4.0
July	52.7	40.6	46.6	66.1 14/34	27.7 11/95	38.4	121.0 12/93	18.7 16/86	4.4
August	55.4	41.7	48.7	71.6 28/14	28.9 9/51	42.7	129.0 —/87	20.1 7/09	5.1
September	59.0	43.7	51.4	81.7 23/26	31.0 16/97	50.7	138.0 23/93	18.3 16/26	5.9
October	62.5	46.1	54.3	92.0 24/14	32.0 12/89	60.0	156.0 9/93	23.8 (g)	6.1
November	65.0	48.2	56.6	98.3 26/37	35.0 16/41	63.3	154.0 19/92	26.0 1/08	7.2
December	67.9	51.3	59.6	105.2 30/97	38.0 3/06	67.2	161.5 10/39	27.2 —/86	7.3
Year — *Averages* ..	*61.9*	*46.9*	*54.4*	—	—	—	—	—	*5.9*
Year — *Extremes* ..	—	—	—	*105.2 30/12/97*	*27.7 11/7/95*	*77.5*	*165.0 24/2/98*	*18.3 16/9/26*	—

(a) Standard 30 years' normal (1911–1940). (b) Records 1855–1879 not comparable. (c) Period 1934–1938 not comparable; records discontinued, 1946. (d) 9/37 and 11/37. (e) 5/86 and 13/05. (f) —/89 and —/93. (g) 1/86 and —/99.

Humidity, Rainfall and Fog.

Month.	Vapour Pressure (inches) Mean 9 a.m.	Rel. Hum. (%) at 9 a.m. Mean.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days of Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Fog. Mean No. of Days of Fog.
No. of years over which observation extends.	30(a)	54	69	69	30(a)	30(a)	73(b)	73(b)	73(b)	30(c)
January	0.309	59	72	46	1.82	13	5.91 1893	0.17 1915	2.96 30/16	0.0
February	0.342	63	77	48	1.68	10	4.96 1935	0.11 1914	2.20 1/54	0.0
March	0.323	67	77	52	2.13	13	10.05 1946	0.29 1943	3.47 17/46	0.3
April	0.290	72	84	58	2.31	14	8.50 1935	0.07 1904	5.02 20/09	0.2
May	0.263	78	89	65	1.71	14	6.37 1905	0.14 1913	1.75 2/93	0.9
June	0.233	80	91	68	2.25	16	8.15 1889	0.28 1886	5.80 7/54	0.8
July	0 227	80	94	72	2.14	17	6.02 1922	0.17 1950	2.51 18/22	1.0
August	0.232	76	92	60	1.82	18	6.32 1946	0.30 1892	2.28 14/90	0.4
September	0.240	67	85	58	1.90	17	5.02 1953	0.38 1951	2.34 21/53	0.1
October	0.258	63	73	51	2.52	18	7.60 1947	0.39 1914	2.58 4/06	0.0
November	0.274	60	72	50	2.23	16	7.39 1885	0.33 1921	3.70 30/85	0.1
December	0.306	58	67	45	2.52	14	7.72 1916	0.17 1931	3.33 5/41	0.0
Year — *Totals* ..	—	—	—	—	*25.03*	*180*	—	—	—	*3.8*
Year — *Averages* ..	*0.271*	*69*	—	—	—	—	—	—	—	—
Year — *Extremes* ..	—	—	*94*	*45*	—	—	*10.05 3/1946*	*0.07 4/1904*	*5.80 7/6/54*	—

(a) Standard 30 years' normal (1911–1940). (b) Records prior to 1883 not comparable. (c) 1922–1951.