

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 2,943,366 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 1930 is 23° 26' 54.21"), the areas within the tropical and temperate zones are approximately as follows :—

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 nearly as great as that of the United States of America, that it is four-fifths of that of Canada, that it is over one-fifth of the area of the whole of the British Empire, that it is more than three-fourths of the whole area of Europe, and that it is about 25 times as large as Great Britain and Ireland or Italy. 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.	Country.	Area.
Continental Divisions—	Sq. miles.	AFRICA—continued.	Sq. miles.
Europe	3,859,076	Belgian Congo	918,000
Asia	16,628,276	Algeria	847,552
Africa	11,240,294	Angola	486,207
North and Central America and West Indies	8,553,436	South African Union	472,347
South America	7,060,511	Portuguese East Africa	293,436
Australasia and Polynesia	3,463,358	Tripolitania	347,497
		Egypt	383,000
Total, exclusive of Arctic and Antarctic Conts.	50,804,951	Tanganyika Territory	374,000
		Abyssinia	350,000
Europe—		Nigeria and Protectorate	335,700
Russia	1,765,332	South-west Africa	332,400
France	212,659	Northern Rhodesia	287,950
Spain (inc. possessions)	194,800	Cyrenaica	285,640
Germany	181,723	Bechuanaland Protectorate	275,000
Sweden	173,156	Madagascar	241,094
Poland	149,953	Kenya Colony and Protec- torate	224,960
Finland	132,608	North and Central America	
Norway	125,086	Canada	3,684,723
Roumania	122,282	United States	3,026,789
Italy	119,710	Mexico	767,198
Jugoslavia	96,134	Alaska	590,884
Great Britain and Northern Ireland	94,633	Newfoundland and Labra- dor	162,734
		Nicaragua	51,660
Asia—		South America—	
Russia	6,475,318	Brazil	3,275,510
China and Dependencies	4,279,170	Argentine Republic	1,153,119
British India and Adminis- tered Territories	1,094,300	Peru	532,047
Arabia and Autonomous States	1,000,000	Bolivia	514,155
Feudatory Indian States	711,032	Colombia (exc. of Panama)	440,846
Persia	628,000	Venezuela	393,874
Dutch East Indies	573,023	Chile	290,119
Turkey	285,334	Ecuador	109,978
Japan (and Dependencies)	265,129	Australasia and Polynesia—	
Afghanistan	245,000	Commonwealth of Australia	2,974,581
Siam	200,148	Dutch New Guinea	160,692
Africa—		New Zealand and Depen- dencies	103,862
French West Africa	1,447,259	Papua	90,540
Anglo-Egyptian Sudan	1,008,100	Territory of New Guinea	89,252
French Equatorial Africa	912,049	British Empire	13,355,426

The figures quoted in the table have, in most cases, been extracted from the Statesman's Year Book for 1930.

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 coast.

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.

7. **Changing of German Place Names in Australia.**—A list of German place and district names in Australia which were changed during the Great War appeared in Year Book No. 19, pages 50 and 51. Limitations of space, however, preclude its repetition in this issue.

§ 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, H. A. Hunt, Esquire.

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

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	Darwin ..	97	12 28	130 51
Adelaide ..	140	34 56	138 35	Daly Waters ..	691	16 16	133 23
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 8.4°, and the extreme readings for the year, or the highest maximum in the hottest month and the lowest reading in the coldest month, 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 humidities consisting as they do of the extremes for each month, do not show the normal annual fluctuation which would be approximately midway between the extremes.

The order of stations in descending values of vapour pressure is Darwin, Daly Waters, Brisbane, Sydney, Perth, Adelaide, Melbourne, Hobart and Alice Springs, while the relative humidity diminishes in the order, Sydney, Hobart, Darwin, Brisbane, Melbourne, Perth, Adelaide, Daly Waters 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 32 inches at Hobart to 95 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.

(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

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

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 144 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 43 years.

Harvey Creek, in the shorter period of 26 years, has three times exceeded 200 inches, the total for 1921 being 254.77 inches, and at the South Johnstone Sugar Experiment Station, where a gauge has recently been established, 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 145.94 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.	Queens- land.	South Australia	Northern Territory	Western Australia.	Tas- maria. (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 47.81 inches, occupies the chief place; Brisbane, Perth, Melbourne, Hobart and Adelaide following in that order, Adelaide with 21.09 inches being the driest. The extreme range from the wettest to the driest year is greatest at Brisbane (72.09 inches) and least at Adelaide (19.48 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.* 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, 1901 TO 1930.

Year.	PERTH.			ADELAIDE.			BRISBANE.			SYDNEY.			MELBOURNE.			HOBART.		
	Amount.	No. of Days.	10 Years' Means.	Amount.	No. of Days.	10 Years' Means.	Amount.	No. of Days.	10 Years' Means.	Amount.	No. of Days.	10 Years' Means.	Amount.	No. of Days.	10 Years' Means.	Amount.	No. of Days.	10 Years' Means.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
1901	36.75	122	..	18.01	124	..	38.48	110	..	40.10	149	..	27.45	113	..	25.11	149	..
2	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	153	..	29.72	128	..	22.41	139	..
5	34.61	116	..	22.28	131	..	36.76	108	..	35.03	145	..	25.64	129	..	32.09	163	..
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	108	34.05	24.56	125	21.15	44.01	125	36.55	45.65	167	43.41	17.72	130	25.36	16.50	148	23.29
9	39.11	107	..	27.69	133	..	34.06	111	..	32.45	177	..	25.86	171	..	27.29	170	..
10	37.02	135	..	24.82	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	..	36.01	163	..	26.78	193	..
12	27.85	123	..	19.57	116	..	41.30	114	..	47.51	172	..	20.37	157	..	23.14	181	..
13	38.28	141	..	18.16	102	..	40.81	115	..	57.70	141	..	21.17	157	..	19.36	165	..
14	20.21	128	..	11.39	91	..	33.99	141	..	56.42	149	..	18.57	129	..	15.42	154	..
15	43.61	164	..	19.38	117	..	25.66	93	..	34.83	117	..	20.95	167	..	20.91	196	..
16	35.16	128	..	23.16	142	..	52.80	136	..	44.91	161	..	38.04	170	..	43.39	203	..
17	45.64	146	..	28.90	153	..	40.92	127	..	52.40	151	..	30.57	171	..	30.62	214	..
18	39.58	138	34.98	17.41	107	21.13	24.95	121	37.87	42.99	149	46.64	27.13	160	26.39	26.04	179	25.82
19	30.66	120	..	17.21	105	..	19.36	96	..	58.71	152	..	24.89	141	..	22.48	153	..
20	40.35	124	..	26.70	119	..	39.72	122	..	43.42	159	..	28.27	162	..	18.00	182	..
21	41.09	135	..	22.04	100	..	54.31	167	..	43.34	140	..	29.76	154	..	18.04	159	..
22	31.86	135	..	33.26	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	33.79	119	..	23.44	143	..	41.08	114	..	37.01	136	..	36.48	171	..	28.76	197	..
25	31.41	120	..	21.91	118	..	53.10	139	..	50.35	145	..	17.57	144	..	22.40	171	..
26	49.22	167	..	22.20	116	..	30.82	110	..	37.07	127	..	50.81	149	..	25.79	187	..
27	36.59	133	..	16.92	101	..	62.08	130	..	48.56	138	..	17.98	135	..	20.09	183	..
28	44.83	140	38.43	19.43	107	22.34	52.64	145	41.22	40.07	130	43.49	24.09	151	24.75	30.23	205	24.69
29	36.77	122	..	17.51	119	..	39.73	118	..	57.90	129	..	28.81	168	..	26.55	194	..
30	39.30	129	..	18.65	116	..	41.22	144	..	44.47	141	..	25.41	145	..	19.38	152	..
Aver.	34.70	121	..	21.09	123	..	45.12	128	..	47.81	152	..	26.04	138	..	23.88	151	..
No. of Yrs.	55	55	..	92	92	..	81	71	..	91	91	..	87	75	..	88	88	..

NOTE.—The above average rainfall figures for Brisbane, Sydney, Melbourne and Hobart differ slightly from the mean annual falls given in the Climatological Tables, which are for a less number of years. Annual totals from 1860 to 1900 inclusive will be found in Official Year Book No. 15, page 53.

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 63 and No. 22, pp. 46 to 48:—

HEAVY RAINFALLS—NEW SOUTH WALES, UP TO 1930, INCLUSIVE.

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

HEAVY RAINFALLS—QUEENSLAND, UP TO 1930, 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	Macnab 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
Conway ..	29 Mar., 1930	21.82	Mount Molloy ..	31 ,, 1911	20.00
" ..	30 ,, 1930	21.82	" ..	1 Apr., ,,	20.00
Crohamhurst			" ..	2 ,, ,,	20.00
(Blackall Range)	2 Feb., 1893	35.71	Nambour ..	9 Jan., 1898	21.00
Dungeness ..	16 Mar., 1893	22.17	Plane Creek		
Goondi ..	30 Jan., 1913	24.10	(Mackay) ..	26 Feb., 1913	27.73
Harvey Creek ..	3 ,, 1911	27.75	Port Douglas ..	1 Apr., 1911	31.53
" ..	31 ,, 1913	24.72	Sarina ..	23 Jan., 1918	22.60
Innisfail (formerly			Tully ..	12 Feb., 1927	23.86
Geraldton) ..	29 Dec., 1903	21.22	Woodlands (Yepp'n)	31 Jan., 1893	23.07
" ..	7 Apr., 1912	20.50	Yandina ..	1 Feb., 1893	20.08
" ..	31 Jan., 1913	20.91	Yarrabah ..	2 Apr., 1911	30.65
Kamerunga (Cairns)	2 Apr., 1911	21.00	" ..	24 Jan., 1916	27.20
Koumala ..	23 Jan., 1918	22.31	Yeppoon ..	31 ,, 1893	20.05
" ..	24 ,, ,,	20.65	" ..	8 Oct., 1914	21.70
Kuranda (Cairns) ..	1 Apr., 1911	24.30			

^a 37½ hours.

HEAVY RAINFALLS—WESTERN AUSTRALIA, UP TO 1930, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Balla Balla ..	21 Mar., 1899	14.40	Frazier Downs ..	3 Mar., 1916	11.25
Boodarie ..	21 Jan., 1896	14.53	Gnaraloo ..	20 ,, 1923	11.00
Broome ..	6 ,, 1917	14.00	Kerdiadary ..	7 Feb., 1901	12.00
Cossack ..	3 Apr., 1898	12.82	Minilya ..	15 Jan., 1923	11.50
" ..	16 ,, 1900	13.23	Mundabullangana	12 Feb., 1929	12.05
Croydon ..	3 Mar., 1903	12.00	Obagama ..	28 Feb., 1910	12.00
Derby ..	29 Dec., 1898	13.09	" ..	24 Dec., 1920	13.02
" ..	7 Jan., 1917	16.47	" ..	15 Feb., 1930	10.66
Exmouth Gulf ..	2 Feb., 1918	12.50	Pilbara ..	2 Apr., 1898	14.04
Fortescue ..	3 May, 1890	23.36			

HEAVY RAINFALLS, WESTERN AUSTRALIA—*continued.*

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Point Torment ..	17 Dec., 1906	11.86	Thangoc ..	28 Dec., 1898	11.15
Port George IV. ..	17 Jan., 1915	11.24	Whim Creek ..	3 Apr., 1898	29.41
Roebourne ..	3 Apr., 1898	11.44	" ..	21 Mar., 1899	18.17
Roebuck Plains ..	5 Jan., 1917	14.01	Winderrie ..	17 Jan., 1923	14.23
" ..	6 " "	22.36	Woodstock ..	21 " 1912	13.00
Springvale ..	14 Mar., 1922	12.25	Wyndham ..	27 " 1890	11.60
Tambray ..	6 " 1900	11.00	" ..	4 Mar., 1919	12.50
Thangoc ..	17-19 Feb., '96	24.18	Yeeda ..	7 Jan., 1917	11.75

HEAVY RAINFALLS—NORTHERN TERRITORY, UP TO 1930, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Bathurst Island			Cosmopolitan Gold Mine ..	24 Dec., 1915	10.60
Mission ..	7 Apr., 1925	11.85	Darwin ..	7 " "	11.67
Bonrook ..	24 Dec., 1915	10.60	Groote Eylandt ..	30-31 Mar., '23	12.00a
Borrooloola ..	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			

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

HEAVY RAINFALLS—SOUTH AUSTRALIA, UP TO 1930, INCLUSIVE.

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

HEAVY RAINFALLS—VICTORIA, UP TO 1930, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Balook ..	27 Sept., 1916	7.23	Murrungowar ..	7 Sept., 1908	8.81
Blackwarry ..	12 May, 1925	7.65	Omeo Valley ..	22 Mar., 1926	7.90
Bruthen ..	28 Jan., 1920	7.00	Reedy Flat ..	28 Jan., 1920	7.08
Buchan ..	17 July, 1925	8.45	Sarsfield ..	13 July, 1925	7.05
Cann River ..	27 Feb., 1919	9.56	Tambo Crossing ..	13 July, 1923	8.89
Hotham Heights ..	8 Jan., 1926	8.40	" ..	29 Jan., 1920	7.80
Mallacoota ..	14 Mar., 1911	7.95	Tonghi Creek ..	27 Feb., 1919	9.90
Mt. Buffalo ..	6 June, 1917	8.53	Wroxham ..	27 Aug., 1919	7.65
" ..	5 Apr., 1929	7.47			

HEAVY RAINFALLS—TASMANIA, UP TO 1930, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Cullenswood ..	5 June, 1923	10.50	Mathinna ..	5 Apr., 1929	13.25
" ..	5 Apr., 1929	11.12	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
Mathinna ..	8-10 " "	15.79			

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 hailstorms 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 30.12 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 30.77 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 alternate periods of flooding and dryness. This is borne out in the case of the inland rivers, the River Murray, for example, which has never been known to become dry, deriving its steadiness of flow mainly through the causes indicated.

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

Sufficient evidence exists, however, to prove that, even if the rainfall 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 TEMPERATURE—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.
							Fahr.	Fahr.	Fahr.	Fahr.		
		Ft.	Ins.	Ins.	Fahr.	Fahr.	Fahr.	Fahr.	Fahr.	Fahr.	Fahr.	
Amsterdam ..	6	27.29	40.59	17.60	63.2	36.8	90.0	4.1	64.4	35.4	35.4	
Auckland ..	125	43.88	74.15	26.32	66.2	52.5	91.0	31.9	67.1	51.8		
Athens ..	351	15.48	33.33	4.56	79.2	49.1	109.4	19.6	81.0	47.4		
Bergen ..	72	77.09	111.58	44.49	60.8	34.2	88.5	4.3	57.9	33.6		
Berlin ..	161	22.72	30.04	14.25	64.8	33.0	98.6	-13.0	60.0	31.8		
Berne ..	1,877	36.30	58.23	24.69	62.2	30.1	91.4	-3.6	64.4	28.0		
Bombay ..	37	71.15	114.89	33.41	83.5	75.1	100.0	55.9	84.8	74.2		
Breslau ..	482	22.52	32.56	16.50	64.1	33.5	100.0	-23.4	65.5	29.3		
Brussels ..	328	28.35	41.18	17.73	62.6	36.0	95.5	-4.4	63.7	34.5		
Budapest ..	500	25.20	35.28	16.79	68.6	30.2	98.6	-5.1	70.4	28.2		
Buenos Ayres ..	82	35.78	79.72	20.04	72.7	50.9	103.1	22.3	73.8	50.0		
Calcutta ..	21	61.82	98.48	38.43	85.6	68.0	108.2	44.2	86.0	66.4		
Capetown ..	40	25.50	36.72	17.71	68.1	54.7	102.0	37.8	68.8	53.9		
Caracas ..	3,420	30.03	47.36	23.76	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	-23.2	72.4	23.7		
Christchurch ..	25	25.16	35.30	13.54	61.3	43.3	95.7	-21.3	61.6	42.4		
Christiana (Oslo) ..	75	63.83	32.21	10.20	61.0	24.5	95.0	-1.1	62.6	28.9		
Colombo ..	40	83.83	139.70	51.60	81.5	79.9	95.8	65.0	82.6	78.9		
Constantinople ..	245	28.75	42.74	14.78	74.0	43.5	103.6	13.0	75.7	42.0		
Copenhagen ..	10	20.79	25.83	15.47	60.4	33.3	85.5	-3.3	61.0	32.4		
Dresden ..	115	26.80	34.49	17.72	62.9	32.4	93.4	-15.3	64.4	31.5		
Dublin ..	47	27.66	35.56	16.60	69.4	32.0	87.2	13.3	60.5	41.6		
Dunedin ..	300	36.96	54.51	22.15	58.3	42.6	94.0	23.0	57.0	41.7		
Edinburgh ..	260	40.79	71.27	27.24	75.6	64.4	110.6	41.1	76.7	63.8		
Edinburg ..	441	25.21	32.05	16.44	55.8	36.8	87.7	5.0	57.2	38.3		
Geneva ..	1,328	33.48	46.89	21.14	64.4	33.7	94.5	16.7	75.4	45.5		
Geneva ..	157	51.20	108.22	28.21	73.8	46.8	84.9	6.6	58.0	38.4		
Glasgow ..	184	33.49	56.18	29.05	52.7	41.0	84.9	6.6	58.0	38.4		
Greenwich ..	140	23.50	35.54	16.38	62.0	39.5	100.0	6.9	63.5	38.5		
Hong Kong ..	109	84.28	110.72	45.84	86.2	64.8	97.0	32.0	86.7	62.0		
Johannesburg ..	5,750	31.63	50.00	21.66	65.4	54.4	94.0	23.3	68.2	48.0		
Leipzig ..	384	24.69	31.37	17.10	63.1	31.5	97.3	-14.8	64.8	30.6		
Leningrad ..	16	21.30	29.52	13.75	61.1	17.4	97.0	-38.2	63.7	15.2		
Lisbon ..	312	29.18	52.79	17.32	69.6	51.3	94.1	32.5	70.2	49.3		
London (Kew) ..	18	23.80	38.20	16.64	61.2	39.8	94.0	9.4	62.7	38.9		
Madrid ..	22	49.85	88.41	18.45	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	22.24	43.03	12.28	70.5	45.3	100.4	11.7	72.3	44.6		
Moscow ..	526	18.94	29.28	12.07	63.4	14.7	99.5	-44.5	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	33.40	53.79	25.63	67.2	14.1	98.0	-33.0	69.7	12.0		
Paris ..	164	22.64	29.57	16.46	63.5	37.2	101.1	-14.1	64.9	36.1		
Pekin ..	143	24.40	36.00	18.00	77.7	26.6	114.0	-5.0	79.2	23.6		
Quebec ..	296	40.50	53.79	32.12	63.5	12.4	96.0	-34.0	66.3	10.1		
Rome ..	166	32.57	57.89	12.72	74.3	46.0	104.2	17.2	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	158.63	32.71	81.2	78.6	94.2	63.4	81.5	78.3		
Stockholm ..	144	19.09	28.27	11.81	59.5	27.3	96.8	-25.6	61.9	26.4		
Tokio ..	65	61.45	86.37	45.72	74.8	39.2	97.9	17.2	77.7	37.5		
Trieste ..	85	42.94	63.14	26.57	73.9	41.3	99.5	14.0	70.3	39.9		
Vienna ..	663	24.50	33.90	16.50	65.7	30.4	97.7	-8.0	67.1	28.0		
Vladivostock ..	55	19.54	33.60	9.39	63.9	11.0	95.7	-21.8	69.4	6.1		
Washington ..	112	43.50	61.33	30.85	74.7	34.5	106.0	-15.0	76.8	32.9		
Wellington (N.Z.) ..	10	48.65	67.68	27.83	61.8	48.6	88.0	28.6	62.5	47.7		
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	22.47	33.71	16.31	(a) 68.0	(b) 43.9	102.6	14.0	69.0	42.6
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STATE CAPITALS.

Perth ..	197	34.70	49.22	20.21	(a) 73.0	(b) 56.0	108.4	34.2	73.9	55.2
Adelaide ..	140	21.09	30.87	11.39	73.1	53.1	116.3	32.0	74.2	51.8
Brisbane ..	137	45.27	88.26	16.17	76.7	59.8	108.9	36.1	77.2	58.5
Sydney ..	138	47.48	82.76	21.49	71.0	54.2	108.5	35.9	71.6	52.8
Melbourne ..	115	25.49	38.04	15.61	66.6	50.1	111.2	27.0	67.6	48.8
Hobart ..	177	23.88	43.39	13.43	61.5	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 1930. These are given in the following tables:—

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. in Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind.				Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m. and 3 p.m.	No. of Clear Days.
		Greatest Number of Miles in One Day.	Mean Hourly Pressure. (lb.)	Total Miles.	Prevailing Direction. 9 a.m. 3 p.m.				
No. of yrs. over which observation extends	46	33	33	33	33	32	33	23	34
January ..	29.908	797 27/98	0.67	11,148	S S E	10.43	1.5	2.8	14.3
February ..	29.923	656 6/08	0.61	9,687	S S E	8.56	1.4	3.1	11.8
March ..	29.986	351 6/13	0.53	9,871	S S E	7.61	1.4	4.0	11.6
April ..	30.072	955 25/00	0.39	8,218	S E	4.75	1.3	4.4	8.0
May ..	30.068	768 5/12	0.36	8,095	E N E	2.75	2.2	5.5	5.4
June ..	30.056	914 19/27	0.36	7,941	N	1.77	2.1	6.0	3.5
July ..	30.090	1,015 20/26	0.40	8,565	N	1.75	2.3	5.7	5.0
August ..	30.086	966 15/03	0.41	8,727	W	2.36	1.5	5.5	5.2
September ..	30.062	864 11/05	0.46	8,903	S W	3.36	1.4	4.9	5.9
October ..	30.028	809 6/16	0.52	9,309	S S W	5.26	0.9	4.9	5.8
November ..	29.991	777 18/97	0.58	10,016	S	7.62	1.3	3.9	8.3
December ..	29.925	776 6/22	0.64	10,858	S	9.81	1.7	3.1	12.3
Year { Totals ..	—	—	—	—	—	66.03	19.0	—	97.1
Year { Averages ..	30.016	1,015 20/7/26	0.49	9,320	S	—	—	4.5	—
Year { Extremes ..	—	—	—	—	—	—	—	—	—

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.).			Extreme Shade Temperature (Fahr.).			Extreme Range.	Extreme Temperature (Fahr.).		Mean Hours of Sunshine.
	Mean Max.	Mean Min.	Mean	Highest.	Lowest.	Highest in Sun.		Lowest on Grass.		
No. of yrs. over which observation extends	34	34	34	34	34	34	32	32	33	
January ..	84.4	63.0	73.7	108.4 28/21	48.6 20/25	58.5	177.3 22/14	40.4 1/21	322.3	
February ..	84.6	63.2	73.9	107.4 4/23	47.7 1/02	59.7	169.0 4/99	39.8 1/21	271.4	
March ..	81.2	61.0	71.1	106.4 14/22	45.8 8/03	60.6	167.0 19/18	36.7 8/03	267.0	
April ..	76.2	57.2	66.7	99.7 9/10	39.3 20/14	60.4	157.0 8/16	31.0 20/14	217.3	
May ..	68.8	52.6	60.7	90.4 2/07	34.3 11/14	56.1	142.2 8/24	25.3 11/14	175.1	
June ..	64.0	49.6	56.8	81.7 2/14	35.0 30/20	46.7	135.5 9/14	26.5 30/20	164.3	
July ..	62.7	47.7	55.2	76.4 21/21	34.2 7/16	42.2	133.2 13/15	25.1 30/20	141.7	
August ..	63.7	48.2	56.0	81.0 12/14	35.3 31/08	45.7	145.1 29/21	27.9 10/11	184.7	
September ..	66.3	50.2	58.3	90.9 30/18	38.9 17/13	52.0	153.6 29/16	29.2 21/16	206.4	
October ..	69.2	52.5	60.8	95.3 30/22	40.5 5/24	54.8	154.0 29/14	30.5 4/17	237.1	
November ..	75.7	56.7	66.2	104.6 24/13	42.0 1/04	62.6	167.0 30/25	35.5 (b)	286.8	
December ..	81.0	60.6	70.8	107.9 20/04	48.0 2/10	59.9	168.7 25/15	39.0 12/20	324.6	
Year { Averages ..	73.2	55.2	64.2	—	—	74.2	—	—	2798.7	
Year { Extremes ..	—	—	—	108.4 28/1/21	34.2 7/7/16	—	177.3 22/1/14	25.1 30/7/20	(a)	

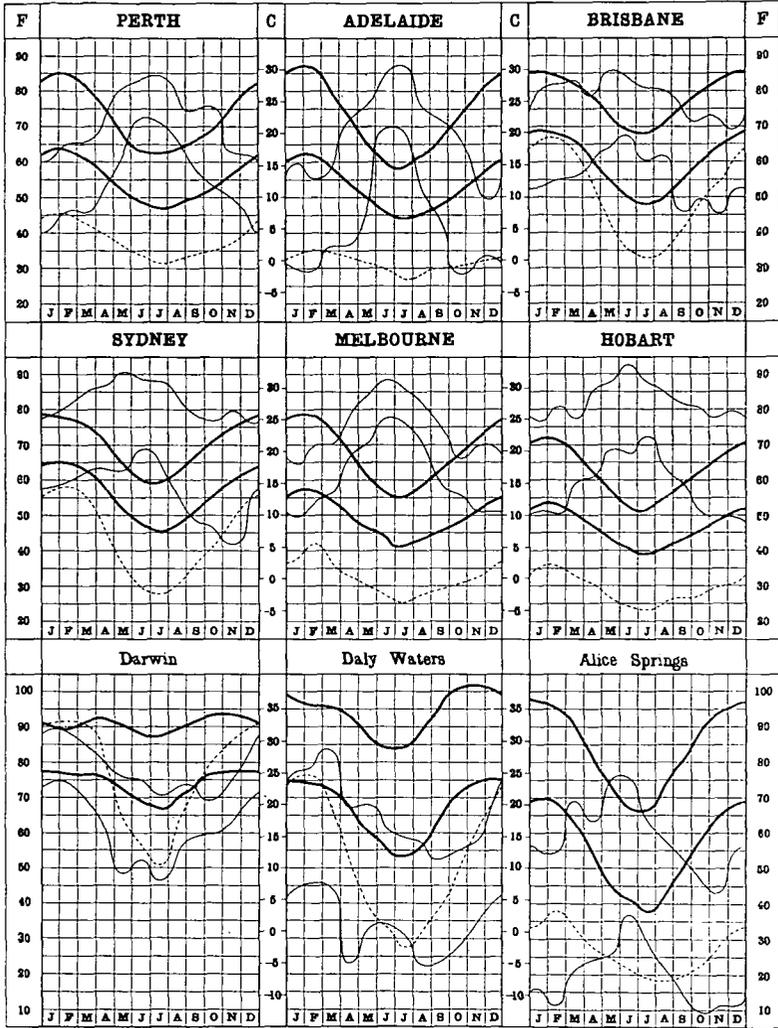
(a) Total for year. (b) 6/1910 and 14/1912.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches).	Rel. Hum. (%)				Rainfall (inches).				Dew. Mean No. Days Dew.
		Mean 9 a.m.	Mean 9 a.m.	Highest Mean.	Lowest Mean.	Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	
No. of yrs. over which observation extends	34	34	34	34	55	55	55	54	54	33
January ..	0.441	52	61	41	0.34	3	2.17 1879	0.00 (a)	1.74 28/79	2.5
February ..	0.442	53	65	46	0.43	3	2.98 1915	0.00 (a)	1.63 26/15	3.5
March ..	0.435	57	66	46	0.77	5	4.50 1896	0.00 (a)	2.06 26/23	6.0
April ..	0.402	62	73	51	1.64	7	5.85 1926	0.00 1920	2.62 30/04	9.4
May ..	0.370	74	81	61	5.04	14	12.13 1879	0.16 1/03	2.80 20/79	12.6
June ..	0.342	78	83	68	7.04	17	12.80 1933	2.16 187	3.90 10/20	12.2
July ..	0.320	79	89	69	6.70	17	12.26 1928	2.42 1876	3.00 4/91	13.0
August ..	0.356	73	79	62	5.71	13	7.21 1923	0.46 1902	2.79 7/3	11.5
September ..	0.348	68	75	58	3.46	12	7.84 1923	0.34 1016	1.73 23/09	10.2
October ..	0.355	61	75	54	2.10	12	7.87 1890	0.49 1892	1.38 15/10	6.0
November ..	0.391	54	63	46	0.80	6	2.78 1916	0.00 1891	1.11 30/03	3.8
December ..	0.418	51	63	44	0.58	4	3.05 1888	0.00 1886 1924	1.72 1/88	2.7
Year { Totals ..	—	—	—	—	34.70	121	—	—	—	93.4
Year { Averages ..	0.371	—	—	—	—	—	—	—	—	—
Year { Extremes ..	—	—	—	—	—	—	12.80 6/23	Nil (b)	3.90 10/6/20	—

(a) Various years. (b) Jan., Feb., March, April, Nov., Dec., various years.

ANNUAL FLUCTUATIONS OF NORMAL MAXIMUM AND MINIMUM TEMPERATURE AND HUMIDITY.



EXPLANATION.—The upper and lower heavy lines in each graph represent the maximum and 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.

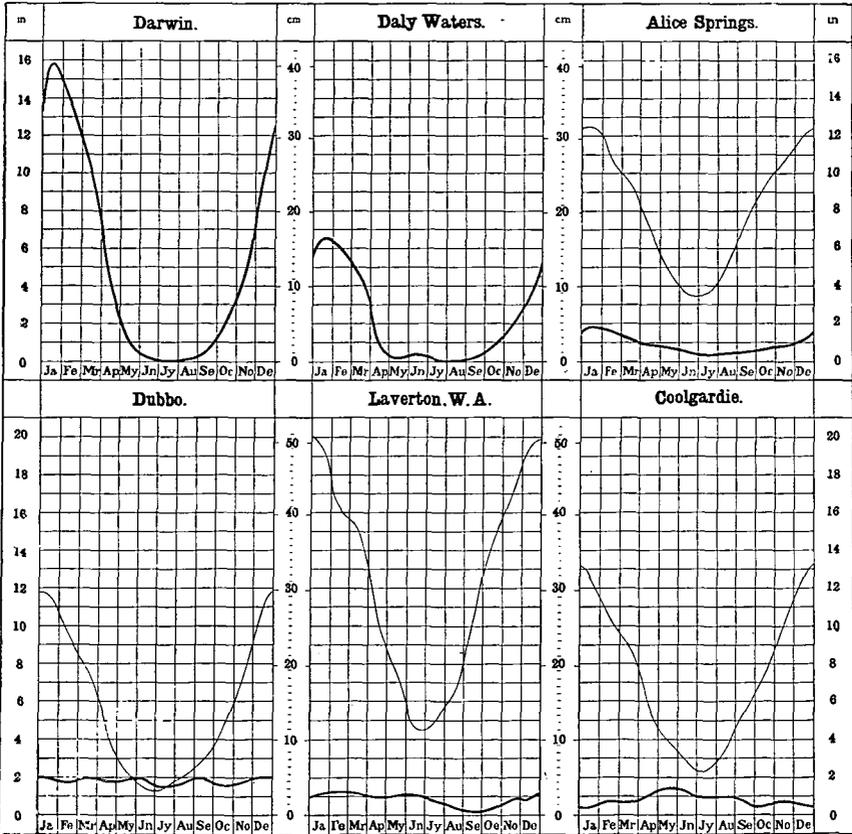
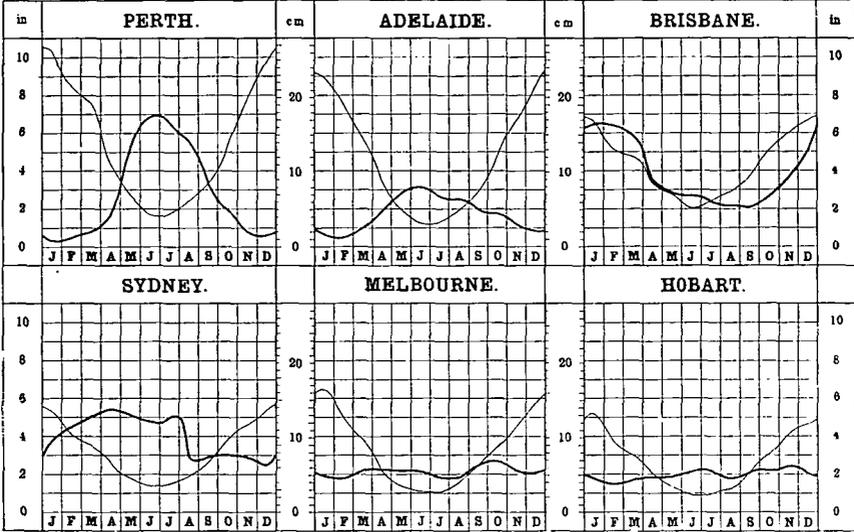
The upper and lower fine lines join the greatest and the least monthly means of relative humidity respectively, the figures under the outer columns "F" indicating percentage values.

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.

Fig. 5 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 June 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 *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 and Daly Waters.

At Perth, Adelaide, Brisbane, Melbourne, Hobart, 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.

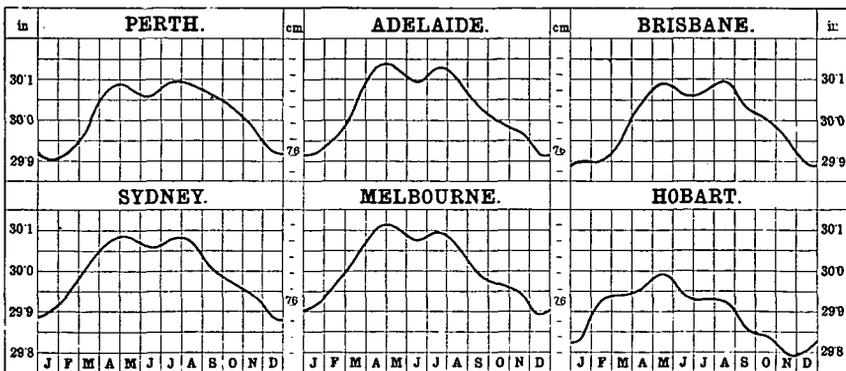
The distance for any date from the zero line to the curve represents the average number of inches, reckoned as per month, of rainfall at that date. Thus, taking the curves for Adelaide in the middle of January, the rain falls on the average at the rate of about three-fourths of an inch per month, or, 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 11½ 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 ..	34.70	66.03	Darwin ..	60.45	—
Adelaide ..	21.09	54.97	Daly Waters ..	26.47	—
Brisbane ..	45.12	55.95	Alice Springs ..	10.79	95.41
Sydney ..	44.47	39.05	Dubbo ..	21.97	66.37
Melbourne ..	26.04	39.19	Laverton, W.A.	9.56	145.36
Hobart ..	23.88	31.81	Coolgardie ..	10.19	84.99

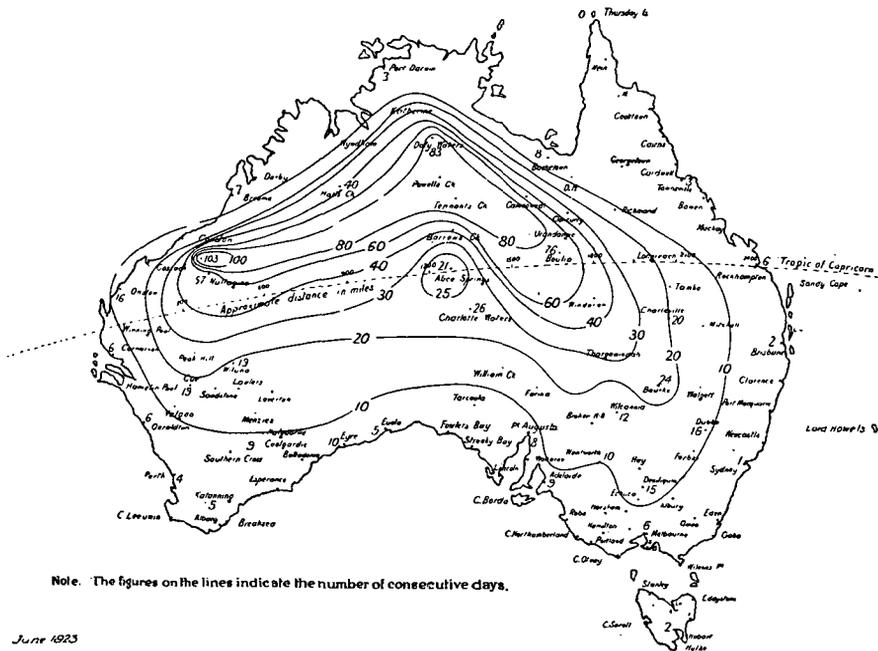
MEAN BAROMETRIC PRESSURE.—CAPITAL CITIES.



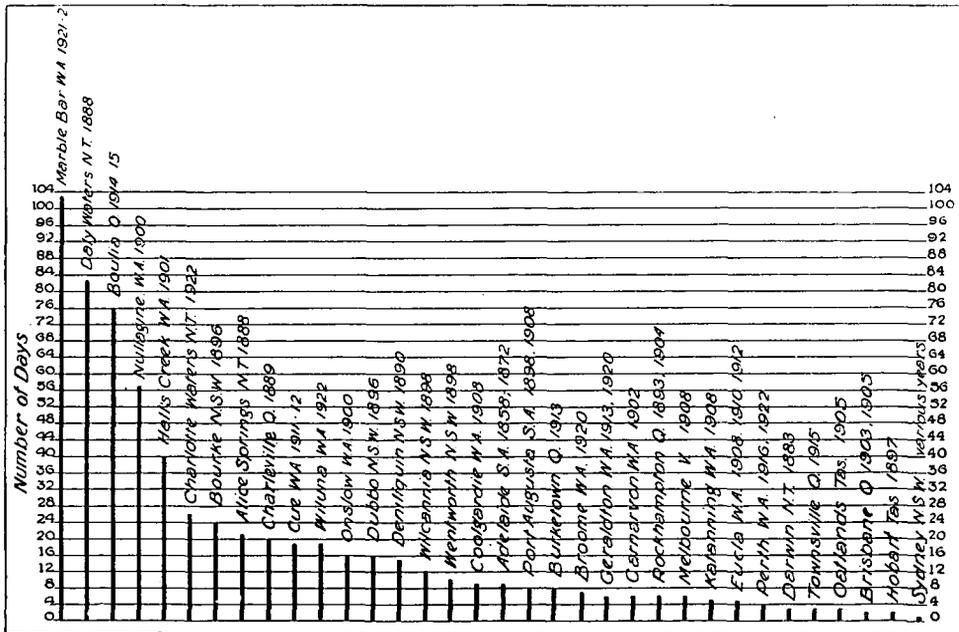
EXPLANATION.—The lines representing the yearly fluctuations of barometric pressure at the State capital cities are means for long periods, and are plotted from the Climatological Tables herein. The pressures are shown in inches on about 2½ times the natural scale, and the corresponding pressures in centimetres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

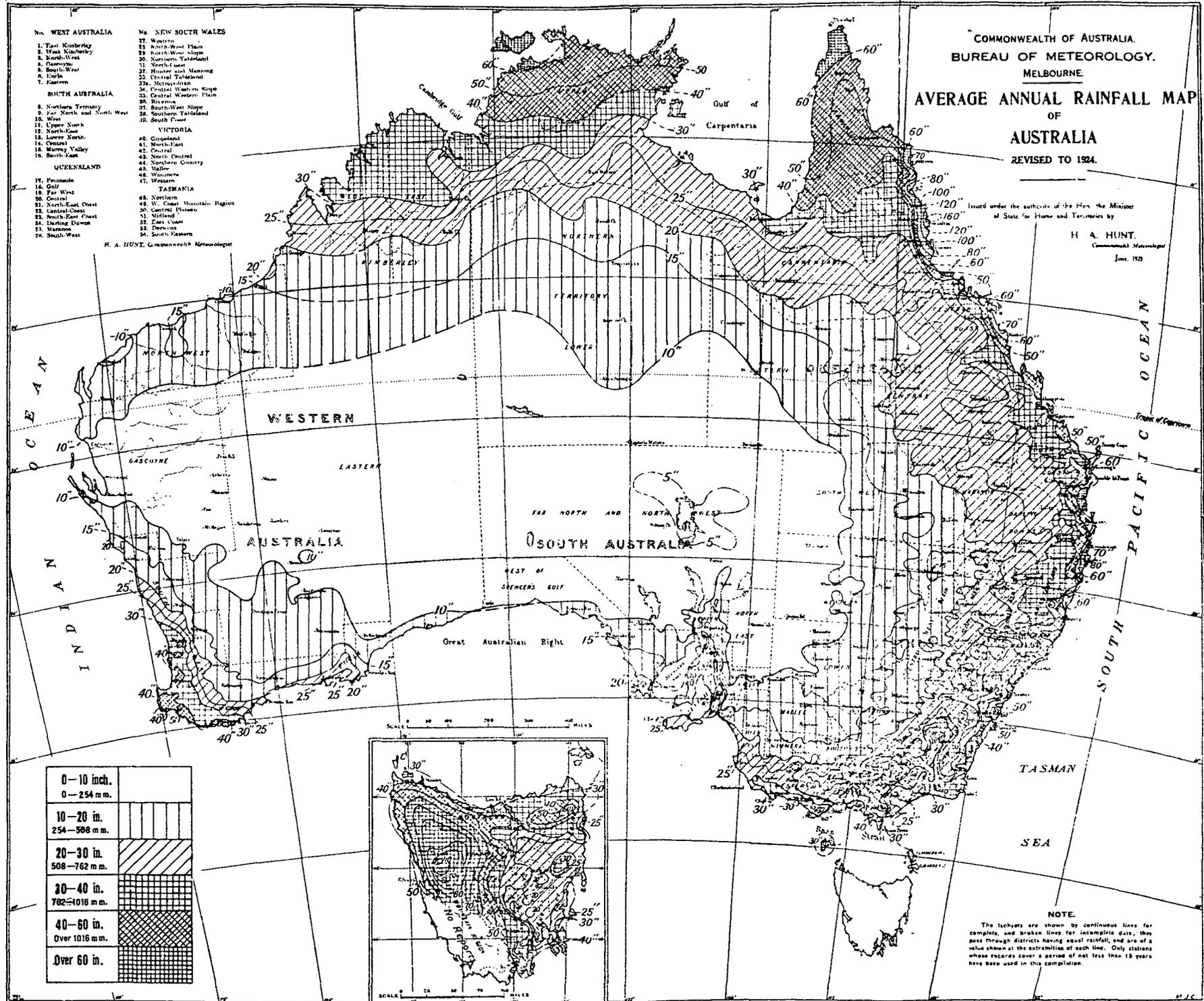
INTERPRETATION.—Taking the Brisbane graph for purposes of illustration, it will be seen that the mean pressure in the middle of January is about 29.87 inches, and there are maxima in the middle of May and August of about 30.99 inches.

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



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





- | | |
|--|---|
| <p>No. WEST AUSTRALIA</p> <ol style="list-style-type: none"> 1. East Kimberley 2. West Kimberley 3. North-West 4. Gascoyne 5. South-West 6. Inland 7. Eastern <p>SOUTH AUSTRALIA</p> <ol style="list-style-type: none"> 8. Northern Territory 9. Far North and North-West 10. West 11. Upper South 12. North-East 13. Lower South 14. Central 15. Murray Valley 16. South-East <p>QUEENSLAND</p> <ol style="list-style-type: none"> 17. Highlands 18. Gulf 19. Far West 20. Central 21. North-East Coast 22. Central Coast 23. South-East Coast 24. Darling Downs 25. Mackay 26. South-West | <p>No. NEW SOUTH WALES</p> <ol style="list-style-type: none"> 27. Western 28. North-West Slope 29. North-East Slope 30. Northern Tableland 31. North Coast 32. Hunter and Manning 33. Central Tableland 34. Metropolitan 35. Finedale Watership 36. Central Western Plain 37. Riverina 38. South-West Slope 39. Southern Tableland 40. South Coast <p>VICTORIA</p> <ol style="list-style-type: none"> 41. Gippsland 42. West Coast 43. Central 44. North Central 45. Northern Country 46. Mallee 47. Wimmera <p>TASMANIA</p> <ol style="list-style-type: none"> 48. Northern 49. W. Coast Mountain Region 50. Central Tassau 51. Midland 52. East Coast 53. Devonian 54. South Eastern |
|--|---|

H. A. HUNT, Commonwealth Meteorologist

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 Home and Territories by
H. A. HUNT,
 Commonwealth Meteorologist
 June, 1925

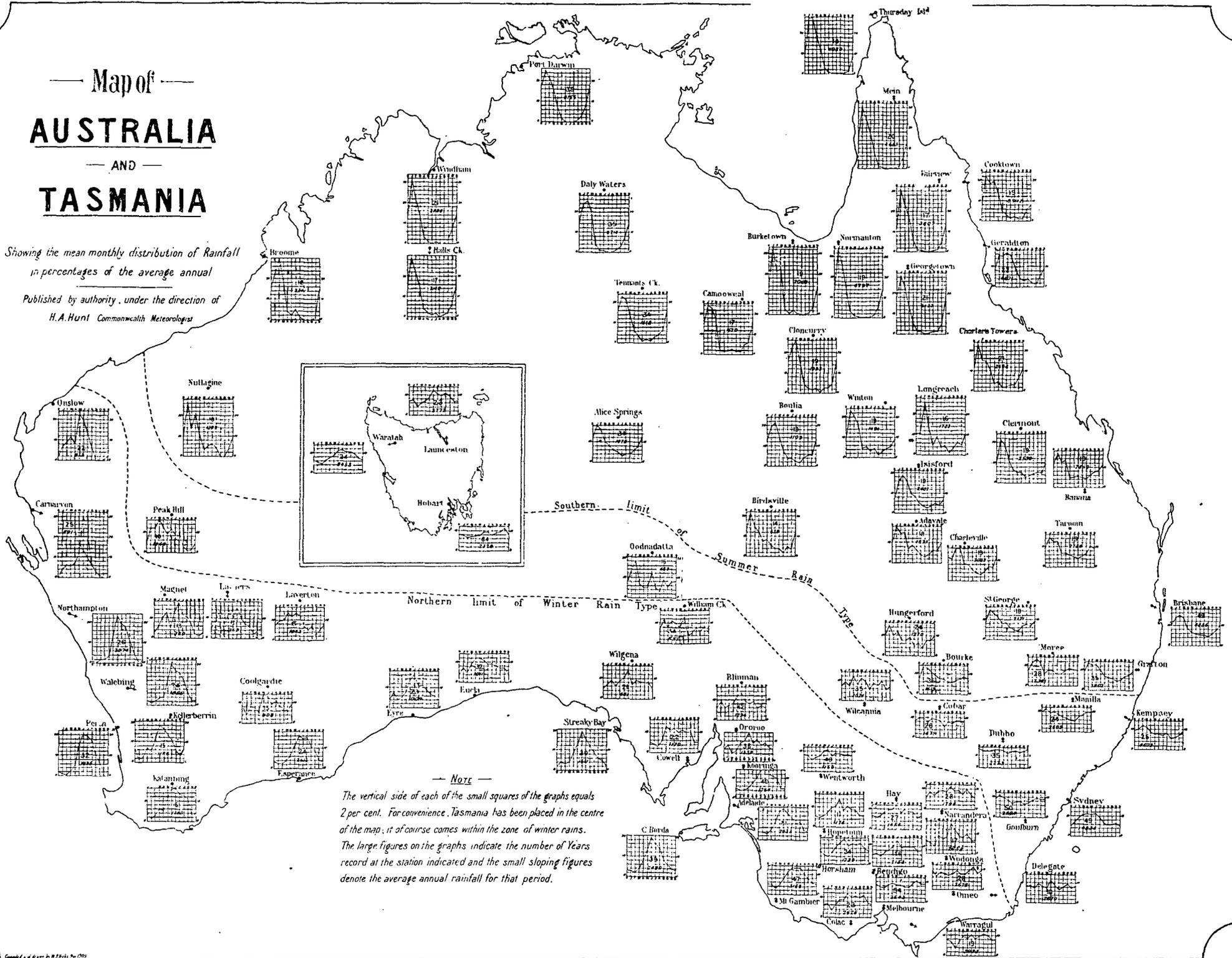
0-10 in.	[White box]
0-254 m.	[White box]
10-20 in.	[Vertical lines]
254-508 m.	[Vertical lines]
20-30 in.	[Diagonal lines /]
508-762 m.	[Diagonal lines /]
30-40 in.	[Cross-hatch]
762-1016 m.	[Cross-hatch]
40-60 in.	[Dense cross-hatch]
Over 1016 m.	[Dense cross-hatch]
Over 60 in.	[Dense cross-hatch]

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 15 years have been used in this compilation.

Map of AUSTRALIA AND TASMANIA

Showing the mean monthly distribution of Rainfall in percentages of the average annual

Published by authority, under the direction of H.A. Hunt Commonwealth Meteorologist



— 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.

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 30° F. Mm. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind.				Mean Amount of Evaporation (Inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m. 3 p.m., & 9 p.m.	No. of Clear Days.
		Greatest Number of Miles in One Day.	Mean Hourly Pressure. (lb.)	Total Miles.	Prevailing Direction.				
No. of yrs. over which observation extends	74	53	53	53	53	61	59	63	49
January ..	29.917	758 19/99	0.34	7,888	S W S W	9.01	2.3	3.5	8.7
February ..	29.951	691 22/96	0.29	6,661	N E S W	7.36	2.1	3.5	7.6
March ..	30.039	628 9/12	0.24	6,616	S E S W	5.88	2.2	3.9	7.2
April ..	30.119	773 10/96	0.22	6,110	N E S W	3.52	1.6	5.0	4.4
May ..	30.123	760 9/80	0.21	6,272	N E S W	2.05	1.6	5.7	2.3
June ..	30.100	750 12/78	0.24	6,496	N E N W	1.25	2.0	6.1	1.6
July ..	30.124	674 25/82	0.24	6,722	N E N W	1.29	1.6	5.8	1.8
August ..	30.097	773 31/97	0.23	7,131	N E S W	1.89	2.2	5.6	2.6
September ..	30.041	720 2/87	0.30	7,259	N N E S W	2.87	2.4	5.2	3.4
October ..	29.994	768 28/93	0.33	7,853	N N E S W	4.78	3.4	5.0	4.1
November ..	29.977	677 2/04	0.33	7,514	S W S W	6.62	3.4	4.6	5.4
December ..	29.919	675 12/91	0.34	7,896	S W S W	8.45	2.6	3.9	7.2
Year { Totals ..	—	—	—	—	—	—	—	—	—
Year { Averages ..	30.033	—	0.28	7,035	N E S W	54.97	27.4	4.8	56.4
Year { Extremes ..	—	773 (a)	—	—	—	—	—	—	—

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

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.).			Extreme Shade Temperature (Fahr.).		Extreme Range.	Extreme Temperature (Fahr.).		Mean Hours of Sunshine.
	Mean Max.	Mean Min.	Mean.	Highest.	Lowest.		Highest in Sun.	Lowest on Grass.	
No. of yrs. over which observation extends	74	74	74	74	74	74	53	70	49
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	311.5
February ..	86.2	62.1	74.1	113.6 12/99	45.5 23/18	68.1	170.5 10/00	35.8 23/26	263.6
March ..	80.8	58.8	69.8	103.0 12/01	44.8 —/57	63.2	174.0 17/83	33.8 27/80	240.0
April ..	73.4	54.6	64.0	98.0 10/66	39.6 15/59	58.4	155.0 1/83	30.2 16/17	181.3
May ..	65.5	50.2	57.9	89.5 4/21	36.9 (a)	52.6	148.2 12/79	25.6 19/28	149.6
June ..	60.0	46.7	53.5	76.0 23/65	32.5 27/76	43.5	138.8 18/79	22.9 12/13	123.4
July ..	59.0	44.7	51.8	74.0 11/06	32.0 24/08	42.0	134.5 26/90	22.1 30/29	138.0
August ..	62.0	45.9	53.9	85.0 31/11	32.3 17/59	52.7	140.0 31/92	22.8 11/29	165.1
September ..	66.3	47.9	57.1	90.7 23/82	32.7 4/58	58.0	160.5 30/82	25.0 25/27	184.7
October ..	72.5	51.5	62.0	102.9 21/22	36.0 —/57	66.9	162.0 30/21	27.8 2/18	223.1
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	264.7
December ..	83.3	59.0	71.1	114.2 14/76	43.0 (b)	71.2	175.7 7/99	32.5 4/84	301.6
Year { Averages ..	72.8	53.2	63.0	—	—	84.3	—	—	2551.6
Year { Extremes ..	—	—	—	116.3 26/1/53	32.0 24/7/08	—	180.0 18/1/82	22.1 30/7/20	(c)

(a) 26/1895 and 24/1904.

(b) 16/1861 and 4/1906.

(c) Total for year.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (Inches).	Rel. Hum. (%)				Rainfall (Inches).				Dew. Mean No. Days Dew.
		Mean 9 a.m.	Mean 9 a.m.	Highest Mean.	Lowest Mean.	Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	
No. of yrs. over which observation extends	63	63	63	63	92	92	92	92	92	59
January ..	0.340	38	59	30	0.71	4	4.00 1850	Nil (a)	2.30 2/89	3.8
February ..	0.356	40	56	30	0.73	4	6.09 1925	Nil (a)	5.57 7/25	5.8
March ..	0.345	46	58	36	1.01	6	4.60 1878	Nil (a)	3.50 5/78	10.6
April ..	0.335	55	72	37	1.71	9	6.78 1853	0.03 1923	3.15 5/60	13.6
May ..	0.316	67	76	49	2.78	14	7.75 1875	0.20 1891	2.75 1/53	15.8
June ..	0.298	76	84	67	3.09	16	8.58 1916	0.42 1836	2.11 1/20	15.3
July ..	0.276	76	87	68	2.65	16	5.38 1865	0.37 1899	1.75 10/65	17.1
August ..	0.283	69	77	54	2.51	16	6.24 1852	0.35 1914	2.23 19/51	16.5
September ..	0.297	61	72	44	2.05	14	5.83 1923	0.45 1896	1.59 20/23	15.5
October ..	0.301	51	67	29	1.74	11	3.83 1870	0.17 1914	2.24 16/08	12.6
November ..	0.307	42	57	31	1.14	7	3.55 1851	0.04 1885	1.88 28/58	6.8
December ..	0.323	39	50	33	1.02	6	3.98 1861	Nil 1904	2.42 23/13	4.5
Year { Totals ..	—	—	—	—	21.09	123	—	—	—	133.1
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. M. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind.				Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds 9 a.m., 3 p.m. & 9 p.m.	No. of Clear Days.
		Greatest Number of Miles in One Day.	Mean Hourly Pressure. (lb.)	Total Miles.	Prevailing Direction. 9 a.m. 3 p.m.				
No. of yrs. over which observation extends	44	18	20	20	44	22	44	43	22
January ..	29.868	361 1/22	0.13	4,904	E	6,718	6.8	6.1	2.5
February ..	29.904	392 28/29	0.14	4,704	S E	5,423	5.6	6.1	2.0
March ..	29.962	485 1/29	0.11	4,544	S S E	4,957	4.6	5.7	4.7
April ..	30.045	400 3/25	0.10	4,186	S & S E	3,936	3.6	4.8	7.9
May ..	30.089	363 7/16	0.09	3,999	S	3,577	3.3	4.6	9.2
June ..	30.072	355 14/28	0.09	4,051	S W	3,557	2.4	4.4	8.6
July ..	30.072	359 2/23	0.09	3,975	S W	3,621	2.7	3.7	12.7
August ..	30.096	331 6/23	0.10	4,212	S W	4,420	3.7	3.7	12.7
September ..	30.042	322 14/23	0.09	4,054	N E & S	4,267	5.8	3.7	12.6
October ..	30.002	325 25/18	0.11	4,531	N E	5,584	6.8	4.4	8.7
November ..	29.958	371 10/23	0.13	4,756	N E	6,340	8.7	4.0	6.4
December ..	29.889	467 15/26	0.14	5,125	N E	7,012	9.3	5.6	3.7
Year { Totals	—	—	—	—	—	—	63.3	—	92.0
Year { Averages	29.999	—	0.11	4,420	S & E	55,949	—	4.8	—
Year { Extremes	—	488 1/3/29	—	—	—	—	—	—	—

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.).			Extreme Shade Temperature (Fahr.).		Extreme Range.	Extreme Temperature (Fahr.).		Mean Hours of Sunshine.
	Mean Max.	Mean Min.	Mean.	Highest.	Lowest.		Highest in Sun.	Lowest on Grass.	
No. of yrs. over which observation extends	44	44	44	44	44	44	41	44	22
January ..	85.4	68.9	77.1	108.9 14/02	58.8 4/93	50.1	166.4 10/17	49.9 4/93	225.7
February ..	84.5	68.6	76.5	105.7 21/25	58.7 (a)	47.0	165.2 6/10	49.3 9/89	262.5
March ..	82.3	66.3	74.3	99.4 5/19	52.4 29/13	47.0	161.7 4/25	45.4 29/13	210.3
April ..	79.0	61.5	70.3	95.2 (b)	44.4 25/25	50.8	153.8 11/16	36.7 24/25	210.4
May ..	73.6	55.3	64.4	90.3 21/23	41.3 24/99	49.0	147.0 1/10	29.8 8/97	204.3
June ..	69.3	51.0	60.2	83.9 19/18	36.3 29/08	52.6	136.0 3/18	25.4 23/88	176.5
July ..	68.5	48.5	58.5	83.4 28/98	36.1 (c)	47.3	146.1 20/15	23.9 11/90	209.6
August ..	71.3	49.9	60.6	88.5 25/28	37.4 6/87	51.1	141.9 (e)	27.1 9/99	236.0
September ..	75.7	54.8	65.2	95.2 16/12	40.7 1/96	54.5	155.5 26/03	30.4 1/89	239.3
October ..	79.7	60.0	69.8	101.4 18/93	43.3 3/99	58.1	157.4 31/18	34.9 8/89	255.1
November ..	82.8	64.2	73.5	106.1 13/13	43.5 2/05	57.6	162.3 7/89	38.3 1/05	248.6
December ..	85.1	67.4	76.3	105.9 26/93	56.4 13/12	49.5	161.7 27/26	49.1 3/94	245.5
Year { Averages	78.1	59.7	68.9	—	—	—	—	—	2663.8
Year { Extremes	—	—	—	108.9 14/1/02	36.1 (d)	72.8	166.4 10/1/17	23.9 11/7/90	(f)

(a) 10 and 11/04. (b) 9/96 and 5/03. (c) 12/94 and 2/96. (d) 12/7/94 and 2/7/96. (e) 20/17 and 28/22. (f) Total for year.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches).	Rel. Hum. (%)			Rainfall (inches).				Dew. Mean No. Days Dew.	
		Mean 9 a.m.	Mean 9 a.m.	Lowest Mean.	Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.		Greatest In One Day.
No. of yrs. over which observation extends	44	44	44	44	79	71	79	79	61	44
January ..	0.660	66	79	53	6.52	14	27.72 1895	0.32 1919	18.31 21/87	7.9
February ..	0.660	69	82	55	6.25	14	40.39 1893	0.68 1849	8.36 16/93	8.0
March ..	0.630	72	85	56	5.71	15	34.04 1870	Nil 1849	11.18 14/08	11.5
April ..	0.527	72	80	60	3.75	12	15.28 1867	0.05 1897	4.97 19/23	13.9
May ..	0.420	73	85	61	2.83	10	13.85 1876	Nil 1846	5.62 9/79	15.0
June ..	0.356	74	84	67	2.84	9	14.03 1873	Nil 1847	6.01 9/93	12.9
July ..	0.323	73	81	61	2.23	8	8.46 1889	Nil 1841	3.54 (c)	14.6
August ..	0.345	69	80	58	2.04	8	14.67 1879	Nil (a)	4.89 12/87	13.1
September ..	0.408	64	76	47	2.00	8	5.43 1886	0.10 1907	2.46 2/94	12.7
October ..	0.476	60	72	49	2.56	9	9.99 1882	0.14 1900	3.75 3/27	11.4
November ..	0.537	60	72	46	3.08	10	12.41 1917	Nil 1842	4.46 16/86	7.7
December ..	0.616	62	70	62	4.86	12	13.99 1910	0.35 1865	6.60 28/71	7.1
Year { Totals	—	—	—	—	45.27	128	—	—	—	135.8
Year { Averages	0.496	68	—	—	—	—	—	—	—	—
Year { Extremes	—	—	85	46	—	—	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.

CLIMATE AND METEOROLOGY OF AUSTRALIA.

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. M. Sea Level and Standard Gravity from hourly readings.	Wind.*		Mean Amount of Evaporation (Inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m. & 9 p.m.	No. of Clear Days.	
		Greatest Number of Miles in One Day.	Mean Hourly Pressure (lbs.).					Total Miles.
No. of yrs. over which observation extends	72	04	04	04	51	71	69	20
January ..	29,897	627	3/93	7,066	5,356	4.8	5.8	5.1
February ..	29,943	697	13/69	6,234	4,206	4.1	5.5	5.4
March ..	30,012	754	20/70	5,888	3,610	3.6	5.0	6.0
April ..	30,072	642	6/82	5,843	2,501	3.3	4.8	7.7
May ..	30,080	682	6/98	5,539	1,890	2.1	4.8	8.0
June ..	30,080	642	13/98	5,850	1,428	2.1	4.4	10.8
July ..	30,071	744	17/79	6,129	1,917	1,529	2.3	4.0
August ..	30,069	649	22/72	5,932	1,917	8.1	3.8	10.8
September ..	30,068	771	6/72	6,133	2,702	3.8	4.3	10.0
October ..	29,987	741	4/72	6,750	3,875	4.7	7.2	7.2
November ..	29,989	583	12/87	6,616	4,620	5.3	5.5	6.1
December ..	29,881	750	3/84	6,981	5,385	5.6	5.6	5.0
Totals	30,000	—	—	6,203	—	39,049	47.0	5.0
Averages	—	—	6/9/74	—	—	—	—	—
Extremes	—	—	—	—	—	—	—	—

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.).		Extreme Shade Temperature (Fahr.).		Extreme Range.	Extreme Temperature (Fahr.).		No. of hours sunshine.	
	Max. Min.	Mean.	Highest.	Lowest.		Highest In Sun.	Lowest on Grass.		
No. of yrs. over which observation extends	72	72	72	72	72	69	72	10†	
January ..	73.4	61.9	108.5	51.2	57.3	89/16	43.7	6/25	
February ..	77.7	71.3	107.8	49.3	68.5	8/26	43.4	29/24	
March ..	75.7	62.9	102.6	48.8	63.8	16/12	33.3	20.4	
April ..	71.3	58.1	91.0	44.6	46.4	10/77	39.9	19.1	
May ..	65.5	52.1	86.0	40.2	42.2	22/59	33.3	24/09	
June ..	61.1	48.3	84.7	38.0	41.8	12/55	28.1	17.1	
July ..	58.7	45.9	79.8	35.9	42.4	5/20	23.1	24/11	
August ..	62.7	47.5	82.0	36.8	45.2	12/90	24.0	4/03	
September ..	67.0	51.4	95.2	40.8	48.4	12/42	30.1	22.0	
October ..	71.3	53.8	98.9	42.2	51.5	14/22	32.7	17/05	
November ..	74.4	59.6	102.7	45.8	62.7	15/19	30.1	22.4	
December ..	77.2	62.9	107.5	48.4	69.1	31/14	32.7	23.0	
Averages	70.2	56.2	108.5	35.9	—	—	—	—	
Extremes	—	—	131/96	12/7/90	72.6	164.5	27/12/88	24.0	4/7/93
								(a)	

HUMIDITY, RAINFALL, AND DEW.

Month.	Rel. Hum. (%)		Rainfall (Inches).		Dew.
	Temp. Pressure Inclusive.	Rel. Hum. Mean.	Rainfall Greatest Monthly.	Rainfall Least Monthly.	
No. of yrs. over which observation extends	72	72	72	72	71
January ..	0.546	67	78	1.4	7.08
February ..	0.564	71	81	15.26	19/22
March ..	0.559	72	85	18.70	18/76
April ..	0.444	76	87	24.49	18/61
May ..	0.387	78	80	23.03	19/19
June ..	0.302	78	80	16.30	18/85
July ..	0.276	76	88	13.21	19/04
August ..	0.201	72	84	14.59	18/90
September ..	0.333	66	77	11.45	18/79
October ..	0.382	63	79	11.14	19/16
November ..	0.444	63	77	9.89	18/65
December ..	0.504	64	77	15.82	19/20
Totals	—	—	—	—	—
Averages	0.405	70	—	—	—
Extremes	—	—	90	47.48	135
			42	—	—
			—	24.49	—
			—	4/1861	—
			—	8/1885	—
			—	—	8.90
			—	—	25/2/73
			—	—	62.7

* Early records revised during 1929. Values for period 1867-September, 1883, reduced 20 per cent.; for period September, 1885-March, 1918, reduced 10 per cent.
 † From 1921 only; previous records discarded owing to a faulty exposure of instrument.

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. M.S. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind.				Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Cloud, 9 a.m. 3 p.m. & 9 p.m.	No. of Clear Days.	
		Greatest Number of Miles in One Day.	Mean Hourly Pressure. (lbs.)	Total Miles.	Prevailing Direction.					
					9 a.m.					3 p.m.
No. of yrs. over which observation extends	46	20	20	20	24	20	23	68	24	
January ..	29.830	500 30/16	0.20	6,000	N N W & N S E	4.874	0.9	6.0	2.6	
February ..	29.920	605 4/27	0.15	4,729	N & N W S E	3.705	1.2	6.0	2.6	
March ..	29.946	443 19/27	0.13	4,911	N & N W S E	3.032	1.3	5.0	2.5	
April ..	29.967	533 27/26	0.14	4,880	N to N W N W & S E	2.035	0.7	6.1	1.6	
May ..	29.989	423 15/27	0.12	4,767	N W to N N to N W	1.417	0.5	6.1	2.2	
June ..	29.959	569 27/20	0.12	4,608	N W & N W N to N W	0.925	0.6	6.1	2.2	
July ..	29.926	489 22/29	0.13	4,863	N N W & N W N to N W	1.957	0.5	5.8	2.2	
August ..	29.922	612 19/26	0.14	5,927	N & N W N & N W	0.304	0.5	6.0	2.1	
September ..	29.846	516 26/15	0.19	5,682	N N W & N N W & S E	2.016	0.6	6.1	1.4	
October ..	29.827	461 8/12	0.20	6,016	N to N W S E & N W	3.093	0.7	6.3	1.2	
November ..	29.804	508 18/15	0.20	5,835	N to N W S E	3.953	0.8	6.4	1.5	
December ..	29.808	486 30/20	0.18	5,716	N S E	4.504	1.0	6.3	1.2	
Year { Totals ..	—	—	—	—	—	31.814	9.5	—	23.8	
Averages ..	29.895	—	0.16	5,253	N to N W S E & N W	—	—	6.1	—	
Extremes ..	—	612 19/8/26	—	—	—	—	—	—	—	

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.).			Extreme Shade Temperature (Fahr.).			Extreme Range.	Extreme Temperature (Fahr.).		Mean Hours of Sunshine.
	Mean Max.	Mean Min.	Mean	Highest.	Lowest.	Highest in Sun.		Lowest on Grass.		
									60	
No. of yrs. over which observation extends	60	60	60	84	84	84	43	63	36	
January ..	71.1	52.9	62.0	105.0 (a)	40.0 3/72	65.0	160.0 (b)	30.6 19/97	217.0	
February ..	71.3	53.4	62.4	104.4 12/99	39.0 20/87	65.4	165.0 24/98	28.3 —/87	181.6	
March ..	68.0	50.8	59.4	99.0 —/61	35.2 31/26	63.8	150.0 3/05	27.5 30/02	178.4	
April ..	62.7	47.7	55.2	90.0 1/56	30.0 25/56	60.0	142.0 18/93	25.0 —/86	140.5	
May ..	57.3	43.7	50.5	77.8 5/21	29.2 20/02	48.6	128.0 (c)	20.0 19/02	132.4	
June ..	52.8	41.0	46.9	75.0 7/74	28.0 22/79	47.0	122.0 12/94	21.0 6/87	106.0	
July ..	52.0	39.5	45.8	72.0 22/77	27.0 18/66	45.0	121.0 12/93	18.7 16/86	124.3	
August ..	55.0	41.0	48.0	77.0 3/76	30.0 10/73	47.0	129.0 —/87	20.1 7/09	146.7	
September ..	58.7	43.2	51.0	81.7 23/26	30.0 12/41	51.7	138.0 23/93	18.3 16/26	149.2	
October ..	62.7	45.5	54.1	92.0 24/14	32.0 12/89	60.0	156.0 9/93	23.8 (d)	172.5	
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	202.5	
December ..	69.2	51.2	60.2	105.2 30/97	38.0 13/06	67.2	157.0 30/18	27.2 —/86	201.4	
Year { Averages ..	62.2	40.5	54.4	—	—	—	—	—	1952.5	
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.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches)	Rel. Hum. (%)				Rainfall (inches).				Dew. Mean No. Days 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.
No. of yrs. over which observation extends	44	44	44	44	88	87	88	87	64	21	
January ..	0.333	58	72	47	1.87 10	—	5.91 1893	0.03 1841	2.96 30/16	0.6	
February ..	0.356	63	77	53	1.47 9	—	9.15 1854	0.07 1847	4.50 27/544	1.6	
March ..	0.332	67	77	58	1.67 10	—	7.60 1854	0.02 1843	2.79 5/19	4.3	
April ..	0.301	73	84	58	1.91 11	—	6.50 1900	0.07 1904	5.02 20/09	9.5	
May ..	0.269	78	89	65	1.89 13	—	6.37 1905	0.10 1843	3.22 14/58	12.8	
June ..	0.241	80	91	68	2.22 14	—	8.15 1889	0.22 1852	4.11 13/89	8.8	
July ..	0.230	80	94	72	2.17 15	—	6.02 1922	0.30 1850	2.51 18/22	8.7	
August ..	0.238	75	92	64	1.62 14	—	10.16 1858	0.23 1854	4.35 12/58	8.8	
September ..	0.256	68	85	60	2.10 15	—	7.14 1844	0.39 1847	2.79 18/44	4.8	
October ..	0.273	64	73	51	2.27 15	—	6.67 1906	0.26 1850	2.58 4/06	2.5	
November ..	0.262	59	72	50	2.47 14	—	8.94 1849	0.16 1863	3.97 7/49	1.1	
December ..	0.315	57	67	45	2.02 12	—	9.00 1875	0.11 1842	2.82 21/29	0.8	
Year { Totals ..	—	—	—	—	23.88	152	—	—	—	65.1	
Averages ..	0.281	67	—	—	—	—	—	—	—	—	
Extremes ..	—	—	94	45	—	—	10.16 8/1858	0.02 3/1843	5.02 20/4/09	—	

(a) 4.18 on 23/64 also.