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 39° 8′ S., or, including Tasmania, 43° 39′ S. On its north are the Timor and Arafura Seas and Torres Strait—on its south the Southern Ocean and Bass Strait. The extreme points are "Steep Point" on the west, "Cape Byron" on the east, "Cape York" on the north, "Wilson's Promontory" on the south, or, if Tasmania be included, "South-East Cape."

(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. (its mean value for 1934 was 23° 26′ 52.10″), the areas within the tropical and temperate zones are approximately as follow :—

AUSTRALIA—AREAS OF TROPICAL AND TEMPERATE REGIONS.

(STATES AND TERRITORY PARTIALLY WITHIN TROPICS.)

Area.	Queensland.	Western Australia.	Northern Territory.	Total.
	Sq. Miles.	Sq. Miles.	Sq. Miles.	Sq. Miles.
Within Tropical Zone	359,000	364,000	426,320	1,149,320
Within Temperate Zone	311,500	611,920	97,300	1,020,720
Ratio of Tropical part to whole State ..	0.535	0.373	0.814	0.530
Ratio of Temperate part to whole State	0.465	0.627	0.186	0.470

Thus the tropical part is roughly about one-half (0.530) of the three territories mentioned above, or about five-thirteenths of the whole of Australia (0.386).

2. **Area of Australia compared with Areas of other Countries.**—It is not always realized that the area of Australia is almost as great as that of the United States of America, four-fifths of that of Canada, more than one-fifth of the area of the British Empire, nearly three-fourths of the whole area of Europe, and about 25 times as large

as Great Britain and Ireland. This great area, coupled with a limited population, renders the solution of the problem of Australian development a particularly difficult one. The areas of Australia and of certain other countries are given in the following table :—

AREA OF AUSTRALIA AND OF OTHER COUNTRIES.

Country.	Area.
Continental Divisions—	Sq. miles.
Europe	4,408,000
Asia	16,177,000
Africa	11,566,000
North and Central America and West Indies	8,648,000
South America	7,004,000
Australasia and Polynesia	3,301,000
Total, exclusive of Arctic and Antarctic Conts.	51,104,000
Europe—	
Soviet Union (Russia)	2,316,214
France	212,659
Spain (inc. possessions)	196,607
Germany	181,738
Sweden	173,349
Poland	149,274
Finland	132,589
Norway	124,556
Rumania	122,282
Italy	119,713
Yugoslavia	95,558
Great Britain and Northern Ireland	94,633
Asia—	
Soviet Union (Russia)	5,859,840
China and Dependencies	4,277,655
British India and Administered Territories	1,318,346
Arabia and Autonomous States	1,000,000
Persia	628,000
Dutch East Indies	572,604
Feudatory Indian States	490,333
Turkey	285,159
Japan and Dependencies	260,644
Afghanistan	245,000
Siam	200,234
Africa—	
French West Africa	1,604,159
Anglo-Egyptian Sudan	1,008,100
French Equatorial Africa	912,049

Country.	Area.
AFRICA—*continued.*	Sq. miles.
Belgian Congo	918,000
Algeria	847,552
Angola	476,712
Union of South Africa	472,347
Egypt	383,000
Nigeria and Protectorate	372,674
Tanganyika Territory	360,000
Abyssinia	350,000
Tripolitania	347,500
South-West Africa	318,099
Portuguese East Africa	297,657
Northern Rhodesia	288,000
Bechuanaland Protectorate	275,000
Madagascar	241,094
Kenya Colony and Protectorate	224,960
Cyrenaica	212,000
North and Central America—	
Canada	3,684,463
United States of America	3,026,789
Mexico	767,198
Alaska	586,400
Newfoundland and Labrador	162,734
Nicaragua	51,660
South America—	
Brazil	3,275,510
Argentine Republic	1,079,965
Bolivia	514,465
Peru	482,133
Colombia (exc. of Panama)	447,536
Venezuela	352,051
Chile	285,133
Ecuador	275,936
Australasia and Polynesia—	
Commonwealth of Australia	2,974,581
Dutch New Guinea	160,692
New Zealand and Dependencies	104,751
Territory of New Guinea	93,000
Papua	90,540
British Empire	13,355,426

The figures quoted in the table have been extracted from the Statesman's Year Book or the Statistical Year Book of the League of Nations.

3. **Areas of Political Subdivisions.**—As already stated, Australia consists of six States and the Northern and Federal Capital Territories. The areas of these, and their proportions of the total of Australia, are shown in the following table :—

AUSTRALIA—AREA OF STATES AND TERRITORIES.

State or Territory.	Area.	Percentage on Total.
	Sq. miles.	%
New South Wales	309,432	10.40
Victoria	87,884	2.96
Queensland	670,500	22.54
South Australia	380,070	12.78
Western Australia	975,920	32.81
Tasmania	26,215	0.88
Northern Territory	523,620	17.60
Federal Capital Territory	940	0.03
Total	2,974,581	100.00

4. **Coastal Configuration.**—(i) *General.* There are no striking features in the configuration of the coast ; the most remarkable indentations 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 Year Book No. 1, an enumeration of the features of the coast-line of Australia was given (see pp. 60 to 68).

(ii) *Coast-line.* The lengths of coast-line, exclusive of minor indentations, of each State and of the whole continent, and the area per mile of coast-line, are shown in the following table :—

AUSTRALIA—COAST LINE AND AREA PER MILE THEREOF.

State.	Coast-line.	Area per Mile of Coast-line.	State.	Coast-line.	Area per Mile of Coast-line.
	Miles.	Sq. miles.		Miles.	Sq. miles.
New South Wales(*a*)	700	443	South Australia ..	1,540	247
Victoria	680	129	Western Australia	4,350	224
Queensland ..	3,000	223	Continent (*b*) ..	11,310	261
Northern Territory	1,040	503	Tasmania ..	900	29

(*a*) Including Federal Capital Territory. (*b*) Area 2,948,366 square miles.

For the entire Commonwealth of Australia this gives a coast-line of 12,210 miles and an average of 244 square miles for one mile of coast-line. According to Strelbitski, Europe has only 75 square miles of area to each mile of coast-line, and, according to recent figures, England and Wales have only one-third of this, viz., 25 square miles.

(iii) *Historical Significance of Coastal Names.* It is interesting to trace the voyages of some of the early navigators by the names bestowed by them on various coastal features—thus Dutch names are found on various points of the Western Australian coast, in Nuyts' Archipelago, in the Northern Territory, and in the Gulf of Carpentaria ;

Captain Cook can be followed along the coasts of New South Wales and Queensland; Flinders' track is easily recognized from Sydney southwards, as far as Cape Catastrophe, by the numerous Lincolnshire names bestowed by him; and the French navigators of the end of the eighteenth and the beginning of the nineteenth century have left their names all along the Western Australian, South Australian, and Tasmanian coasts.

5. **Geographical Features of Australia.**—In each of the earlier issues of this Year Book fairly complete information has been given concerning some special geographical element. The nature of this information and its position in the various Year Books can be readily ascertained on reference to the special index following the index to maps and graphs at the end of this work.

6. **Fauna, Flora, Geology, and Seismology of Australia.**—Special articles dealing with these features have appeared in previous Year Books, but limits of space naturally preclude their repetition in each volume. As pointed out in 5 *supra*, however, the nature and position of these articles can be readily ascertained from the special index. A reference to Barisal Guns will be found in Vol. IX., p. 56.

§ 2. Climate and Meteorology of Australia.*

1. **Introductory.**—In Year Book No. 3, pp. 79, 80, some account was given of the history of Australian meteorology, including reference to the development of magnetic observations and the equipment for the determination of various climatological records. In Year Book No. 4, pp. 84 and 87, will be found a short sketch of the creation and organization of the Commonwealth Bureau of Meteorology, and a résumé of the subjects dealt with at the Meteorological Conference in 1907. Space will not permit of the inclusion of this matter in the present issue.

2. **Meteorological Publications.**—Reference to publications issued by the Central Meteorological Bureau will be found in Official Year Book No. 22, pp. 40, 41. The following publications have since been issued:—Volume of "Results of Rainfall Observations made in Western Australia," for all years of record to 1927; Map of Normal Meteorological Conditions in Australia affecting Aviation; and a Paper "A Basis for Seasonal Forecasting", by H. A. Hunt.

3. **General Description of Australia.**—A considerable portion (0.530) of three divisions of Australia is north of the tropic of Capricorn—that is to say, within the States of Queensland and Western Australia, and the Northern Territory; no less than 1,149,320 square miles belong to the tropical zone, and 1,020,720 to the temperate zone. The whole area of Australia within the temperate zone, however, is 1,825,261 square miles; thus the tropical part is about 0.386, or about five-thirteenths of the whole, or the "temperate" region is half as large again as the "tropical" (more accurately 1.588). By reason of its insular geographical position, and the absence of striking physical features, 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, on the whole, more temperate.

The altitudes of the surface of Australia range up to a little over 7,300 feet, hence its climate embraces a great many features, from the characteristically 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 large areas also which are treeless, and where 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. Climatologically, therefore, Australia may be said to present a great variety of features.

4. **Meteorological Divisions.**—(i) *General.* Reference to the divisions adopted by the Commonwealth Meteorologist will be found in Official Year Book No. 22, p. 41.

* Prepared from data supplied by the Commonwealth Meteorologist, W. S. Watt, Esquire.

(ii) *Special Climatological Stations.* The latitudes, longitudes, and altitudes of special stations, the climatological features of which are graphically represented hereinafter are as follow :—

SPECIAL CLIMATOLOGICAL STATIONS—AUSTRALIA.

Locality.	Height above Sea Level.	Latitude. S.		Longitude. E.		Locality.	Height above Sea Level.	Latitude. S.		Longitude. E.	
	Feet.	deg.	min.	deg.	min.		Feet.	deg.	min.	deg.	min.
Perth ..	197	31	57	115	50	Canberra ..	1,837	35	20	149	15
Adelaide ..	140	34	56	138	35	Darwin ..	97	12	28	130	51
Brisbane ..	137	27	28	153	2	Alice Springs	1,926	23	38	133	37
Sydney ..	138	33	52	151	12	Dubbo ..	870	32	18	148	35
Melbourne ..	115	37	49	144	58	Laverton, W.A.	1,530	28	40	122	23
Hobart ..	177	42	53	147	20	Coolgardie ..	1,389	30	57	121	10

5. **Temperatures.**—(i) *Comparisons with other Countries.* In respect of Australian temperatures generally, it may be pointed out that the isotherm for 70° Fahrenheit extends in South America and South Africa so far south as latitude 33°, while in Australia it reaches only so 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 the 70° isotherm extends in several of the western States so far north as latitude 41°. In Europe, the same isotherm reaches almost to the southern shores of Spain, passing, however, afterwards 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 higher temperature than 70°.

The extreme range of shade temperatures in summer and winter in a very large part of Australia amounts to probably only 81°. In Siberia, in Asia, the similar range is no less than 171°, and in North America 153°, or approximately double the Australian range.

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 months is only 8.5°, and the extreme readings for the year, or the highest maximum on record and the lowest minimum, show a difference of under 50°.

Coming southward, the extreme range of temperature increases gradually on the coast, and in a more pronounced manner inland.

(ii) *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 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, and during the dry winters the major portion of the country to the south of the tropics is subject to ground frosts. An exact knowledge of temperature disposition cannot be determined until the interior becomes more settled, but from data procurable it would appear that 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 coldest part of Australia is the extreme south-east of New South Wales and extreme east of Victoria—the region of the Australian Alps. Here the temperature seldom, if ever, reaches 100° even in the hottest of seasons.

Tasmania as a whole enjoys a most moderate and equable range of temperature throughout the year, although occasionally hot winds may cross the Straits and cause the temperature to rise to 100° in the low-lying parts.

(iii) *Monthly Maximum and Minimum Temperatures.* The normal monthly maximum and minimum temperatures can be best shown by means of graphs, which exhibit the nature of the fluctuation of each for all available years. In the diagram herein for nine representative places in Australia, the upper heavy curves show the mean maximum, and the lower heavy curves the mean minimum temperatures based upon daily observations, while the other curves show the humidities.

6. **Humidity.**—After temperature, humidity is the most important element of climate, as regards its effect on human comfort, rainfall supply, and in connexion with engineering problems generally.

In this publication the *absolute humidity* has been graphically represented in the form of inches of vapour pressure (i.e., that portion of the barometric pressure due to vapour). It is this total quantity of moisture in the air which affects personal comfort, plays an important part in varying the density of the atmosphere, and in heating and refrigerating processes. The more commonly quoted value, called the *relative humidity,* refers to the ratio which the actual moisture contents of the air bear to the total amount possible if saturation existed at the given temperature, and is usually quoted as a percentage. The relative humidity is an important factor in all drying operations, but is much less important than the absolute humidity as affecting animal life.

The mean monthly vapour pressure has also been added to the tables of climatological data for the capital cities included herein.

The normal monthly values of vapour pressure, it should be noted, combine to make the annual curve for this element which is comparable with the maximum and minimum temperature curves. but the relative himidities 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 vapour pressure is Darwin, Brisbane, Sydney, Perth, Melbourne, Adelaide, Canberra, Hobart and Alice Springs, while the relative humidity diminishes in the order, Sydney, Canberra, Darwin, Melbourne, Brisbane, Hobart, Perth Adelaide, and Alice Springs.

7. **Evaporation.**—(i) *General.* The rate and quantity of evaporation in any territory is influenced by the prevailing temperature, and by atmospheric humidity, pressure, and movement. In Australia, the question is of perhaps 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 tabular records herein, which show that the yearly amount varies from about 31 inches at Hobart to 96 inches at Alice Springs in the centre of the continent. Over the *inland* districts of the continent it has been calculated that evaporation equals the rainfall where the annual totals are about 36 inches, the variations above and below this quantity being inverse.

* In Australia, artificial storage ponds or reservoirs are called "tanks."

(ii) *Monthly Evaporation Curves.* The curves showing the mean monthly evaporation in various parts of Australia disclose how characteristically different are the amounts for the several months in different localities. The evaporation for representative places is shown on the diagram herein.

(iii) *Loss by Evaporation.* In the interior of Australia the possible evaporation is greater than the actual rainfall. 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 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.

8. **Rainfall.**—(i) *General.* As even a casual reference to climatological maps indicating the distribution of rainfall and prevailing direction of wind would clearly show, 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 the physiographical features generally.

Australia lies within the zones of the south-east trades and prevailing westerly winds. The southern limit of the south-east trade 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 upon which the rain-laden winds blow from the New South Wales northern border to Thursday Island. 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 very reliable, although generally light to moderate, rains enjoyed by the south-western portion of Western Australia, by the south-eastern agricultural areas of South Australia, by a great part of Victoria, and by the whole of Tasmania.

(ii) *Factors determining Distribution and Intensity of Rainfall.* (iii) *Time of Rainfall.* In Official Year Book No. 6 (see pp. 72 to 74) some notes were given of the various factors governing the distribution, intensity, and period of Australian rainfall.

(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 three stations situated on, or adjacent to, the Johnstone and Russell Rivers have an average annual rainfall of between 142 and 165 inches. The maximum and minimum falls there are :— Goondi, 241.53 in 1894 and 67.88 inches in 1915, or a range of 173.65 inches ; Innisfail, 211.24 in 1894 and 69.87 inches in 1902, or a range of 141.37 inches ; Harvey Creek, 254.77 in 1921 and 80.47 inches in 1902, or a range of 174.30 inches.

On four occasions more than 200 inches have been recorded at Goondi, the last of these being in 1910, when 204.82 inches were registered. The record at this station covers a period of 48 years.

Harvey Creek, in the shorter period of 28 years, has four times exceeded 200 inches, the total for 1921 being 254.77 inches, and at the South Johnstone Sugar Experiment Station, where a gauge was established fifteen years ago, 202.52 inches were recorded in 1921.

In Tasmania the wettest part is in the West Coast region, the mean annual rainfall at Lake Margaret being 145.03 inches, with a maximum of 175.12 inches in 1924.

The driest known part of the continent is in the Lake Eyre district in South Australia (the only part of the continent below sea level), where the annual average is only 5 inches, and where the fall rarely exceeds 10 inches for the twelve months.

The inland districts of Western Australia were at one time regarded as the driest part of Australia, but authentic observations in recent years over settled districts in the east of that State show that the annual average is from 10 to 12 inches.

(v) *Quantities and Distribution of Rainfall.* The departure from the normal rainfall increases progressively from the southern to the northern shores of the continent, and similarly also at all parts of the continent subject to capricious monsoonal rains, as the comparisons hereunder will show. The general distribution is best seen from the rainfall map herein, which shows the areas subject to average annual rainfalls lying between certain limits. The areas enjoying varying quantities of rainfall determined from the latest available information are shown in the following table :—

AVERAGE ANNUAL RAINFALL DISTRIBUTION.

Average Annual Rainfall.	N.S.W. (*a*)	Victoria.	Queensland.	South Australia	Northern Territory	Western Australia.	Tasmania. (*b*)	Total. (*b*)
	sqr. mls.	sqr. mls.	sqr. mls.	sqr. mls.	sqr. mls.	sqr. mls.	sqr. mls.	sqr. mls.
Under 10 inches	48,749	nil	80,496	310,660	140,500	486,952	nil	1,067,357
10—15 ,,	78,454	19,270	81,549	36,460	132,780	255,092	nil	603,605
15—20 ,,	55,762	13,492	111,833	19,940	63,026	94,101	304	358,458
20—25 ,,	45,140	14,170	143,610	8,620	49,157	44,340	3,844	308,881
25—30 ,,	30,539	15,579	99,895	3,258	41,608	31,990	3,016	225,885
30—40 ,,	33,557	14,450	61,963	1,036	37,642	59,520	5,027	213,195
Over 40 ,,	18,171	10,923	91,154	96	58,907	3,925	11,247	194,423
Total area ..	310,372	87,884	670,500	380,070	523,620	975,920	23,438	2,971,804

(*a*) Including Federal 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 a normal rainfall of 47.84 inches, occupies the chief place; Brisbane, Perth, Melbourne, Hobart, Canberra, and Adelaide following in that order, Adelaide with 21.14 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 (19.48 inches).

In order to show how the rainfall is distributed throughout the year in various parts of the continent, the figures for representative towns have been selected. (See map.) The figures for Darwin, typical of the Northern Territory, 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 Perth, as representing the south-western part of the continent, are the reverse, for while the summer months are dry, the winter ones are very wet. In Melbourne and Hobart the rain is fairly well distributed throughout the twelve months, with a maximum in October for the former, and in November for the latter. The records at Alice Springs and Daly Waters indicate that in the central parts of Australia the wettest months are in the summer and autumn. In Queensland, as in the Northern Territory, the heaviest rains fall in the summer months, but good averages are also maintained during the other seasons.

On the coast of New South Wales, the first six months of the year are the wettest, with a maximum 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 or more inches, the remaining two-thirds averaging from 5 to 20 inches.

(vi) *Curves of Rainfall and Evaporation.* The relative amounts of rainfall and evaporation at different times through the year are clearly indicated in the graphs herein. Inspection thereof will show how large is the evaporation when water is fully exposed to the direct rays of the sun and to wind.

(vii) *Tables of Rainfall.*—(a) *Years* 1902 to 1934. The table of rainfall for a long period of years for each of the various Australian capitals affords information as to the variability of the fall in successive years, and the list of the more remarkable falls furnishes information as to what may be expected on particular occasions. The capitals are dealt with in the order in which they occur in the adopted meteorological divisions.

RAINFALL—AUSTRALIAN CAPITAL CITIES.

Year.	Canberra.(a)		Perth.		Adelaide.		Brisbane.		Sydney.		Melbourne.		Hobart.	
	Amount.	No. of Days.	Amount.	No. of Days.	Amount.	No. of Days.	Amount.	No. of Days.	Amount.	No. of Days.	Amount.	No. of Days.	Amount.	No. of Days.
	in.		in.		in.		in.		in.		in.		in.	
1902 ..	..	..	27.06	93	16.02	123	16.17	87	43.07	180	23.08	102	21.85	150
3 ..	..	..	35.69	140	25.47	134	49.27	136	38.62	173	28.43	130	25.86	139
4 ..	..	..	34.35	125	20.31	117	33.23	124	45.93	158	29.72	128	22.41	139
5 ..	..	..	34.61	116	22.28	131	36.76	108	35.03	145	25.64	129	32.09	168
6 ..	..	..	32.37	121	26.51	127	42.85	125	31.89	160	22.29	114	23.31	155
7 ..	..	..	40.12	132	17.78	125	31.46	119	31.32	132	22.26	102	25.92	166
8 ..	..	..	30.52	106	24.56	125	44.01	125	45.65	167	17.72	130	16.50	148
9 ..	..	..	39.11	107	27.69	138	34.06	111	32.45	177	25.86	171	27.29	170
1910 ..	..	..	37.02	135	24.62	116	49.00	133	46.91	160	24.61	167	25.22	205
11 ..	..	..	23.38	108	15.99	127	35.21	128	50.24	155	36.61	168	26.78	193
12 ..	19.27	76	27.85	123	19.57	116	41.30	114	47.51	172	20.37	157	23.14	181
13 ..	16.38	71	38.28	141	18.16	102	40.81	115	57.70	141	21.17	157	19.36	165
14 ..	18.49	81	20.21	128	11.39	91	33.99	141	56.42	149	18.57	129	15.42	154
15 ..	22.31	87	43.61	164	19.38	117	25.66	93	34.83	117	20.95	167	20.91	196
16 ..	31.26	119	35.16	128	28.16	142	52.80	136	44.91	161	38.04	170	43.39	203
17 ..	29.70	144	45.64	146	28.90	153	40.92	127	52.40	151	30.57	171	30.62	214
18 ..	18.27	95	39.58	138	17.41	107	24.95	121	42.99	149	27.13	160	26.04	179
19 ..	16.31	85	30.66	120	17.21	108	19.36	96	58.71	152	24.89	141	22.48	153
20 ..	29.30	107	40.35	124	26.70	119	39.72	122	43.42	159	28.27	162	18.00	182
21 ..	..	..	41.09	135	22.64	100	54.31	167	43.34	140	29.76	154	18.04	159
22 ..	..	..	31.86	135	23.20	117	35.82	109	39.35	136	25.02	151	28.27	189
23 ..	..	..	44.47	134	29.79	139	23.27	93	37.01	123	22.64	158	32.93	198
24 ..	25.95	68	33.79	119	23.44	143	41.08	114	37.01	136	36.48	171	28.76	197
25 ..	33.71	59	31.41	126	21.91	118	53.10	139	50.35	145	17.57	144	22.40	171
26 ..	20.53	97	49.22	167	22.20	116	30.82	111	37.07	127	20.81	149	25.79	187
27 ..	21.40	83	36.59	133	16.92	101	62.08	130	48.56	138	17.98	135	20.02	183
28 ..	17.82	96	44.88	140	19.43	107	52.64	145	40.07	130	24.09	151	30.23	205
29 ..	22.34	88	36.77	172	17.51	119	39.78	118	57.90	129	28.81	168	26.55	194
30 ..	16.52	86	39.80	129	18.65	116	41.22	144	44.47	141	25.41	145	19.38	152
31 ..	24.25	105	39.18	118	22.26	146	66.72	136	49.22	153	28.63	164	27.17	179
32 ..	19.13	107	39.40	107	25.04	141	24.79	97	37.47	146	31.08	179	30.29	155
33 ..	20.30	88	32.47	116	22.12	130	49.71	118	42.71	153	22.28	136	23.18	173
34 ..	35.89	118	40.61	120	20.24	125	54.26	117	64.91	183	33.53	157	23.17	194
Average	22.96	93	34.92	121	21.14	123	45.28	127	47.84	153	26.16	139	23.97	152
No. of Years	20	20	59	59	96	96	85	75	95	95	91	79	92	91

(a) Records commenced in 1912; are not available for the years 1921 to 1923.

NOTE.—The above average rainfall figures for Brisbane, Sydney and Melbourne differ slightly from the mean annual falls given in the Climatological Tables and on page 54, which are for a less number of years. Annual totals from 1860 to 1901 inclusive will be found in Official Year Book No. 15, page 53.

(*b*) *Ten Years' Means, 1908 to 1928.* The mean rainfall for the decennia ended 1908, 1918 and 1928, respectively, is given hereunder :—

RAINFALL—AUSTRALIAN CAPITAL CITIES, TEN YEARS' MEANS.

Ten Years ended—	Canberra.	Perth.	Adelaide.	Brisbane.	Sydney.	Melbourne.	Hobart.
	in.	in.	in.	in.	in.	in.	in.
1908 ..	(*a*)	34.05	21.15	36.55	43.41	25.36	23.29
1918 ..	(*b*)22.24	34.98	21.13	37.87	46.64	26.39	25.82
1928 ..	(*c*)23.57	38.43	22.34	41.22	43.49	24.75	24.69

(*a*) Not available. (*b*) Seven years ended 1918. (*c*) Years 1919, 1920, and 1924 to 1931.

9. **Remarkable Falls of Rain.**—The following are the most remarkable falls of rain in the various States and in the Northern Territory which have occurred within a period of twenty-four hours. In New South Wales and Queensland falls of less than 20 inches in the twenty-four hours have not been included. For other very heavy falls at various localities reference may be made to Official Year Book No. 14, pp. 60 to 64 and No. 22, pp. 46 to 48 :—

HEAVY RAINFALLS—NEW SOUTH WALES, UP TO 1934, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		in.			in.
Broger's Creek ..	14 Feb., 1898	20.05	South Head (near Sydney) ..	29 Apr., 1841	20.12
„ „ ..	13 Jan., 1911	20.83	„ „ ..	16 Oct., 1844	20.41
Cordeaux River ..	14 Feb., 1898	22.58	Towamba ..	5 Mar., 1893	20.00
Morpeth	9 Mar., 1893	21.52			

HEAVY RAINFALLS—QUEENSLAND, UP TO 1934, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Babinda (Cairns) ..	1 Feb., 1913	20.51	Kuranda (Cairns) ..	2 Apr., 1911	28.80
„ „ ..	24 Jan., 1916	22.30	Mackay ..	21 Jan., 1918*a*	24.70
Buderim Mountain	11 „ 1898	26.20	Macnade Mill ..	6 „ 1901	23.33
Cairns	2 Apr., 1911	20.16	„ ..	4 Mar., 1915	22.00
Carbrook	23 Jan., 1918	22.66	Mooloolah ..	13 „ 1892	21.53
Cardwell ..	24 Jan., 1934	20.75	Mount Callon West	6 Feb., 1931	20.04
Conway	29 Mar., 1930	21.82	Mount Molloy ..	31 Mar., 1911	20.00
„	30 „ 1930	21.82	„ ..	1 Apr., „	20.00
Crohamhurst (Blackall Range)	2 Feb., 1893	35.71	„ ..	2 „ „	20.00
Deeral	9 Nov., 1933	20.97	Nambour ..	9 Jan., 1898	21.00
Dungeness ..	16 Mar., 1893	22.17	Plane Creek (Mackay) ..	26 Feb., 1913	27.73
Goondi	30 Jan., 1913	24.10	Port Douglas ..	1 Apr., 1911	31.53
Harvey Creek ..	3 „ 1911	27.75	Sarina	23 Jan., 1918	22.60
„ „ ..	31 „ 1913	24.72	Tomewin ..	6 Feb., 1931	20.00
Innisfail (formerly Geraldton) ..	29 Dec., 1903	21.22	Tully	12 Feb., 1927	23.86
„ „ ..	7 Apr., 1912	20.50	„	19 Jan., 1932	27.20
„ „ ..	31 Jan., 1913	20.91	Woodlands (Yepp'n)	31 Jan., 1893	23.07
Kamerunga (Cairns)	2 Apr., 1911	21.00	Yandina ..	1 Feb., 1893	20.08
Koumala ..	23 Jan., 1918	22.31	Yarrabah ..	2 Apr., 1911	30.65
„ ..	24 „ „	20.65	„ ..	24 Jan., 1916	27.20
Kuranda (Cairns) ..	1 Apr., 1911	24.30	Yeppoon ..	31 „ 1893	20.05
			„ ..	8 Oct., 1914	21.70

(*a*) 37½ hours.

HEAVY RAINFALLS—WESTERN AUSTRALIA, UP TO 1934, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Balla Balla ..	21 Mar., 1899	14.40	Obagama ..	24 Dec., 1920	13.02
Beagle Bay ..	19 May, 1931	13.00	,, ..	15 Feb., 1930	10.66
Boodarie ..	21 Jan., 1896	14.53	Pilbara	2 Apr., 1898	14.04
Broome	6 ,, 1917	14.00	Point Torment ..	17 Dec., 1906	11.86
Cossack	3 Apr., 1898	12.82	Port George IV. ..	17 Jan., 1915	11.24
,, ...	16 ,, 1900	13.23	Roebourne ..	3 Apr., 1898	11.44
Croydon	3 Mar., 1903	12.00	Roebuck Plains ..	5 Jan., 1917	14.01
Derby	29 Dec., 1898	13.09	,, ,, ..	6 ,, ,,	22.36
,, ...	7 Jan., 1917	16.47	Springvale ..	14 Mar., 1922	12.25
,, ...	23 Jan., 1931	12.25	Tambray ..	6 ,, 1900	11.00
Exmouth Gulf ..	2 Feb., 1918	12.50	Thangoo ..	17-19 Feb.,'96	24.18
Fortescue ..	3 May, 1890	23.36	,, ..	28 Dec., 1898	11.15
Frazier Downs ..	3 Mar., 1916	11.25	Whim Creek ..	3 Apr., 1898	29.41
,, ,, ..	26 Jan., 1931	12.50	,, ,, ..	21 Mar., 1899	18.17
Gnaraloo ..	20 Mar., 1923	11.00	Winderrie ..	17 Jan., 1923	14.23
Kerdiadary ..	7 Feb., 1901	12.00	Woodstock ..	21 ,, 1912	13.00
Lulingui	3 Feb., 1932	10.02	Wyndham ..	27 ,, 1890	11.60
Minilya	15 Jan., 1923	11.50	,, ..	4 Mar., 1919	12.50
Mundabullangana ..	12 Feb., 1929	12.05	Yeeda	7 Jan., 1917	11.75
Obagama ..	28 Feb., 1910	12.00			

HEAVY RAINFALLS—NORTHERN TERRITORY, UP TO 1934, INCLUSIVE.

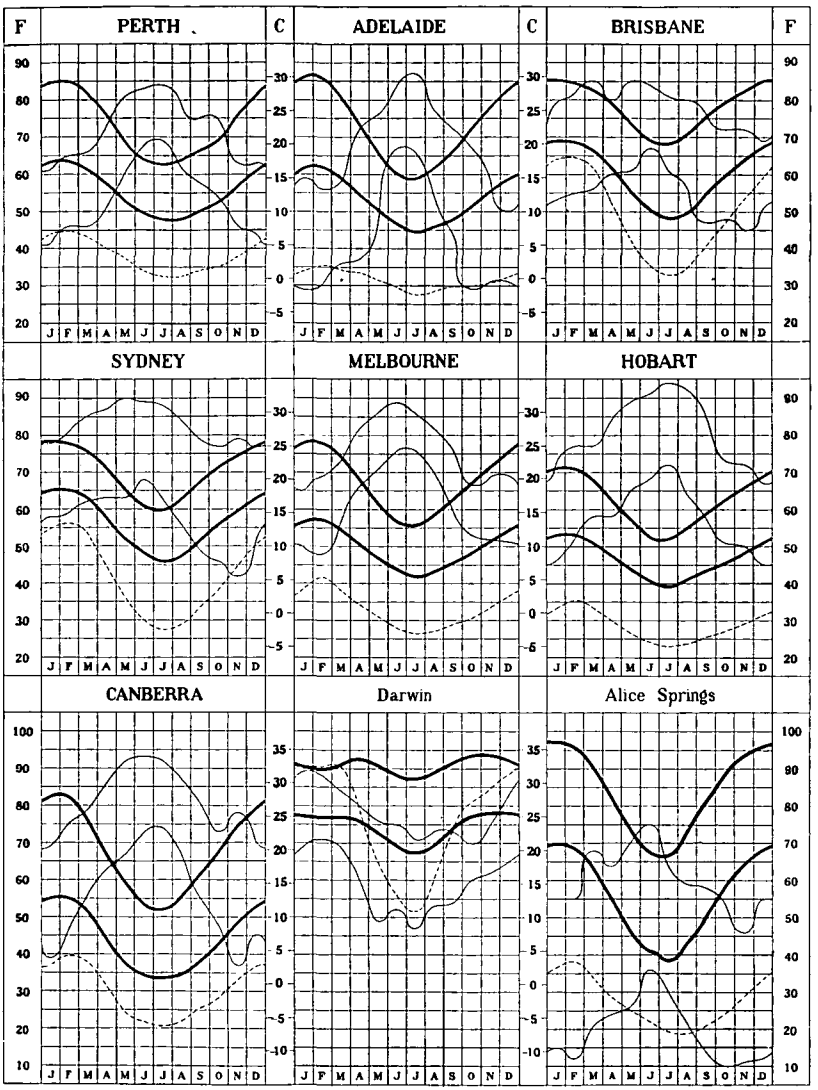
Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Bathurst Island Mission ..	7 Apr., 1925	11.85	Darwin	7 Dec., 1915	11.67
Bonrook	24 Dec., 1915	10.60	Groote Eylandt ..	30-31 Mar.,'23	12.00*a*
Borroloola ..	14 Mar., 1899	14.00	Koolpinyah ..	6 Mar., 1930	10.35
Brock's Creek ..	4 Jan., 1914	10.68	Lake Nash ..	21 Mar., 1901	10.25
,, ,, ..	24 Dec., 1915	14.33	Pine Creek ..	8 Jan., 1897	10.35
Burrundie ..	4 Jan., 1914	11.61	South Goulburn Island ..	7 Jan., 1934	10.48
Cape Don ..	13 Jan., 1934	13.58			
Cosmopolitan Gold Mine	24 Dec., 1915	10.60			

(*a*) Approximate only, as gauge was washed away.

HEAVY RAINFALLS—SOUTH AUSTRALIA, UP TO 1934, INCLUSIVE.

Name of Town or Locality.	Date.	Amount.
		ins.
Wilmington	28 Feb., 1921 ..	3.97
	1 Mar., 1921 ..	7.12

ANNUAL FLUCTUATIONS OF NORMAL MAXIMUM AND MINIMUM TEMPERATURE AND HUMIDITY.



EXPLANATION.—The upper and lower heavy lines in each graph represent the mean maximum and mean minimum temperatures respectively. The Fahrenheit temperature scales are shown on the outer edge of the sheet under " F " and the centigrade scales in the two inner columns under " C."

The broken line shows the normal absolute humidity in the form of 9 a.m. vapour pressures for which *the figures in the outer " F " columns represent hundredths of an inch of barometric pressure.*

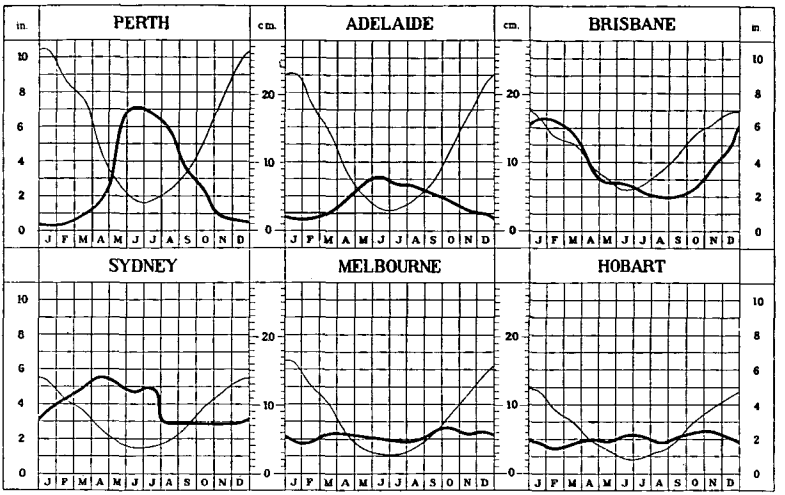
The upper and lower fine lines join the greatest and the least monthly means of relative humidity respectively, the figures under the outer columns " F " indicating percentage values.

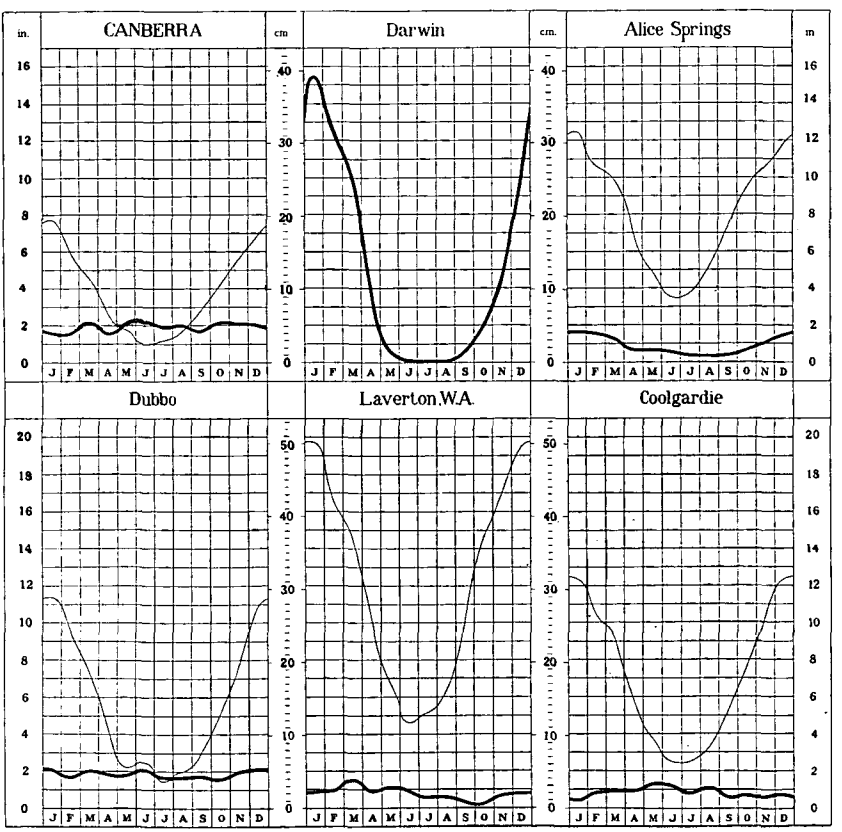
The curves for temperature and vapour pressure joining the mean monthly values serve to show the annual fluctuation of these elements, but the relative humidity graphs joining the extreme values for each month do not indicate any normal annual variation.

Comparison of the maximum and minimum temperature curves affords a measure of the mean diurnal range of temperature. At Perth in the middle of January, for instance, there is normally a range of 21° from 63° F. to 84° F., but in July it is only 15° from 48° F. to 63° F.

The relative humidity curves illustrate the extreme range of the mean monthly humidity over a number of years.

MEAN MONTHLY RAINFALL AND EVAPORATION.





EXPLANATION.—On the preceding graphs thick lines denote rainfall, and thin lines evaporation, and show the fluctuation of the mean rate of fall or evapora ton *per month* throughout the year. The results, plotted from the Climatological Tables herein are shown in inches (see the outer columns), and the corresponding metric scale (centimetres) is shown in the two inner columns. The evaporation is not given for Darwin.

At Perth, Adelaide, Brisbane, Melbourne, Hobart, Canberra, Alice Springs, and Coolgardie the results have been obtained from jacketed tanks sunk in the ground. At Sydney and Dubbo sunken tanks without water jackets are used, whilst at Laverton (W.A.) the records are taken from a small portable jacket evaporation dish of 8 inches in diameter.

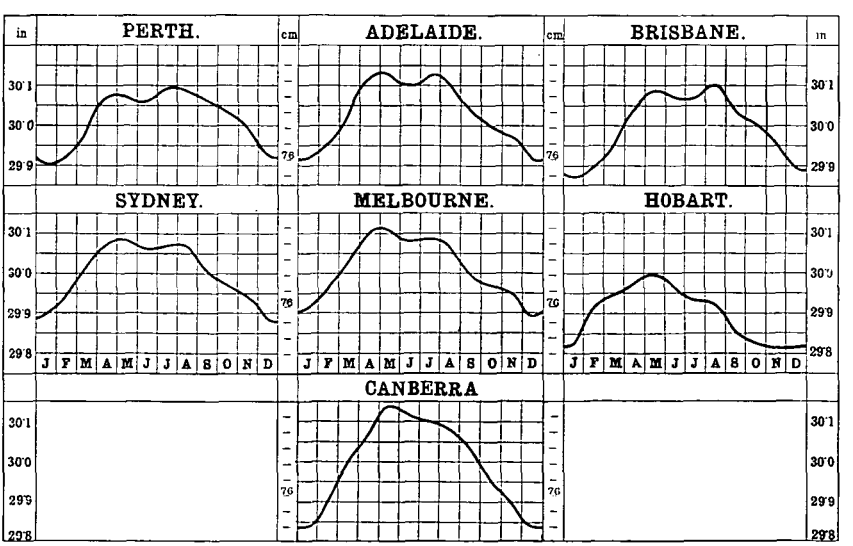
The distance for any date from the zero line to the curve represents the average number of inches, reckoned as per month, of rainfall at that date. Thus, taking the curves for Adelaide in the middle of January, the rain falls on the average at the rate of about three-fourths of an inch per month or, say, at the rate of about 9 inches per year. In the middle of June it falls at the rate of a little over 3 inches per month, or, say, at the rate of about 37 inches per year. At Dubbo, the evaporation is at the rate of nearly 11¾ inches per month about the middle of January, and only about 1½ inches at the middle of June.

The mean annual rainfall and evaporation at the places indicated are given in the appended table.

MEAN ANNUAL RAINFALL AND EVAPORATION.

Place.	Rainfall.	Evaporation.	Place.	Rainfall.	Evaporation.
	In.	In.		In.	In.
Perth ..	34.92	66.22	Canberra ..	22.96	45.93
Adelaide ..	21.14	55.12	Darwin ..	59.92	—
Brisbane ..	45.44	55.60	Alice Springs ..	10.60	96.36
Sydney ..	47.54	39.21	Dubbo ..	22.14	66.37
Melbourne ..	25.66	39.07	Laverton, W.A.	9.24	145.17
Hobart ..	23.97	31.14	Coolgardie ..	10.20	84.99

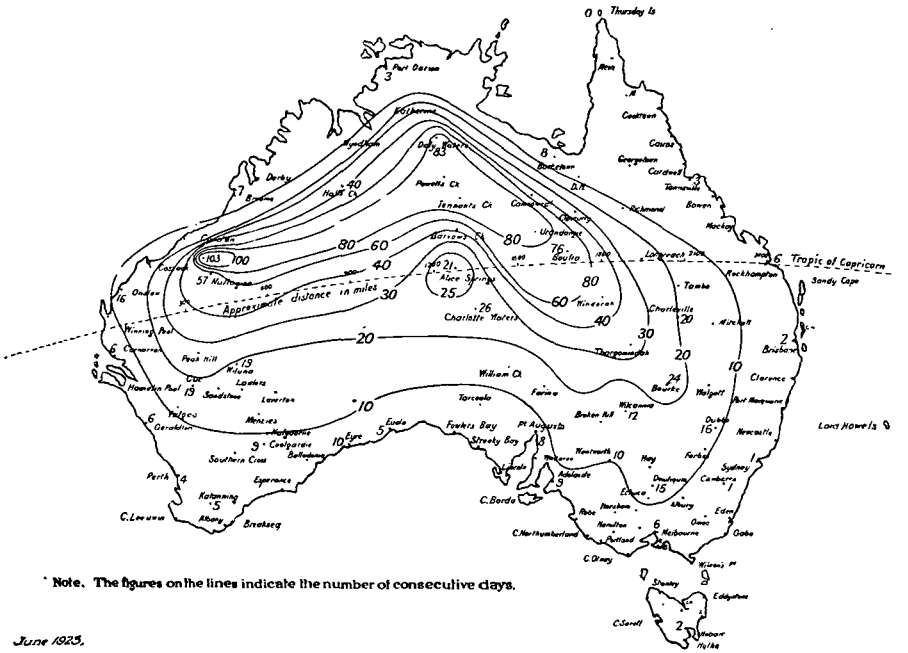
MEAN BAROMETRIC PRESSURE.—CAPITAL CITIES.



EXPLANATION.—The lines representing the yearly fluctuations of barometric pressure at the State capital cities are means for long periods, and are plotted from the Climatological Tables herein. The pressures are shown in inches on about 2½ times the natural scale, and the corresponding pressures in centimetres are also shown in the two inner columns, in which each division represents one millimetre.

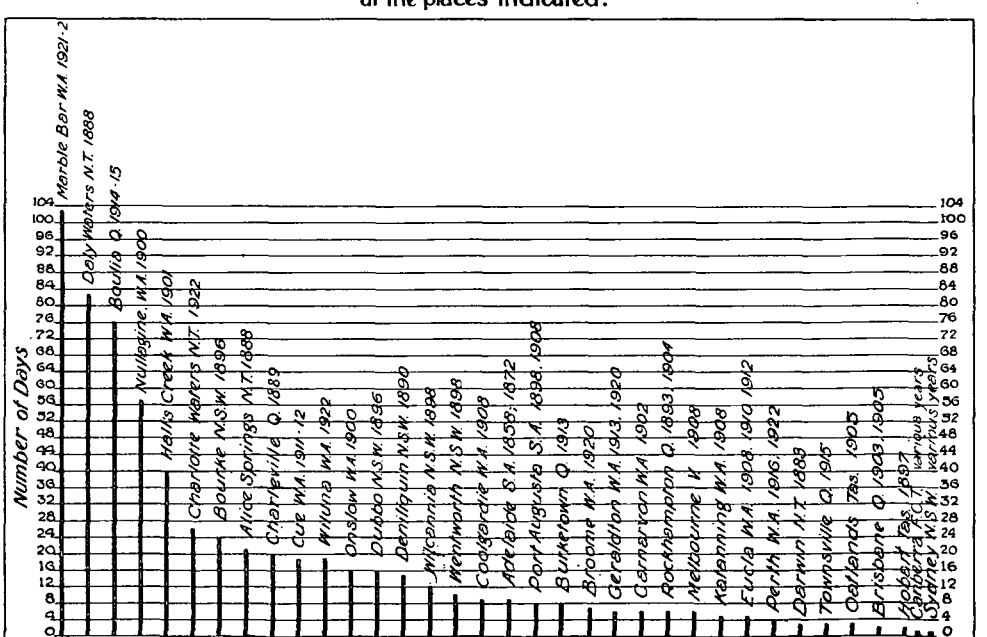
Taking the Brisbane graph for purposes of illustration, it will be seen that the mean pressure in the middle of January is about 29.87 inches, and there are maxima in the middle of May and August of about 30.09 inches.

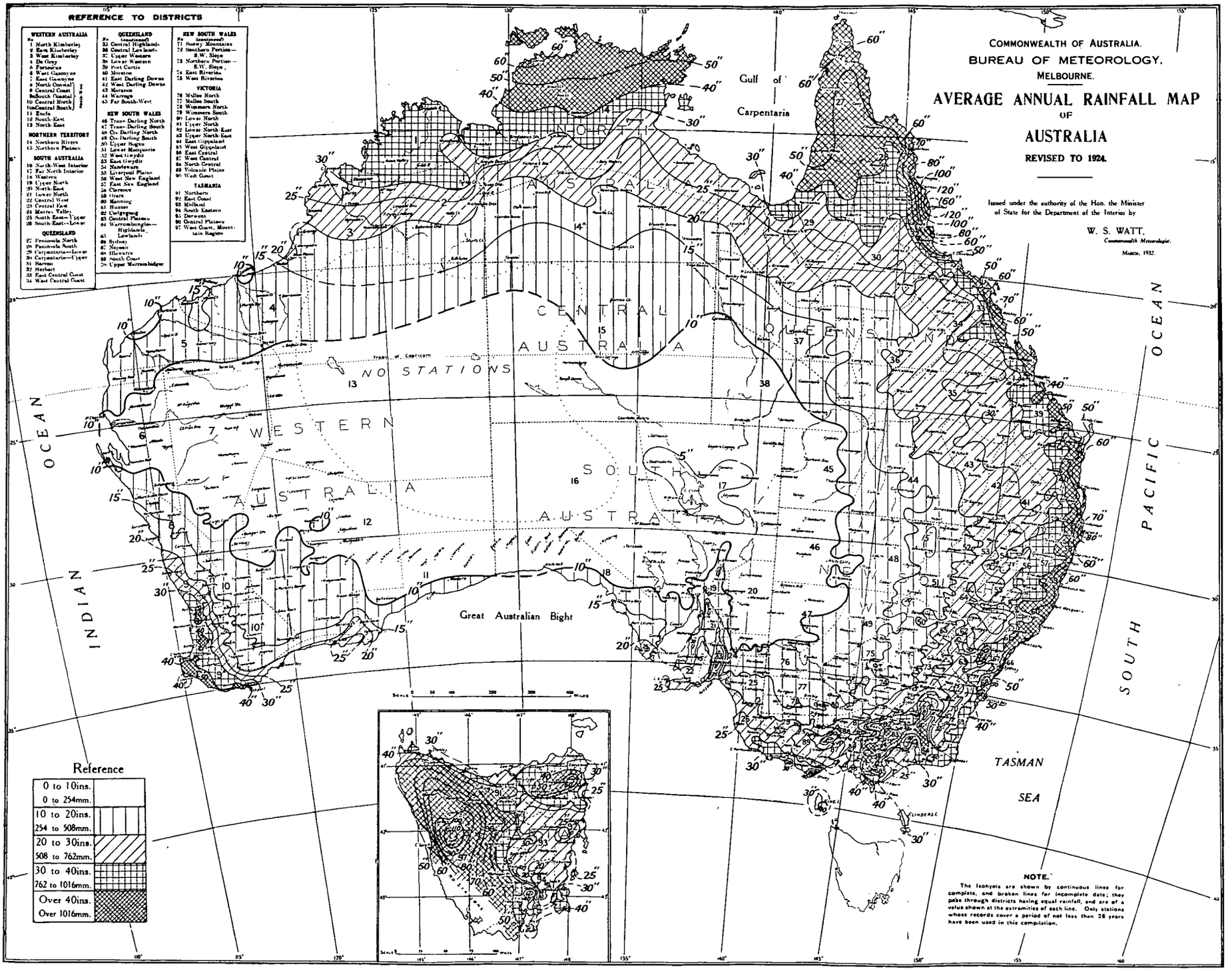
Area affected and period of duration of the Longest Heat Waves when the Maximum Temperature for consecutive 24 hours reached or exceeded 100° Fah.

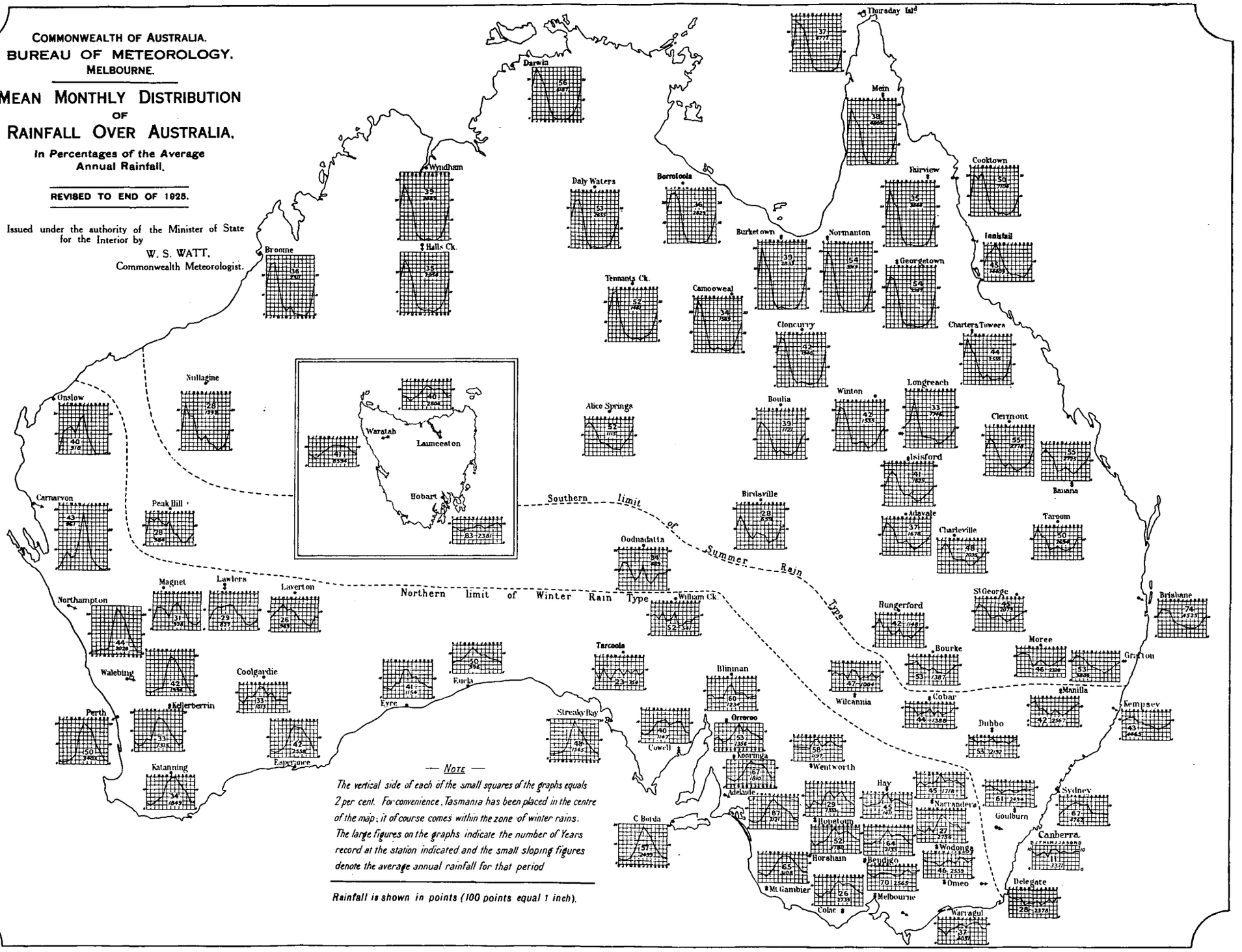


June 1925.

Greatest number of consecutive days on which the Shade Temperature was over 100° Fah. at the places indicated.




REFERENCE TO DISTRICTS
WESTERN AUSTRALIA
1 North Kimberley
2 East Kimberley
3 West Kimberley
4 De Grey
5 Fortescue
6 West Gascoyne
7 East Gascoyne
8 North Coastal
9 Central Coast
10 South Coastal
11 Central North
12 Central South
13 Eucla
14 South-East
15 North-East
NORTHERN TERRITORY
16 Northern Rivers
17 Northern Plateau
SOUTH AUSTRALIA
18 North-West Interior
19 Far North Interior
20 Western
21 Upper North
22 North-East
23 Lower North
24 Central West
25 Central East
26 Murray Valley
27 South-East—Upper
28 South-East—Lower
QUEENSLAND
29 Peninsula North
30 Peninsula South
31 Carpentaria—Lower
32 Carpentaria—Upper
33 Barron
34 Herbert
35 East Central Coast
36 West Central Coast
QUEENSLAND (continued)
37 Central Highland-
38 Central Lowland-
39 Upper Western
40 Lower Western
41 Port Curtis
42 Moreton
43 East Darling Downs
44 West Darling Downs
45 Maranoa
46 Warrego
47 Far South-West
NEW SOUTH WALES
48 Trans-Darling North
49 Trans-Darling South
50 Cis-Darling North
51 Cis-Darling South
52 Upper Bogan
53 Lower Macquarie
54 West Gwydir
55 East Gwydir
56 Namoi-ware
57 Liverpool Plains
58 West New England
59 East New England
60 Clarence
61 Orara
62 Manning
63 Hunter
64 Gulgong
65 Central Plateau
66 Warrumbungles—Highlands
67 Lowlands
68 Sydney
69 Nepean
70 Illawarra
71 South Coast
72 Upper Murrumbidgee
NEW SOUTH WALES (continued)
73 Snowy Mountains
74 Southern Portion—S.W. Slope
75 Northern Portion—S.W. Slope
76 East Riverina
77 West Riverina
VICTORIA
78 Mallee North
79 Mallee South
80 Wimmera North
81 Wimmera South
82 Lower North
83 Upper North
84 Lower North-East
85 Upper North-East
86 East Gippsland
87 West Gippsland
88 East Central
89 West Central
90 North Central
91 Volcanic Plains
92 West Coast
TASMANIA
93 Northern
94 East Coast
95 Midland
96 South Eastern
97 Derwent
98 Central Plateau
99 West Coast, Mountain Region
COMMONWEALTH OF AUSTRALIA.
BUREAU OF METEOROLOGY.
MELBOURNE.
AVERAGE ANNUAL RAINFALL MAP
OF
AUSTRALIA
REVISED TO 1924.
Issued under the authority of the Hon. the Minister of State for the Department of the Interior by
W. S. WATT,
Commonwealth Meteorologist.
March, 1932.
Gulf of Carpentaria
NORTH AUSTRALIA
CENTRAL AUSTRALIA
QUEENSLAND
WESTERN AUSTRALIA
SOUTH AUSTRALIA
NEW SOUTH WALES
NO STATIONS
Great Australian Bight
INDIAN OCEAN
PACIFIC OCEAN
SOUTH
TASMAN SEA
Reference
0 to 10ins.
0 to 254mm.
10 to 20ins.
254 to 508mm.
20 to 30ins.
508 to 762mm.
30 to 40ins.
762 to 1016mm.
Over 40ins.
Over 1016mm.
NOTE.
The Isohyets are shown by continuous lines for complete, and broken lines for incomplete data; they pass through districts having equal rainfall, and are of a value shown at the extremities of each line. Only stations whose records cover a period of not less than 28 years have been used in this compilation.


COMMONWEALTH OF AUSTRALIA.
BUREAU OF METEOROLOGY.
MELBOURNE.
MEAN MONTHLY DISTRIBUTION
OF
RAINFALL OVER AUSTRALIA.
In Percentages of the Average Annual Rainfall.
REVISED TO END OF 1925.
Issued under the authority of the Minister of State for the Interior by
W. S. WATT.
Commonwealth Meteorologist.
Southern limit of Summer Rain Type
Northern limit of Winter Rain Type
— Note —
The vertical side of each of the small squares of the graphs equals 2 per cent. For convenience, Tasmania has been placed in the centre of the map; it of course comes within the zone of winter rains. The large figures on the graphs indicate the number of Years record at the station indicated and the small sloping figures denote the average annual rainfall for that period
Rainfall is shown in points (100 points equal 1 inch).
Darwin
Thursday Isl.
Mein
Cooktown
Fairview
Innisfail
Wyndham
Daly Waters
Borroloola
Burketown
Normanton
Georgetown
Broome
Halls Ck.
Tennants Ck.
Camooweal
Cloncurry
Charters Towers
Nullagine
Onslow
Alice Springs
Boulia
Winton
Longreach
Clermont
Isisford
Banana
Waratah
Launceston
Hobart
Carnarvon
Peak Hill
Birdsville
Jundah
Charleville
Targom
Oodnadatta
Magnet
Lawlers
Laverton
Northampton
William Ck.
Rungerford
St George
Brisbane
Moree
Bourke
Grafton
Walebing
Coolgardie
Tarcoola
Blinman
Wilcannia
Cobar
Manilla
Kempsey
Perth
Kalgoorlie
Eucla
Eyre
Streaky Bay
Cowell
Orroroo
Dubbo
Esperance
Katanning
Adelaide
Wentworth
Hay
Narrandera
Goulburn
Sydney
Canberra
Illogetown
Borshain
Bendigo
Wodonga
Omeo
Delegate
Mt Gambier
Melbourne
Colac
Warragul
C Borda

HEAVY RAINFALL—VICTORIA, UP TO 1934, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Apollo Bay ..	28 Mar., 1932	11.08	Mallacoota ..	14 Mar., 1911	7.95
Balook	27 Sept., 1916	7.23	Montrose	1 „ „	7.48
Black's Spur ..	1 Dec., 1934	7.45	Mt. Buffalo ..	6 June, 1917	8.53
Blackwarry ..	12 May, 1925	7.65	„ ..	5 Apr., 1929	7.47
Bruthen	28 Jan., 1920	7.00	Murrungowar ..	7 Sept., 1908	8.81
Buchan	17 July, 1925	8.45	„ ..	10 July, 1932	14.65
Cann River ..	27 Feb., 1919	9.56	„ ..	4 Jan., 1934	7.57
Drouin West ..	1 Dec., 1934	7.80	Nerrim South ..	1 Dec., 1934	8.12
Garfield	1 „ „	7.21	Olinda	1 „ „	9.10
Gembrook ..	1 „ „	8.08	Omeo Valley ..	22 Mar., 1926	7.90
Hazel Park ..	1 „ „	10.50	Peechelba ..	7 Jan., 1934	7.25
Healesville ..	1 „ „	7.12	Reedy Flat ..	28 Jan., 1920	7.08
Hotham Heights ..	8 Jan., 1926	8.40	Sarsfield ..	13 July, 1925	7.05
Kallista	1 Dec., 1934	8.25	Silvan	1 Dec., 1934	8.05
Kalorama ..	1 „ „	10.05	Tambo Crossing ..	13 July, 1923	8.89
Korumburra ..	1 „ „	8.51	„ „ ..	29 Jan., 1920	7.80
Labertouche ..	1 „ „	8.06	Tonghi Creek ..	27 Feb., 1919	9.90
Longwarry ..	1 „ „	7.10	Warragul ..	1 Dec., 1934	7.47
Madalya	1 „ „	7.80	Wroxham ..	27 Aug., 1919	7.05

HEAVY RAINFALLS—TASMANIA, UP TO 1934, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Cullenswood ..	5 June, 1923	10.50	Lottah	3 Mar., 1931	9.98
„ ..	5 Apr., 1929	11.12	Mathinna ..	8-10 „ 1911	15.79
„ ..	3 Mar., 1931	7.03	„	5 Apr. 1929	13.25
Gormanston ..	3 „ 1931	6.85	Riana	5 „ 1929	11.08
Gould's Country ..	8-10 Mar., '11	15.33	Riversdale ..	27 „ 1928	5.90
„ „ ..	5 Apr., 1929	12.13	The Springs ..	30-31 Jan., '16	10.75
Lottah	8-10 Mar., '11	18.10	Triabunna ..	5 June, 1923	10.20

HEAVY RAINFALLS—FEDERAL CAPITAL TERRITORY, UP TO 1934, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Canberra ..	27 May, 1925	6.84	Land's End ..	27 May, 1925	6.35
Cotter Junction ..	„ „	7.13	Uriarra	16 Jan., 1891	5.35
Duntroon ..	„ „	5.87	„	27 May, 1925	6.57
Fairlight ..	„ „	6.25			

10. **Snowfall.**—Light snow has been known to fall occasionally so 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 the State of New South Wales, and has extended at times along the whole of the Great Dividing Range, from its southern extremity in Victoria so 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 also the temperature falls below zero Fahrenheit during the night. In the ravines around Kosciusko and similar localities the snow never entirely disappears.

The antarctic "V"-shaped disturbances are always associated with the most pronounced and extensive snowfalls. The barometric gradients are very steep where the "trough line" extends northward, and the apexes are unusually sharp-pointed, and protrude into very low latitudes, sometimes even to the tropics.

11. **Hail.**—Hail falls most frequently along the southern shores of the continent in the winter, and over south-eastern Australia during the summer months. The size of the hailstones generally increases with distance from the coast, a fact which lends strong support to the theory that hail is brought about by ascending currents. 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. They are almost invariably associated with tornadoes or tornadic tendencies, and on the east coast the clouds from which the stones fall are generally of a remarkable sepia-coloured tint.

12. **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 30.11 inches at Alice Springs. Barometer readings corrected to mean sea-level and standard gravity have, under anticyclonic conditions in the interior of the continent, ranged as high as 30.78 inches (at Kalgoorlie on the 28th July, 1901) and have fallen as low as 27.55 inches. This lowest record was registered at Mackay during a tropical hurricane on the 21st January, 1918. An almost equally abnormal reading of 27.88 inches was recorded at Innisfail during a similar storm on the 10th March, 1918. The mean annual fluctuations of barometric pressure for the capitals of Australia are shown on the graph herein.

13. **Wind.**—Notes on the distinctive wind currents in Australia were given in preceding Year Books (see No. 6, page 83), but, owing to limitations of space, have not been included herein.

14. **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 cyclonic storms, evolved from the V-shaped 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 coast line of Victoria, and on the west coast of Tasmania. Apparently the more violent wind pressures from these cyclones 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 S.W. and finally towards the S.E. Only a small percentage, however, reach Australia, the majority recurving in their path to the east of New Caledonia.

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 apparently originate in the ocean in the vicinity of Cambridge Gulf, 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, and cause great havoc amongst the pearl-fishers. 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 coastline, 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, will be found in previous issues of the Official Year Book (see No. 6, pp. 84, 85, 86).

A special article dealing with "Australian Hurricanes and Related Storms" appeared in Official Year Book No. 16, pp. 80–84.

15. **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, the mean temperature of Sydney shows a rise of two tenths of a degree during the last twenty years, a change probably brought about by the great increase of residential and manufacturing buildings within the city and in the surrounding suburbs. Again, low-lying lands on the north coast of New South Wales, which originally were seldom subject to frosts, have, with the denudation of the surrounding hills from forests, experienced annual visitations, the probable explanation being that through the absence of trees the cold air of the high lands 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 alternative 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 has 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, 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.

In previous issues some notes on observations made in other countries were added (see Official Year Book No. 6, pp. 86 and 95).

16. **Rainfall and Temperatures, Various Cities.**—The following table shows rainfall and temperature for various important cities throughout the world, for the Federal Capital, and for the capitals of the Australian States.

RAINFALL AND TEMPERATURES—VARIOUS CITIES.

Place.	Height above M.S.L.	Annual Rainfall.			Temperature.					
		Average.	Highest.	Lowest.	(a) Mean Summer.	(b) Mean Winter.	Highest on Record.	Lowest on Record.	Average Hottest Month.	Average Coldest Month.
	Ft.	Ins.	Ins.	Ins.	Fahr.	Fahr.	Fahr.	Fahr.	Fahr.	Fahr.
Amsterdam (Gardens) ..	3	31.26	38.39	20.24	61.3	37.4	93.2	3.2	64.0	37.0
Auckland ..	160	44.85	74.15	26.32	65.8	52.3	85.0	35.0	66.6	51.6
Athens ..	351	15.48	33.33	4.56	79.2	49.1	109.4	19.6	81.0	47.4
Bergen ..	116	73.43	107.32	54.33	56.1	34.7	86.0	7.3	57.4	34.2
Berlin (Central) ..	161	22.72	30.04	14.25	64.8	33.0	98.6	−13.4	66.0	31.8
Berne	1,877	36.30	58.23	24.69	62.2	30.1	91.4	− 3.6	64.4	28.0
Bombay ..	32	70.54	114.89	33.42	82.7	74.7	100.2	53.2	84.3	73.9
Breslau ..	410	22.60	32.51	15.91	64.2	30.9	99.9	−25.6	64.2	30.9
Brussels ..	328	28.35	41.18	17.73	62.6	36.0	95.4	− 4.4	63.7	34.5
Budapest ..	425	24.96	37.05	16.81	69.3	32.2	101.7	−10.1	71.2	30.2
Buenos Ayres ..	82	38.78	79.72	20.04	72.7	50.9	104.0	22.3	73.8	50.0
Calcutta ..	21	61.82	98.48	38.43	85.6	68.0	111.3	44.2	86.0	66.4
Capetown ..	40	25.50	36.72	17.71	68.1	54.7	102.0	34.0	68.8	53.9
Caracas ..	3,420	30.03	47.36	23.70	68.3	65.3	87.8	48.2	69.2	63.7
Chicago ..	823	33.28	45.86	24.52	70.0	26.1	103.0	−23.0	72.4	23.7
Christchurch ..	22	25.21	35.30	13.54	60.8	43.5	95.7	21.3	61.6	42.7
Christiania (Oslo)	82	25.39	36.18	16.24	61.0	25.5	95.0	−13.4	63.1	24.4
Colombo ..	24	88.53	123.96	53.56	81.6	78.7	97.2	61.6	82.0	78.6
Constantinople ..	245	28.75	42.74	14.78	74.0	43.5	103.6	13.0	75.7	42.0
Copenhagen ..	43	22.80	32.52	14.02	60.9	32.7	91.4	−13.0	62.6	31.8
Dresden ..	115	24.22	34.42	11.73	64.6	33.2	93.4	−15.3	66.0	31.6
Dublin (City) ..	54	27.66	35.56	16.60	59.1	42.8	87.0	13.0	60.4	42.5
Dunedin ..	300	36.92	54.51	21.86	57.3	43.5	94.0	23.0	58.0	42.5
Durban ..	260	40.79	71.27	27.24	75.6	64.4	110.6	41.1	76.7	63.8
Edinburgh (Leith)	441	25.21	32.05	16.44	55.9	39.0	90.0	6.0	57.3	38.7
Geneva ..	1,332	32.13	47.60	18.73	64.0	33.4	100.0	−13.5	65.8	31.8
Genoa	157	51.29	108.22	28.21	73.8	46.8	94.5	16.7	75.4	45.5
Glasgow ..	139	38.49	56.18	29.05	57.0	39.5	84.9	6.6	58.3	39.3
Greenwich ..	149	23.50	35.54	16.38	61.7	40.4	100.0	4.0	63.3	40.1
Hong Kong ..	109	85.61	119.72	45.84	81.5	60.5	97.0	32.0	82.0	58.8
Johannesburg ..	5,750	31.63	50.00	21.66	65.4	54.4	93.6	20.8	68.2	48.0
Leipzig ..	394	24.69	31.37	17.10	63.9	31.6	96.4	−16.6	64.8	30.0
Leningrad ..	16	21.30	29.52	13.75	61.1	17.4	89.6	−30.3	63.7	15.2
Lisbon ..	313	26.97	52.82	16.34	70.0	52.9	102.9	29.3	71.1	51.8
London (Kew) ..	18	23.80	38.18	12.16	60.8	39.9	94.0	9.0	62.3	39.1
Madras ..	22	49.85	78.92	21.74	89.0	76.8	113.0	57.5	89.9	76.1
Madrid ..	2,149	16.23	27.48	9.13	73.0	41.2	107.1	10.5	75.7	39.7
Marseilles ..	246	22.10	43.04	11.11	70.4	45.5	101.5	6.3	72.0	44.3
Moscow ..	526	18.94	29.07	12.07	63.4	14.7	95.0	−41.4	66.1	11.9
Naples ..	489	34.00	56.58	21.75	73.6	48.0	99.1	23.9	75.4	46.8
New York ..	314	44.63	58.68	33.17	71.4	31.8	102.0	−13.0	73.5	30.2
Ottawa ..	236	33.51	51.25	25.63	66.6	14.0	98.0	−33.0	69.1	11.8
Paris (Parc-St. Maur) ..	164	22.68	29.80	10.94	63.5	37.9	101.1	−19.5	64.8	36.7
Pekin	123	22.66	36.00	18.00	77.9	26.8	100.2	2.7	79.3	23.7
Quebec	296	41.25	53.79	32.12	63.4	12.6	97.0	−34.0	65.6	9.8
Rome	166	32.57	57.89	12.72	74.3	46.0	103.0	21.4	76.1	44.6
San Francisco ..	155	22.27	38.82	9.00	58.8	50.5	101.0	29.0	59.3	49.5
Shanghai ..	21	45.00	62.52	27.92	78.0	41.1	102.9	10.2	80.4	37.8
Singapore	8	91.99	158.68	32.71	81.2	78.6	94.2	63.4	81.5	78.3
Stockholm	146	21.60	28.47	11.77	62.2	26.4	91.8	−22.0	59.7	27.3
Tokio	65	61.45	86.37	45.72	74.8	39.2	91.0	29.7	77.7	37.5
Trieste.. ..	85	42.94	63.14	26.57	73.9	41.3	99.5	14.0	76.3	39.9
Vienna	664	25.51	35.55	16.54	65.3	31.3	97.2	−14.4	66.7	29.5
Vladivostock (Mt.)	420	29.23	38.48	21.17	65.5	9.7	92.3	−22.2	69.4	3.6
Washington ..	112	43.50	61.33	30.85	74.7	34.5	106.0	−15.0	76.8	32.9
Wellington ..	10	39.86	67.68	27.83	61.9	48.7	88.0	28.6	62.6	48.0
Zürich ..	1,542	45.15	78.27	29.02	63.3	31.3	94.1	− 0.8	65.1	29.5
FEDERAL CAPITAL.										
Canberra ..	1,837	22.96	33.71	16.31	(a) 67.9	(b) 43.9	104.2	14.0	68.7	42.8
STATE CAPITALS.										
					(a)	(b)				
Perth	197	34.92	49.22	20.21	73.1	56.0	112.2	34.2	74.2	55.3
Adelaide ..	140	21.14	30.87	11.39	73.0	53.1	116.3	32.0	74.0	51.9
Brisbane ..	137	45.44	88.26	16.17	76.6	59.8	108.9	36.1	77.2	58.6
Sydney ..	138	47.54	82.76	21.49	71.0	54.3	108.5	35.7	71.6	52.9
Melbourne ..	115	25.66	38.04	15.61	66.6	50.1	111.2	27.0	67.6	48.8
Hobart ..	177	23.97	43.39	13.43	61.4	46.9	105.2	27.0	62.2	45.8

(a) Mean of the three hottest months. (b) Mean of the three coldest months.

17. **Climatological Tables.**—The means, averages, extremes, totals, etc., for a number of climatological elements have been determined from long series of observations at the Australian capitals up to and including the year 1934. These are given in the following tables :—

CLIMATOLOGICAL DATA—CANBERRA, FEDERAL CAPITAL TERRITORY.

LAT. 35° 20′ S., LONG. 149° 15′ E. HEIGHT ABOVE M.S.L. 1,837 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. Greatest Number of Miles in One Day.	Wind. Mean Hourly Pressure. (lb.)	Wind. Total Miles.	Wind. Prevailing Direction. 9 a.m.	Wind. Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m. and 9 p.m.	No. of Clear Days.
No. of yrs. over which observation extends.	17	17	17	17	13	13	13	7	9	9
January	29.836	306 30/13	0.05	3,083	N W	N W	7.69	3	3.8	11
February	29.898	465 20/21	0.04	2,459	S E	W N W & N W	5.98	5	4.4	9
March	30.000	434 8/13	0.03	2,334	S E	N W	4.59	5	4.7	8
April	30.068	279 27/13	0.02	1,933	S E	N W & S E	2.70	2	4.7	7
May	30.137	283 15/13	0.02	1,953	S E	N W & S E	1.75	1	4.6	9
June	30.114	360 10/15	0.03	2,092	S E & N W	N W.	1.02	1	5.4	6
July	30.102	282 7/31	0.02	2,091	N W	N W	1.18	1	5.1	7
August	30.080	276 23/25	0.03	2,220	N W	N W	1.65	2	4.6	7
September	30.034	374 10, 16/12	0.04	2,601	N W	N W	2.82	2	4.3	10
October	29.949	376 10/12	0.04	2,755	N W	N W	4.13	3	4.5	7
November	29.902	410 18/24	0.04	2,735	N W	N W	5.58	5	4.5	7
December	29.843	289 7/24	0.04	2,795	N W	N W	6.84	7	4.8	6
Year Totals	—	—	—	—	—	—	45.93	37	—	94
Year Averages	29.997	—	0.03	2,421	N W	N W	—	—	4.6	—
Year Extremes	..	465 20/2/21	..	..	..	..	—	—	—	—

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 Hours of Sunshine.
No. of yrs. over which observation extends.	18	18	18	18	18	18	(a)	16	11
January	82.3	55.1	68.7	104.2 28/32	38.8 25/28	65.4	—	33.2 17/33	236.7
February	82.3	55.1	68.7	102.6 16/19	33.0 21/33	69.6	—	26.8 21/33	198.6
March	76.1	51.3	63.7	97.0 18/27	32.2 22/20	64.8	—	25.5 24/17	215.9
April	66.8	44.0	55.4	83.0 1/25	26.5 29/17	56.5	—	17.5 29/17	195.3
May	59.3	37.5	48.4	74.7 9/19	19.0 30/24	55.7	—	12.0 28/20	155.3
June	53.3	34.5	43.9	66.2 5/17	18.2 (d)	48.0	—	12.1 15/29	128.7
July	51.9	33.6	42.8	65.0 8/19	14.0 19/24	51.0	—	10.0 19/24	143.5
August	55.3	34.5	44.9	73.0 (b)	18.0 5/19	55.0	—	11.8 5/19	169.7
September	61.3	38.4	49.8	83.2 27/19	25.0 1/28	58.2	—	18.5 25/27	202.2
October	67.5	42.8	55.2	93.8 31/19	27.0 2/18	66.8	—	20.0 (e)	232.0
November	74.4	48.3	61.4	96.6 1/19	28.1 24/15	68.5	—	25.8 2/18	221.8
December	79.3	53.0	66.2	98.0 (c)	32.0 3/24	66.0	—	31.0 (f)	235.0
Year Averages	67.5	44.0	55.8	—	—	—	—	—	(g)2,334.7
Year Extremes	—	—	—	104.2 28/1/32	14.0 19/7/24	90.2	—	10.0 19/7/24	—

(a) Not available. (b) 28/1923 and 23/1924. (c) 12/1914 and 31/1931. (d) 15 and 16/1929.
(e) 1 and 3/1923. (f) 1/1923, 15 and 16/1931 and 3/1924. (g) Yearly total.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches). Mean 9 a.m.	Rel. Hum. (%). Mean 9 a.m.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest In One Day.	Dew. Mean No. of Days Dew.
No. of yrs. over which observation extends.	16	16	16	16	20	20	20	20	20	2
January	0.370	54	69	39	1.58	6	5.08 1934	0.07 1919–1932	2.92 6/27	3
February	0.396	60	75	47	1.55	6	3.73 1924	0.00 1933	2.75 23/16	4
March	0.377	68	79	56	2.18	7	5.81 1914	0.21 1924	1.86 7/20	9
April	0.311	75	86	63	1.54	7	2.87 1916	0.20 1925	1.94 8/21	9
May	0.243	82	92	67	2.11	8	13.37 1925	0.06 1934	6.84 27/25	15
June	0.217	85	93	73	2.20	9	5.86 1931	0.45 1927	3.95 22/25	14
July	0.205	84	92	74	1.88	10	4.15 1933	0.25 1913	2.40 13/34	10
August	0.218	81	87	67	2.02	10	3.78 1934	0.01 1914	1.90 18/25	6
September	0.253	72	81	55	1.67	9	5.26 1915	0.36 1928	2.18 20/15	7
October	0.282	63	73	48	2.13	10	7.50 1934	0.64 1914	2.74 25/34	15
November	0.331	59	78	37	2.08	8	6.95 1924	0.09 1918	2.38 5/23	14
December	0.366	57	70	45	2.02	8	4.49 1919	0.11 1925	2.10 28/29	8
Year Totals	—	—	—	—	22.96	98	—	—	—	4
Year Averages	0.297	70	—	—	—	—	—	—	— 11	—
Year Extremes	—	—	93	37	—	—	13.37 5/25	0.00 2/33	6.84 27/5/25	—

CLIMATOLOGICAL DATA—PERTH, WESTERN AUSTRALIA.

LAT. 31° 57′ S., LONG. 115° 50′ E. HEIGHT ABOVE M.S.L. 197 FT.

BAROMETER, WIND, EVAPORATION, LIGHTNING, CLOUDS, AND CLEAR DAYS.

Month.	Bar. corrected to 32° F. Min. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. Greatest Number of Miles in One Day.		Wind. Mean Hourly Pressure. (lb.)	Wind. Total Miles.	Wind. Prevailing Direction. 9 a.m.	Wind. Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m. and 9 p.m.	No. of Clear Days.
No. of yrs. over which observation extends.	50	37		37	37	37	37	36	37	27	38
January	29.907	797	27/98	0.65	11,003	E S E	S S W	10.44	1.7	2.9	14.5
February	29.923	650	6/08	0.59	9,550	E S E	S S W	8.63	1.5	3.1	12.0
March	29.984	651	6/13	0.51	9,787	E	S S W	7.61	1.4	3.6	12.1
April	30.070	955	25/00	0.38	8,130	E N E	S S W	4.73	1.4	4.3	8.2
May	30.068	825	29/32	0.35	8,079	N E	S W	2.76	2.2	5.5	5.6
June	30.058	914	19/27	0.36	7,949	N N E	W N W	1.76	2.3	5.9	3.8
July	30.087	1,015	20/26	0.39	8,554	N N E	W	1.75	2.1	5.6	5.1
August	30.087	966	15/03	0.41	8,705	N N E	W S W	2.34	1.6	5.6	5.4
September ..	30.061	864	11/05	0.44	8,807	N E	W S W	3.37	1.2	4.9	0.2
October	30.030	809	6/16	0.51	9,709	S S E	S W	5.30	1.0	4.8	6.4
November ..	29.993	777	18/97	0.57	9,957	S E	S W	7.08	1.4	3.9	8.0
December ..	29.925	776	6/22	0.62	10,769	S E	S S W	9.85	1.8	3.1	12.6
Year { Totals ..	—	—		—	—	—	—	66.22	19.6	—	100.5
Year { Averages ..	30.016	—		0.48	9,250	E	S W	—	—	4.4	—
Year { Extremes ..	—	1,015	20/7/26	—	—	—	—	—	—	—	—

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.). Mean Max.	Mean Temperature (Fahr.). Mean Min.	Extreme Shade Temperature (Fahr.). Mean.	Highest.		Lowest.		Extreme Range.	Extreme Temperature (Fahr.). Highest in Sun.		Lowest on Grass.		Mean Hours of Sunshine.
No. of yrs. over which observation extends.	38	38	38	38		38		38	36		36		37
January	84.7	63.3	74.0	110.2	12/34	48.6	20/25	61.6	177.3	22/14	40.4	1/21	322.9
February	84.9	63.4	74.2	112.2	8/33	47.7	1/02	64.5	169.0	4/99	39.8	1/21	271.3
March	81.4	61.5	71.4	106.4	14/22	45.8	8/03	60.6	167.0	19/18	36.7	8/03	268.0
April	76.1	57.3	66.7	99.7	19/10	39.3	20/14	60.4	157.0	8/16	31.0	20/14	217.6
May	68.9	52.7	60.8	90.4	2/07	34.3	11/14	56.1	146.0	4/25	25.3	11/14	175.9
June	64.1	49.6	56.8	81.7	2/14	35.0	30/20	46.7	135.5	9/14	26.5	30/20	143.8
July	62.7	47.9	55.3	76.4	21/21	34.2	7/16	42.2	132.9	25/13	25.1	30/20	165.0
August	63.8	48.2	56.0	81.0	12/14	35.4	31/08	45.6	145.1	29/21	28.0	27/18	185.3
September ..	66.4	50.3	58.4	90.9	30/18	38.8	18/00	52.1	153.6	29/16	29.2	21/16	207.4
October	69.1	52.5	60.8	95.3	30/22	40.0	16/31	55.3	154.0	29/14	29.8	16/31	240.9
November ..	75.6	56.8	66.2	104.6	24/13	42.0	1/04	62.6	167.0	30/15	35.4	6/10	288.7
December ..	81.2	60.9	71.0	107.9	20/04	48.0	2/10	59.9	168.8	11/27	39.0	(a)	324.8
Year { Averages ..	73.3	55.4	64.4	—		—		—	—		—		2811.6
Year { Extremes ..	—	—	—	112.2	8/2/33	34.2	7/7/16	78.0	177.3	22/1/14	25.1	30/7/20	(b)

(a) 2/1910 and 12/1920. (b) Total for year.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches). Mean 9 a.m.	Rel. Hum. (%). Mean 9 a.m.	Rel. Hum. (%). Highest Mean.	Rel. Hum. (%). Lowest Mean.	Rainfall (inches). Mean Monthly.	Rainfall (inches). Mean No. of Days Rain.	Rainfall (inches). Greatest Monthly.		Rainfall (inches). Least Monthly.		Rainfall (inches). Greatest In One Day.		Dew. Mean No. of Days Dew.
No. of yrs. over which observation extends.	38	38	38	38	59	59	59		59		59		38
January	0.438	51	61	41	0.34	3	2.17	1879	Nil	(a)	1.74	27/79	2.7
February	0.445	53	65	46	0.41	3	2.98	1915	Nil	(a)	1.63	26/15	3.9
March	0.430	57	66	46	0.86	5	5.71	1934	Nil	(a)	3.03	9/34	6.5
April	0.397	61	73	51	1.68	7	5.85	1926	Nil	1920	2.62	30/04	10.2
May	0.374	73	81	61	5.11	14	12.13	1879	0.98	1903	2.80	20/79	12.8
June	0.339	77	83	68	7.08	17	12.80	1923	2.16	1877	3.90	10/20	12.9
July	0.327	79	84	69	6.73	17	12.28	1926	2.42	1876	3.00	4/91	13.3
August	0.323	74	79	62	5.74	18	12.21	1928	0.46	1902	2.73	7/08	12.0
September ..	0.341	68	75	58	3.44	15	7.84	1923	0.34	1916	1.82	4/31	10.5
October	0.349	62	75	54	2.22	12	7.87	1890	0.49	1892	1.73	3/33	6.4
November ..	0.379	54	63	46	0.76	6	2.78	1916	Nil	1891	1.11	30/03	3.8
December ..	0.411	50	63	44	0.55	4	3.05	1888	Nil	1886, 1924	1.72	1/88	2.9
Year { Totals ..	—	—	—	—	34.92	121	—		—		—		97.9
Year { Averages ..	0.374	62	—	—	—	—	—		—		—		—
Year { Extremes ..	—	—	84	41	—	—	12.80	6/1923	Nil	(b)	3.90	10/6/20	—

(a) Various years. (b) Jan., Feb., March., April, Nov. and Dec., 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. Greatest Number of Miles in One Day.	Wind. Mean Hourly Pressure. (lb.)	Wind. Total Miles.	Wind. Prevailing Direction. 9 a.m.	Wind. Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m. and 9 p.m.	No. of Clear Days.
No. of yrs. over which observation extends.	78	57	57	57	57	57	65	63	67	53
January	29.917	758 19/99	0.33	7,856	S W	S W	9.08	2.4	3.5	8.7
February	29.952	691 22/96	0.28	6,615	N E	S W	7.39	2.0	3.5	7.6
March	30.038	628 9/12	0.23	6,581	S	S W	5.92	2.2	4.0	7.1
April	30.119	773 10/96	0.21	6,070	N E	S W	3.50	1.6	5.0	4.5
May	30.124	760 9/80	0.20	6,217	N E	N W	2.05	1.7	5.8	2.3
June	30.101	750 12/78	0.24	6,474	N E	N	1.26	1.9	6.2	1.8
July	30.123	674 25/82	0.24	6,672	N E	N W	1.29	1.6	5.9	1.9
August	30.097	773 31/97	0.27	7,116	N E	S W	1.88	2.1	5.6	2.5
September	30.041	720 2/87	0.30	7,218	N N E	S W	2.87	2.3	5.2	3.5
October	29.996	768 28/98	0.33	7,816	N N E	S W	4.78	3.3	5.0	3.9
November	29.978	677 2/04	0.32	7,487	S W	S W	6.61	3.3	4.6	5.4
December	29.920	675 12/91	0.33	7,842	S W	S W	8.49	2.6	3.9	7.3
Year Totals	—	—	—	—	—	—	55.12	27.0	—	56.5
Year Averages	30.034	—	0.27	6,997	N E	S W	—	—	4.8	—
Year Extremes	—	773 (a)	—	—	—	—	—	—	—	—

(a) 10/4/96 and 31/8/97.

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 Hours of Sunshine.
No. of yrs. over which observation extends.	78	78	78	78	78	78	57	74	53
January	86.1	61.5	73.8	116.3 26/58	45.1 21/84	71.2	180.0 18/82	36.5 14/79	309.8
February	86.1	62.0	74.0	113.6 12/99	45.5 23/18	68.1	170.5 10/00	35.8 23/26	264.0
March	80.8	58.9	69.9	110.5 9/34	43.9 21/33	66.6	174.0 17/83	32.1 21/33	239.3
April	73.3	54.5	63.9	98.0 10/66	39.6 15/59	58.4	155.0 1/83	30.2 16/17	181.1
May	65.8	50.3	58.0	89.5 4/21	36.9 (a)	52.6	148.2 12/79	25.6 19/28	149.5
June	60.4	46.7	53.6	76.0 23/65	32.5 27/76	43.5	138.8 18/79	22.9 12/13	123.6
July	59.0	44.7	51.9	74.0 11/06	32.0 24/08	42.0	134.5 26/90	22.1 30/29	137.3
August	61.9	45.9	53.9	85.0 31/11	32.3 17/59	52.7	140.0 31/92	22.8 11/29	163.6
September	66.4	48.0	57.2	90.7 23/82	32.7 4/58	58.0	160.5 23/82	25.0 25/27	185.1
October	72.4	51.4	61.9	102.9 21/22	36.0 —/57	66.9	162.0 30/21	27.8 (c)	226.9
November	78.6	55.4	67.0	113.5 21/65	40.8 2/09	72.7	166.9 20/78	31.5 2/09	263.6
December	83.2	58.9	71.1	114.6 29/31	43.0 (b)	71.6	175.7 7/99	32.5 4/84	302.1
Year Averages	72.8	53.2	63.0	—	—	—	—	—	—
Year Extremes	—	—	—	116.3 26/1/58	32.0 24/7/08	84.3	180.0 18/1/82	22.1 30/7/29	2545.9 (d)

(a) 26/1895 and 24/1904. (b) 16/1861 and 4/1906. (c) 2/1918 and 4/1931. (d) Total for year.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches). Mean 9 a.m.	Rel. Hum. (%). Mean 9 a.m.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.		Least Monthly.		Greatest In One Day.		Dew. Mean No. of Days Dew.
No. of yrs. over which observation extends.	67	67	67	67	96	96	96		96		96		63
January	0.337	38	59	29	0.72	4	4.00	1850	Nil	(a)	2.30	2/89	3.6
February	0.354	40	56	30	0.72	4	6.09	1925	Nil	(a)	5.57	7/25	5.6
March	0.343	46	58	36	1.02	6	4.60	1878	Nil	(a)	3.50	5/78	10.4
April	0.334	55	72	37	1.72	9	6.78	1853	0.03	1923	3.15	5/60	13.8
May	0.315	67	76	49	2.73	14	7.75	1875	0.10	1934	2.75	1/53	16.0
June	0.297	76	84	67	3.09	16	8.58	1916	0.42	1886	2.11	1/20	16.1
July	0.277	76	87	66	2.64	16	5.38	1865	0.37	1899	1.75	10/65	17.3
August	0.285	69	77	54	2.54	16	6.24	1852	0.35	1914	2.23	19/51	16.6
September	0.296	60	72	44	2.09	14	5.83	1923	0.45	1896	1.59	20/23	15.6
October	0.298	51	67	29	1.72	11	3.83	1870	0.17	1914	2.24	16/08	12.9
November	0.307	42	57	31	1.15	7	4.10	1934	0.04	1885	2.08	7/34	6.7
December	0.321	39	50	31	1.00	6	3.98	1861	Nil	1904	2.42	23/13	4.4
Year Totals	—	—	—	—	21.14	123	—		—		—		139.0
Year Averages	0.309	53	—	—	—	—	—		—		—		—
Year Extremes	—	—	87	29	—	—	8.58	6/16	Nil	(b)	5.57	7/2/25	—

(a) Various years. (b) January, February, March, December, various years.

CLIMATOLOGICAL DATA—BRISBANE, QUEENSLAND.

LAT. 27° 28′ S., LONG. 153° 2′ E. HEIGHT ABOVE M.S.L. 137 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. Greatest Number of Miles in One Day.	Wind. Mean Hourly Pressure. (lb.)	Wind. Total Miles.	Wind. Prevailing Direction. 9 a.m.	Wind. Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m. and 9 p.m.	No. of Clear Days.
No. of yrs. over which observation extends.	48	24	24	24	48	48	26	48	43	26
January	29.868	361 1/22	0.12	4,769	S E	E & N E	6.647	7.3	5.7	3.3
February	29.904	503 5/31	0.12	4,383	S & S E	N E & E	5.437	5.7	5.7	2.4
March	29.964	488 1/29	0.10	4,333	S	S E & E	5.064	4.5	5.3	4.9
April	30.043	400 3/25	0.09	3,964	S	S E & E	3.912	3.9	4.6	7.8
May	30.086	363 7/16	0.07	3,811	S	S E	3.048	3.2	4.3	8.7
June	30.072	455 14/28	0.08	3,891	S W & S	S & W	2.355	2.5	4.2	9.0
July	30.072	359 2/23	0.07	3,794	S & S W	S W	2.672	2.6	3.7	12.7
August	30.099	331 6/23	0.08	3,888	S & S W	S W & N E	3.409	3.9	3.4	12.5
September	30.043	329 4/31	0.08	3,839	S & S W	N E & E	4.315	6.0	3.5	12.2
October	30.005	325 25/18	0.10	4,350	S	N E	5.622	6.9	4.1	8.9
November	29.961	371 10/28	0.11	4,524	S E & N E	N E	6.203	8.9	4.9	6.1
December	29.887	467 15/26	0.12	4,748	S E	N E	6.912	9.5	5.3	3.8
Year — Totals	—	—	—	—	—	—	55.596	64.9	—	92.3
Year — Averages	30.000	—	0.10	4,191	S	N E	—	—	4.6	—
Year — Extremes	—	503 5/2/31	—	—	—	—	—	—	—	—

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 Hours of Sunshine.
No. of yrs. over which observation extends.	48	48	48	48	48	48	41	48	26
January	85.4	68.9	77.2	108.9 14/02	58.8 4/93	50.1	166.4 10/17	49.9 4/93	230.4
February	84.5	68.5	76.5	105.7 21/25	58.5 23/31	47.2	165.2 6/10	49.1 22/31	208.6
March	82.4	66.4	74.4	99.4 5/19	52.4 29/13	47.0	161.7 4/25	45.4 29/13	216.2
April	79.0	61.6	70.3	95.2 (a)	44.4 25/25	50.8	153.8 11/16	36.7 24/25	209.5
May	73.6	55.4	64.5	90.3 21/23	41.3 24/99	49.0	147.0 1/10	29.8 8/97	203.2
June	69.3	51.1	60.2	88.9 19/18	36.3 29/08	52.6	136.0 3/18	25.4 23/88	181.7
July	68.5	48.6	58.6	83.4 28/98	36.1 (b)	47.3	146.1 20/15	23.9 11/90	210.5
August	71.2	49.9	60.6	88.5 25/28	37.4 6/87	51.1	141.9 20/17	27.1 9/99	236.6
September	75.6	54.8	65.2	95.2 16/12	40.7 1/96	54.5	155.5 26/03	30.4 1/89	239.7
October	79.5	59.9	69.7	101.4 18/93	43.3 3/99	58.1	157.4 31/18	34.9 8/89	255.1
November	82.5	64.2	73.4	106.1 18/13	48.5 2/05	57.6	162.3 7/89	38.8 1/05	242.4
December	84.9	67.4	76.2	105.9 26/93	56.4 13/12	49.5	161.7 27/26	49.1 3/94	247.9
Year — Averages	78.0	59.7	68.9	—	—	—	—	—	—
Year — Extremes	—	—	—	108.9 14/1/02	36.1 (c)	72.8	166.4 10/1/17	23.9 11/7/90	2681.8 (d)

(a) 9/96 and 5/03. (b) 12/94 and 2/96. (c) 12/7/94 and 2/7/96. (d) Total for year.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches). Mean 9 a.m.	Rel. Hum. (%). Mean 9 a.m.	Highest Mean.	Lowest Mean.	Mean Monthly.	Rainfall (inches). Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest In One Day.	Dew. Mean No. of Days Dew.
No. of yrs. over which observation extends.	48	48	48	48	83	75	83	83	65	48
January	0.639	66	79	53	6.45	13	27.72 1895	0.32 1919	18.31 21/87	8.8
February	0.646	69	82	55	6.41	13	40.39 1893	0.58 1849	10.61 6/31	8.9
March	0.614	72	85	56	5.65	15	34.04 1870	Nil 1849	11.18 14/08	12.3
April	0.523	72	80	60	3.86	12	15.28 1867	0.05 1897	4.97 19/28	14.7
May	0.424	73	85	61	2.78	10	13.85 1876	Nil 1846	5.62 9/79	15.9
June	0.359	74	84	67	2.75	8	14.03 1873	Nil 1847	6.01 9/93	14.0
July	0.328	72	81	61	2.24	8	8.46 1889	Nil 1841	3.54 (c)	15.3
August	0.349	69	80	56	1.99	7	14.67 1879	Nil (a)	4.89 12/87	14.3
September	0.410	64	76	47	2.02	8	5.43 1886	0.10 1907	2.46 2/94	13.4
October	0.472	60	72	48	2.54	9	9.99 1882	0.14 1900	3.75 3/27	12.4
November	0.536	60	72	45	3.80	10	12.41 1917	Nil 1842	4.46 16/86	8.6
December	0.595	61	69	51	4.95	12	13.99 1910	0.35 1865	6.60 28/71	8.3
Year — Totals	—	—	—	—	45.44	125	—	—	—	146.9
Year — Averages	0.491	68	—	—	—	—	—	—	—	—
Year — Extremes	—	—	85	45	—	—	40.39 2/93	Nil (b)	18.31 21/1/87	—

(a) 1862, 1869, 1880. (b) March, May, June, July, August, and November, various years. (c) 15/76 and 16/89.

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 hourly readings.	Wind.* Greatest Number of Miles in One Day.	Mean Hourly Pressure. (lb.)	Total Miles.	Prevailing Direction. 9 a.m.	Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m. and 9 p.m.	No. of Clear Days.
No. of yrs. over which observation extends.	76	68	68	68	21	21	55	75	73	24
January	29.895	627 3/93	0.27	7,022	N E to E	E N E	5.394	5.0	5.8	5.0
February	29.942	697 12/69	0.24	6,045	N E to E	E N E	4.243	4.4	5.9	5.6
March	30.013	754 20/70	0.19	5,858	W	E N E	3.641	4.1	5.5	5.7
April	30.070	642 6/82	0.17	5,339	W	N E to E	2.604	3.7	5.1	7.5
May	30.083	682 6/98	0.17	5,485	W	W	1.819	3.0	4.9	7.8
June	30.063	642 12/08	0.20	5,892	W	W	1.434	2.1	4.8	8.6
July	30.069	744 17/79	0.20	6,081	W	W	1.522	2.3	4.4	10.3
August	30.069	649 22/72	0.19	5,900	W	N E to E	1.931	3.2	4.0	10.9
September	30.009	771 6/74	0.22	6,154	W	N E	2.712	3.9	4.4	9.7
October	29.968	741 4/72	0.24	6,686	W	E N E	3.897	4.9	4.9	7.6
November	29.941	583 12/87	0.25	6,558	N E to E	E N E	4.613	5.5	5.6	5.6
December	29.882	750 3/84	0.26	6,960	N E to E	E N E	5.402	5.8	5.7	5.1
Year Totals	—	—	—	—	—	—	39.212	47.9	—	89.4
Year Averages	30.000	—	0.22	6,165	W	E N E	—	—	5.1	—
Year Extremes	—	771 6/9/74	—	—	—	—	—	—	—	—

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 Hours of Sunshine.
No. of yrs. over which observation extends.	76	76	76	76	76	76	73	76	14†
January	78.4	64.9	71.6	108.5 13/96	51.2 14/65	57.3	164.3 26/15	43.7 6/25	231.4
February	77.7	65.0	71.3	107.8 8/26	49.3 28/63	58.5	161.2 8/26	42.8 22/33	203.7
March	75.7	63.0	69.3	102.6 3/69	48.8 14/86	53.8	158.3 10/26	39.9 17/13	198.3
April	71.3	58.0	64.6	91.0 20/22	44.6 27/64	46.4	144.1 10/77	33.3 24/09	180.7
May	65.6	52.2	58.9	86.0 1/19	40.2 22/59	45.8	129.7 1/96	29.3 25/17	172.5
June	61.2	48.3	54.7	80.4 11/31	35.7 22/32	44.7	125.5 2/23	28.0 22/32	157.0
July	59.8	46.0	52.9	78.3 22/26	35.9 12/90	42.4	124.7 19/77	24.0 4/93	185.1
August	62.8	47.5	55.2	82.0 31/84	36.8 3/72	45.2	149.0 30/78	26.1 4/09	219.8
September	67.0	51.4	59.2	92.3 27/19	40.8 18/64	51.5	142.2 12/78	30.1 17/05	218.8
October	71.3	55.8	63.6	98.9 19/98	42.2 6/27	56.7	152.2 20/33	32.7 9/05	239.8
November	74.3	59.6	67.0	102.7 21/78	45.8 1/05	56.9	158.5 28/99	36.0 6/06	231.2
December	77.0	62.8	69.9	107.5 31/04	48.4 3/24	59.1	164.5 27/89	41.4 3/24	227.3
Year Averages	70.2	56.2	63.2	—	—	—	—	—	a 2,465.6
Year Extremes	—	—	—	108.5 13/1/96	35.7 22/6/32.	72.8	164.5 27/12/89.	24.0 4/7/93	

(a) Total for year.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches). Mean 9 a.m.	Rel. Hum. (%). Mean 9 a.m.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest In One Day.	Dew. Mean No. of Days Dew.
No. of yrs. over which observation extends.	76	76	76	76	76	76	76	76	76	74
January	0.546	67	78	58	3.58	14	15.26 1911	0.25 1932	7.08 13/11	1.4
February	0.562	70	81	59	4.27	13	18.56 1873	0.23 1933	8.90 25/73	2.5
March	0.533	73	85	62	4.89	15	18.70 1870	0.42 1876	6.52 9/13	4.4
April	0.447	76	87	63	5.56	14	24.49 1861	0.06 1868	7.52 29/60	6.9
May	0.359	79	90	63	5.16	15	23.03 1919	0.18 1860	8.36 28/89	7.8
June	0.302	78	89	68	4.72	12	16.30 1885	0.19 1904	5.17 16/84	6.6
July	0.275	76	88	63	4.90	12	13.21 1900	0.12 1862	7.80 7/31	7.2
August	0.290	71	84	56	2.90	11	14.89 1899	0.04 1885	5.33 2/60	6.7
September	0.334	66	79	49	2.92	12	14.05 1879	0.08 1882	5.69 10/79	4.6
October	0.382	63	77	46	2.86	12	11.14 1916	0.21 1867	6.37 13/02	3.3
November	0.444	63	79	42	2.85	12	9.88 1865	0.07 1915	4.23 19/00	2.2
December	0.505	65	77	52	2.93	13	15.82 1920	0.23 1913	4.75 13/10	1.6
Year Totals	—	—	—	—	47.54	155	—	—	—	55.2
Year Averages	0.403	70	—	—	—	—	—	—	—	—
Year Extremes	—	—	90	42	—	—	24.49 4/1861	0.04 8/1885	8.90 25/2/73	—

* Early records revised during 1929. Values for period 1867—September 1885, reduced 20 per cent.; for period September 1885 to March 1913, reduced 10 per cent. † From 1921 only; previous records discarded owing to faulty exposure of instruments.

CLIMATOLOGICAL DATA—MELBOURNE, VICTORIA.

LAT. 37° 49′ S., LONG. 144° 58′ E. HEIGHT ABOVE M.S.L., 115 FT.

BAROMETER, WIND, EVAPORATION, LIGHTNING, CLOUDS, AND CLEAR DAYS.

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from hourly readings.	Wind. Greatest Number of Miles in One Day.		Wind. Mean Hourly Pressure. (lb.)	Wind. Total Miles.	Wind. Prevailing Direction. 9 a.m.	Wind. Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m. and 9 p.m.	No. of Clear Days.
No. of yrs. over which observation extends.	77	61		61	61	61	61	62	27	77	27
January	29.910	583	10/97	0.26	6,953	S W	S E	6.443	1.9	5.1	7.2
February	29.959	566	8/68	0.24	6,011	S W	S E	5.050	2.3	4.9	6.7
March	30.033	677	9/81	0.20	6,005	S W	S E	4.004	1.8	5.5	5.3
April	30.102	597	7/68	0.17	5,421	S W	N W	2.411	1.1	5.8	4.6
May	30.107	693	12/65	0.17	5,542	N W	N E	1.483	0.6	6.5	3.0
June	30.081	761	13/76	0.20	5,931	N W	N E	1.122	0.5	6.6	2.6
July	30.087	755	8/74	0.20	6,016	N W	N E	1.085	0.4	6.3	2.9
August	30.064	637	14/75	0.22	6,441	N W	N E	1.492	1.0	6.3	2.8
September	29.998	617	11/72	0.25	6,597	N W	S W	2.324	1.2	6.1	3.3
October	29.965	899	5/66	0.26	6,903	S W	N W	3.367	1.9	6.0	3.6
November	29.952	734	13/66	0.26	6,650	S W	S E	4.539	2.5	5.9	3.8
December	29.899	655	1/75	0.27	7,087	S W	S E	5.751	2.0	5.5	4.6
Year Totals	—		—	—	—	—	—	39.071	17.2	—	50.4
Year Averages	30.013		—	0.23	6,296	S W	N W	—	—	5.9	—
Year Extremes	—	899	5/10/66	—	—	—	—	—	—	—	—

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 Hours of Sunshine.
No. of yrs. over which observation extends.	79	79	79	79	79	79	74	75	53
January	78.0	56.7	67.4	111.2 14/62	42.0 28/85	69.2	178.5 14/62	30.2 28/85	259.4
February	78.0	57.2	67.6	109.5 7/01	40.2 24/24	69.3	167.5 15/70	30.9 6/91	237.9
March	74.5	54.7	64.6	105.5 2/93	37.1 17/84	68.4	164.5 1/68	28.9 (b)	205.3
April	68.2	50.7	59.4	94.0 (a)	34.8 24/88	59.2	152.0 8/61	25.0 23/97	161.8
May	61.5	46.8	54.2	83.7 7/05	29.9 29/16	53.8	142.6 2/59	21.1 26/16	137.7
June	56.8	43.9	50.4	72.2 1/07	28.0 11/66	44.2	129.0 11/61	19.9 30/29	110.9
July	55.6	41.9	48.8	69.3 22/26	27.0 21/69	42.3	125.8 27/80	20.5 12/03	130.5
August	58.6	43.3	51.0	77.0 20/85	28.3 11/63	48.7	137.4 29/69	21.3 14/02	153.0
September	62.7	45.6	54.1	88.6 28/28	31.1 16/08	57.5	142.1 20/67	22.8 8/18	171.6
October	67.1	48.3	57.7	98.4 24/14	32.1 3/71	66.3	154.3 28/68	24.8 22/18	200.9
November	71.4	51.3	61.3	105.7 27/94	36.5 2/96	69.2	159.6 29/65	24.6 2/96	232.4
December	75.3	54.4	64.8	110.7 15/76	40.0 4/70	70.7	170.3 20/69	33.2 1/04	248.0
Year Averages	67.3	49.6	58.4	—	—	—	—	—	(c)2,249.4
Year Extremes	—	—	—	111.2 14/1/62	27.0 21/7/69	84.2	178.5 14/1/62	19.9 30/6/29	—

(a) 6/1865 and 17/1922. (b) 17/1884 and 20/1897. (c) Total for year.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches). Mean 9 a.m.	Rel. Hum. (%.) Mean 9 a.m.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest In One Day.	Dew. Mean No. of Days Dew.
No. of yrs. over which observation extends.	27	27	27	27	79	79	79	79	76	27
January	0.385	58	65	50	1.88	8	5.68 1904	0.01 1932	2.97 9/97	2.6
February	0.417	62	69	48	1.74	7	6.24 1904	0.03 1870	3.37 18/19	4.0
March	0.382	64	73	57	2.24	10	7.50 1911	0.14 1934	3.55 5/19	7.8
April	0.343	72	82	66	2.24	11	6.71 1901	Nil 1923	2.28 22/01	9.4
May	0.311	79	86	71	2.13	13	4.31 1862	0.14 1934	1.85 7/91	10.2
June	0.278	83	89	76	2.05	14	4.51 1859	0.73 1877	1.74 21/04	8.8
July	0.265	82	86	76	1.86	14	7.02 1891	0.57 1902	2.71 12/91	8.8
August	0.270	76	82	70	1.90	15	4.04 1924	0.48 1903	1.94 26/24	7.8
September	0.289	68	76	60	2.33	14	7.93 1916	0.52 1907	2.62 12/80	6.7
October	0.305	62	67	53	2.66	13	7.61 1869	0.29 1914	3.00 17/69	5.6
November	0.335	60	69	52	2.27	11	6.71 1916	0.25 1895	2.57 16/76	2.1
December	0.367	59	69	51	2.36	9	7.18 1863	0.11 1904	3.20 1/34	1.9
Year Totals	—	—	—	—	25.66	139	—	—	—	75.7
Year Averages	0.324	69	—	—	—	—	—	—	—	—
Year Extremes	—	—	89	48	—	—	7.93 9/1916	Nil 4/1923	3.55 5/3/19	—

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. Greatest Number of Miles in One Day.	Wind. Mean Hourly Pressure. (lb.)	Wind. Total Miles.	Wind. Prevailing Direction. 9 a.m.	Wind. Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m. and 9 p.m.	No. of Clear Days.
No. of yrs. over which observation extends.	50	24	24	24	29	29	24	27	72	28
January	29.826	500 30/16	0.19	5,988	N to N W	S E	4.821	0.9	6.0	2.4
February	29.914	605 4/27	0.15	4,778	N & N N W	S E	3.686	1.1	6.0	2.4
March	29.946	443 19/27	0.13	4,964	N to N W	S E	2.990	1.4	5.9	2.4
April	29.972	533 27/26	0.13	4,815	N to N W	N W & S E	1.956	0.6	6.2	1.6
May	29.994	423 15/27	0.12	4,729	N W to N	N to N W	1.376	0.5	6.1	2.2
June	29.963	569 27/20	0.12	4,498	N W & N N W	N to N W	0.904	0.5	6.1	2.2
July	29.930	489 22/29	0.13	4,848	N W to N	N to N W	0.933	0.5	5.8	2.2
August	29.922	612 19/26	0.13	4,990	N to N W	N W to N	1.272	0.4	5.9	2.0
September	29.848	516 26/15	0.19	5,659	N to N W	N W & S E	1.953	0.7	6.1	1.5
October	29.826	461 8/12	0.20	6,074	N to N W	S E & N W	3.020	0.6	6.4	1.2
November	29.813	508 18/15	0.19	5,743	N to N W	S E	3.814	0.7	6.4	1.5
December	29.814	562 1/34	0.18	5,703	N to N W	S E	4.417	0.8	6.3	1.3
Year — Totals	—	—	—	—	—	—	31.142	8.7	—	22.9
Year — Averages	29.897	—	0.16	5,232	N to N W	S E & N W	—	—	6.1	—
Year — Extremes	—	612 19/8/26	—	—	—	—	—	—	—	—

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.). Mean Max.	Mean Min.	Mean.	Extremes Shade Temperature (Fahr.). Highest.	Lowest.	Extreme Range.	Extreme Temperature (Fahr.). Highest in Sun.	Lowest on Grass.	Mean Hours of Sunshine.
No. of yrs. over which observation extends.	64	64	64	88	88	88	47	67	14*
January	71.0	52.8	61.9	105.0 (a)	40.0 3/72	65.0	160.0 (b)	30.6 19/97	240.2
February	71.2	53.3	62.2	104.4 12/99	39.0 20/87	65.4	165.0 24/98	28.3 –/87	199.0
March	67.9	50.9	59.4	99.0 –/61	35.2 31/26	63.8	150.0 3/05	27.5 30/02	200.0
April	62.5	47.7	55.1	90.0 1/56	30.0 25/56	60.0	142.0 18/93	25.0 –/86	143.0
May	57.4	43.9	50.6	77.8 5/21	29.2 20/02	48.6	128.0 (c)	20.0 19/02	140.1
June	52.7	41.0	46.8	75.0 7/74	28.0 22/79	47.0	122.0 12/94	21.0 6/87	118.7
July	52.1	39.5	45.8	72.0 22/77	27.0 18/66	45.0	121.0 12/93	18.7 16/86	129.6
August	55.0	41.1	48.0	77.0 3/76	30.0 10/73	47.0	129.0 –/87	20.1 7/09	160.4
September	58.8	43.3	51.0	81.7 23/26	30.0 12/41	51.7	138.0 23/93	18.3 16/26	171.7
October	62.6	45.5	54.0	92.0 24/14	32.0 12/89	60.0	156.0 9/93	23.8 (d)	188.9
November	66.0	48.2	57.1	98.0 23/88	35.2 5/13	62.8	154.0 19/92	26.0 1/08	221.5
December	69.1	51.2	60.2	105.2 30/97	38.0 13/06	67.2	157.0 30/18	27.2 –/86	225.2
Year — Averages	62.2	46.5	54.3	—	—	—	—	—	2,138.3
Year — Extremes	—	—	—	105.2 30/12/97	27.0 18/7/66	78.2	165.0 24/2/98	18.3 16/9/26	(e)

(a) 27/49 and 1/00. (b) 5/86 and 13/05. (c) –/89 and –/93. (d) 1/86 and –/99. (e) Total for year.
* Early records discarded owing to faulty instrument.

CLIMATOLOGICAL DATA—HOBART, TASMANIA—*continued.*

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches).	Rel. Hum. (%).			Rainfall (inches)					Dew.
	Mean 9 a.m.	Mean 9 a.m.	Highest Mean.	Lowest Mean.	Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest In One Day.	Mean No. of Days Dew.
No. of yrs. over which observation extends.	48	48	48	48	92	91	92	92	68	25
January	0.330	58	72	46	1.84	10	5.91 1893	0.03 1841	2.96 30/16	0.6
February ..	0.355	63	77	52	1.47	9	9.15 1854	0.07 1847	4.50 27/54*a*	1.3
March	0.332	67	77	58	1.74	10	7.60 1854	0.02 1843	3.27 11/32	5.2
April	0.299	72	84	58	1.93	12	6.50 1909	0.07 1904	5.02 20/09	9.4
May	0.265	78	89	65	1.86	13	6.37 1905	0.10 1843	3.22 14/58	13.0
June	0.241	80	91	68	2.21	14	8.15 1889	0.22 1852	4.11 13/89	8.7
July	0.230	80	94	72	2.16	14	6.02 1922	0.30 1850	2.51 18/22	8.8
August	0.238	75	92	64	1.82	14	10.16 1858	0.23 1854	4.35 12/58	8.6
September ..	0.255	67	85	58	2.10	15	7.14 1844	0.39 1847	2.75 18/44	5.1
October	0.270	63	73	51	2.33	15	6.67 1906	0.26 1850	2.58 4/06	2.8
November ..	0.292	59	72	50	2.45	14	8.94 1849	0.16 1868	3.97 7/49	1.1
December ..	0.313	57	67	45	2.06	12	9.00 1875	0.11 1842	2.82 21/29	0.9
Year Totals ..	—	—	—	—	23.97	152	—	—	—	65.5
Year Averages ..	0.281	67	—	—	—	—	—	—	—	—
Year Extremes ..	—	—	94	45	—	—	10.16 8/1858	0.02 3/1843	5.02 20/4/09	—

(*a*) 4.18 on 28/54.