

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 1933 was 23° 26' 52.57"), 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 nearly as great as that of the United States of America, that it is four-fifths of that of Canada, that it is nearly 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.
	Sq. miles.		Sq. miles.
Continental Divisions—		AFRICA—continued.	
Europe	3,858,307	Belgian Congo	918,000
Asia	16,045,830	Algeria	847,500
Africa	11,583,442	Angola	486,079
North and Central America and West Indies ..	8,554,273	Union of South Africa ..	472,347
South America	7,155,018	Egypt	383,000
Australasia and Polynesia	3,467,076	Tanganyika Territory ..	374,000
		Nigeria and Protectorate..	372,674
		Abyssinia	350,000
Total, exclusive of Arctic and Antarctic Conts...	51,263,946	Tripolitania	347,500
		South-west Africa	322,768
		Portuguese East Africa ..	297,657
		Northern Rhodesia	287,950
Europe—		Cyrenaica	285,000
Russia	1,769,282	Bechuanaland Protectorate	275,000
France	212,659	Madagascar	241,094
Spain (inc. possessions) ..	196,607	Kenya Colony and Protec- torate	224,960
Germany	181,723		
Sweden	173,356	North and Central America—	
Poland	149,960	Canada	3,690,043
Finland	132,589	United States of America..	3,026,789
Norway	124,588	Mexico	767,198
Rumania	122,282	Alaska	586,400
Italy	119,713	Newfoundland and Labra- dor	162,734
Yugoslavia	96,012	Nicaragua	51,660
Great Britain and Northern Ireland	94,633		
		South America—	
Asia—		Brazil	3,275,510
Russia	6,475,318	Argentine Republic	1,079,965
China and Dependencies ..	4,278,352	Peru	532,047
British India and Adminis- tered Territories ..	1,318,346	Bolivia	514,155
Arabia and Autonomous States	1,000,000	Colombia (exc. of Panama)	447,536
Persia	628,000	Venezuela	393,874
Dutch East Indies	572,604	Chile	285,133
Feudatory Indian States ..	490,333	Ecuador	275,936
Turkey	285,334		
Japan and Dependencies ..	260,644	Australasia and Polynesia—	
Afghanistan	245,000	Commonwealth of Australia	2,974,581
Siam	200,234	Dutch New Guinea	160,692
		New Zealand and Depen- dencies	103,862
Africa—		Territory of New Guinea ..	93,000
French West Africa	1,779,039	Papua	90,540
Anglo-Egyptian Sudan ..	1,008,100		
French Equatorial Africa	912,049	British Empire	13,391,538

The figures quoted in the table have, in most cases, been extracted from the Statesman's Year Book for 1933.

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 8.4°, 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 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, Brisbane, Sydney, Perth, Melbourne, Adelaide, Canberra, Hobart and Alice Springs, while the relative humidity diminishes in the order, Sydney, Canberra, Darwin, Brisbane, Melbourne, Adelaide, Hobart, Perth 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 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 47 years.

Harvey Creek, in the shorter period of 27 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 was established fourteen 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 146.75 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 :—

AVEARGE ANNUAL RAINFALL DISTRIBUTION.

Average Annual Rainfall.	N.S.W. (a)	Victoria.	Queens- land.	South Australia	Northern Territory.	Western Australia.	Tas- mania. (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 47.66 inches, occupies the chief place; Brisbane, Perth, Melbourne, Hobart, Canberra, and Adelaide following in that order, Adelaide with 21.15 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 1933.* 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	5.03	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	103	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	36.24	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
Average	22.28	92	34.82	121	21.15	123	45.17	128	47.66	152	26.08	139	23.98	152
No. of Years	19	19	58	58	95	95	84	74	94	94	90	78	91	90

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 53, 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.

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

(b) *Ten Years' Means*, 1908 to 1928. The mean rainfall for the decennia ended 1908, 1918 and 1928, respectively, are 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 63 and No. 22, pp. 46 to 48 :—

HEAVY RAINFALLS—NEW SOUTH WALES, UP TO 1933, 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 1933, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Babinda (Cairns) ..	1 Feb., 1913	20.51	Mackay ..	21 Jan., 1918a	24.70
" " ..	24 Jan., 1916	22.30	Maenade Mill ..	6 " , 1901	23.33
Buderim Mountain	11 " , 1898	26.20	" " ..	4 Mar., 1915	22.00
Cairns ..	2 Apr., 1911	20.16	Mooloolah ..	13 " , 1892	21.53
Carbrook ..	23 Jan., 1918	22.66	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			" " ..	2 " , " ,	20.00
(Blackall Range)	2 Feb., 1893	35.71	Nambour ..	9 Jan., 1898	21.00
Deeral ..	9 Nov., 1933	20.97	Plane Creek		
Dunegness ..	16 Mar., 1893	22.17	(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			Tully ..	12 Feb., 1927	23.86
Geraldton) ..	29 Dec., 1903	21.22	" " ..	19 Jan., 1932	27.20
" " ..	7 Apr., 1912	20.50	Woodlands (Yepp'n)	31 Jan., 1893	23.07
" " ..	31 Jan., 1913	20.91	Yandina ..	1 Feb., 1893	20.08
Kamerunga (Cairns)	2 Apr., 1911	21.00	Yarrabah ..	2 Apr., 1911	30.65
Koumala ..	23 Jan., 1918	22.31	" " ..	24 Jan., 1916	27.20
" " ..	24 " , " ,	20.65	Yeppoon ..	31 " , 1893	20.05
Kuranda (Cairns) ..	1 Apr., 1911	24.30	" " ..	8 Oct., 1914	21.70
" " ..	2 Apr., 1911	28.80			

(a) 37½ hours.

HEAVY RAINFALLS—WESTERN AUSTRALIA, UP TO 1933, 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	Thangoc ..	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 1933, 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 1933, INCLUSIVE.

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

HEAVY RAINFALLS—VICTORIA, UP TO 1933, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Apollo Bay ..	28 Mar., 1932	11.08	Murrungowar ..	10 July, 1932	14.65
Balook ..	27 Sept., 1916	7.23	" ..	24 June, 1933	13.91
Blackwarry ..	12 May, 1925	7.65	Omeo Valley ..	22 Mar., 1926	7.90
Bruthen ..	28 Jan., 1920	7.00	Raymond ..	19 Nov., 1933	7.03
Buchan ..	17 July, 1925	8.45	Reedy Flat ..	28 Jan., 1920	7.08
Cann River ..	27 Feb., 1919	9.56	Sarsfield ..	13 July, 1925	7.05
Hotham Heights ..	8 Jan., 1926	8.40	Shoreham ..	1 Dec., 1933	7.04
Mallacoota ..	14 Mar., 1911	7.95	Tambo Crossing ..	13 July, 1923	8.89
Mt. Buffalo ..	6 June, 1917	8.53	" ..	29 Jan., 1920	7.80
" ..	5 Apr., 1929	7.47	Tonghi Creek ..	27 Feb., 1919	9.90
Murrungowar ..	7 Sept., 1908	8.81	Wroxham ..	27 Aug., 1919	7.65

HEAVY RAINFALLS—TASMANIA, UP TO 1933, 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

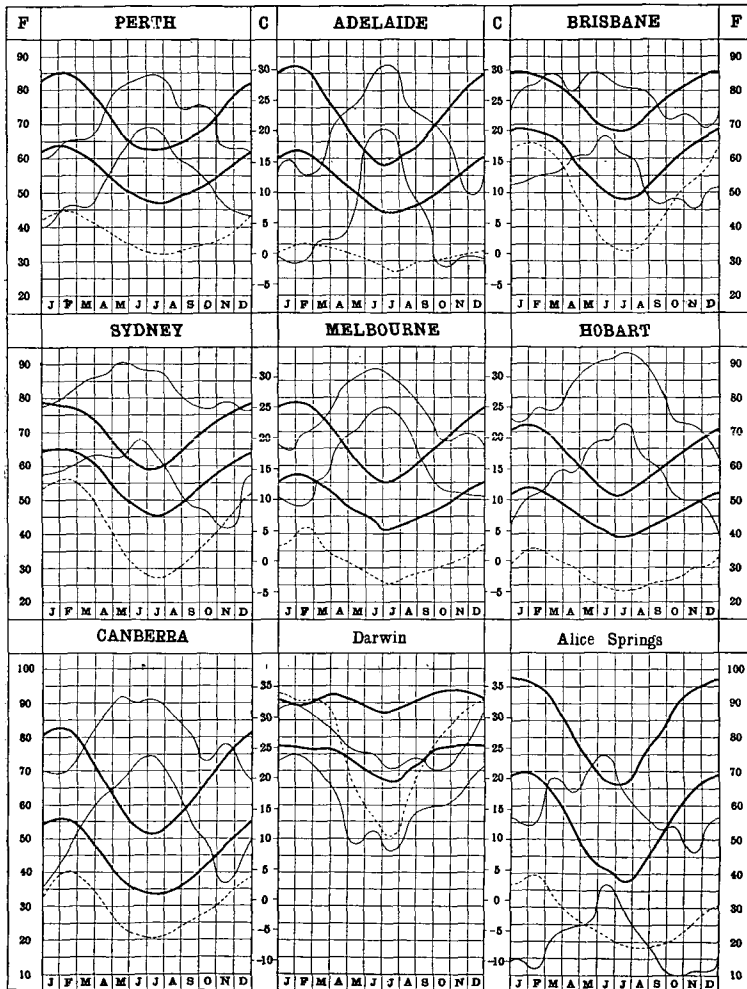
HEAVY RAINFALLS—FEDERAL CAPITAL TERRITORY, UP TO 1933, INCLUSIVE.

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.

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.

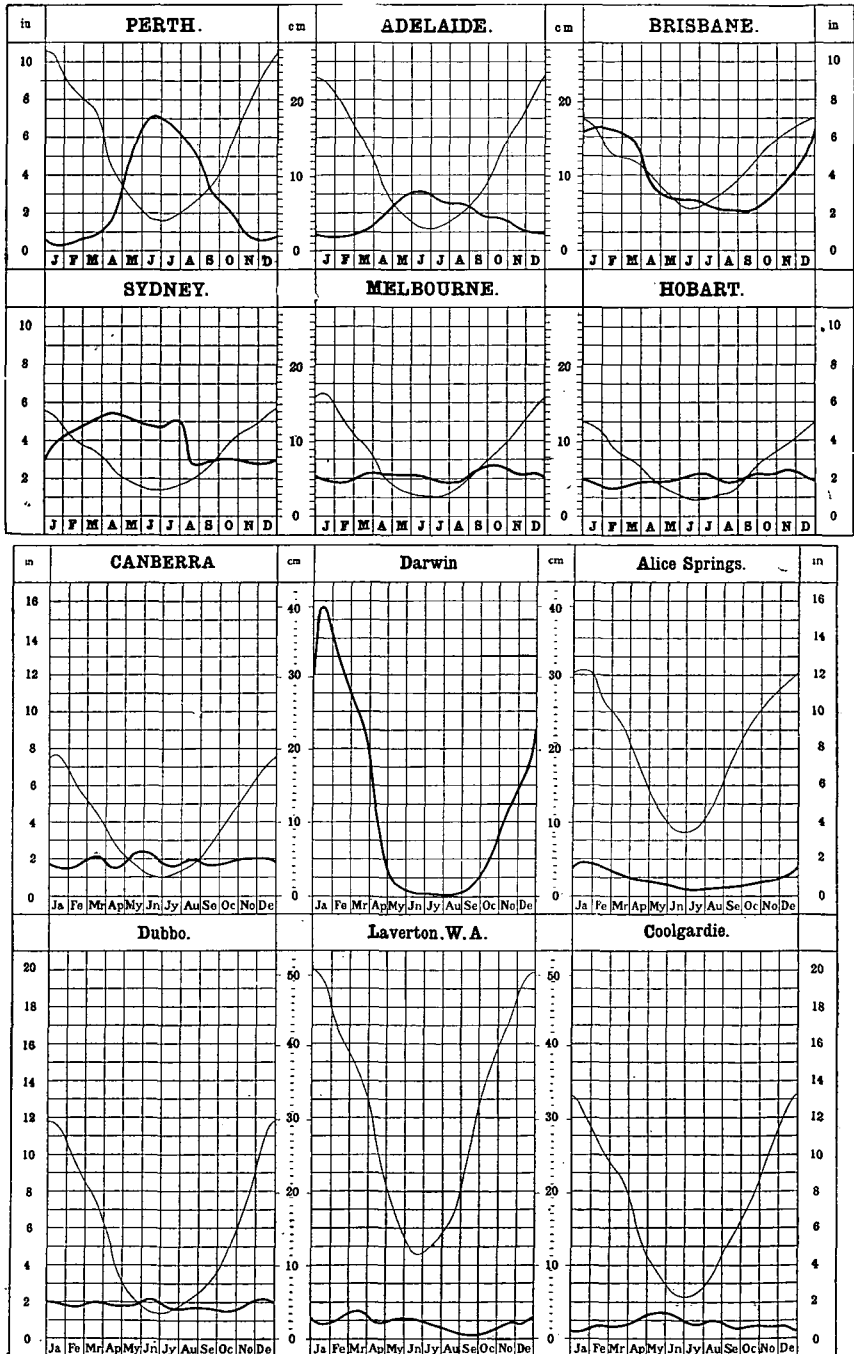
The upper and lower line lines join the greatest and the least monthly means of relative humidity respectively, the figures under the outer columns "F" indicating percentage values.

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 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.

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.

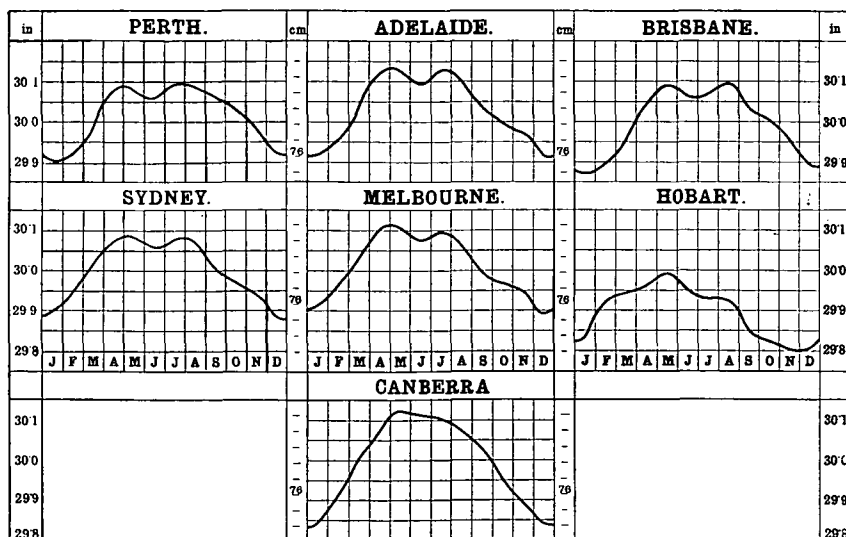
The distance for any date from the zero line to the curve represents the average number of inches, reckoned as per month, of rainfall at that date. Thus, taking the curves for Adelaide in the middle of January, the rain falls on the average at the rate of about three-fourths of an inch per month or, 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 $11\frac{1}{2}$ inches per month about the middle of January, and only about $1\frac{1}{2}$ 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.	Evapora- tion.	Place.	Rainfall.	Evapora- tion.
	In.	In.		In.	In.
Perth ..	34.82	66.23	Canberra ..	22.28	46.40
Adelaide ..	21.15	55.02	Darwin ..	60.16	—
Brisbane ..	45.17	55.96	Alice Springs ..	10.68	96.20
Sydney ..	47.66	39.20	Dubbo ..	22.04	66.37
Melbourne ..	26.08	39.11	Laverton, W.A.	9.58	145.52
Hobart ..	23.98	31.24	Coolgardie ..	10.17	84.99

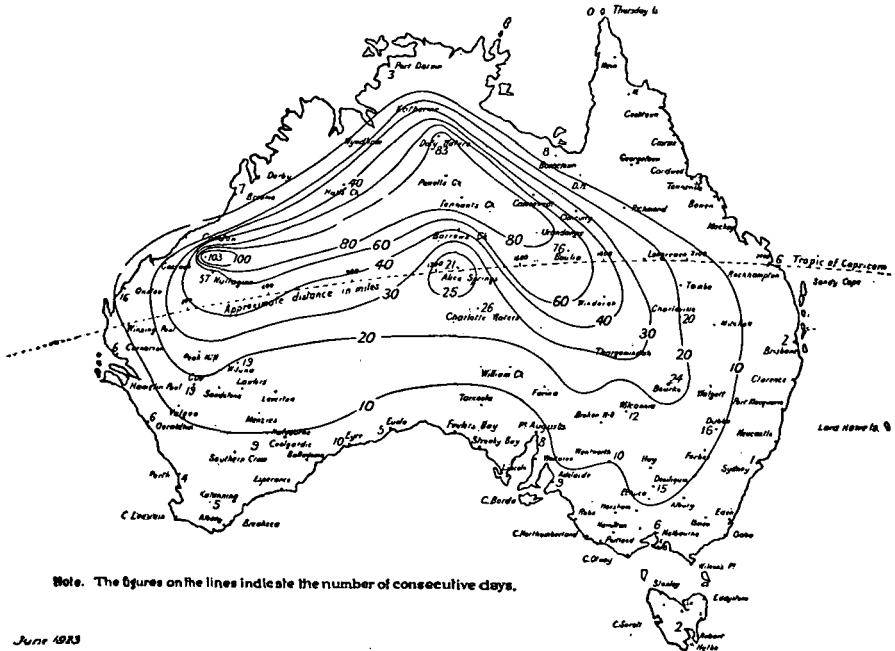
MEAN BAROMETRIC PRESSURE.—CAPITAL CITIES



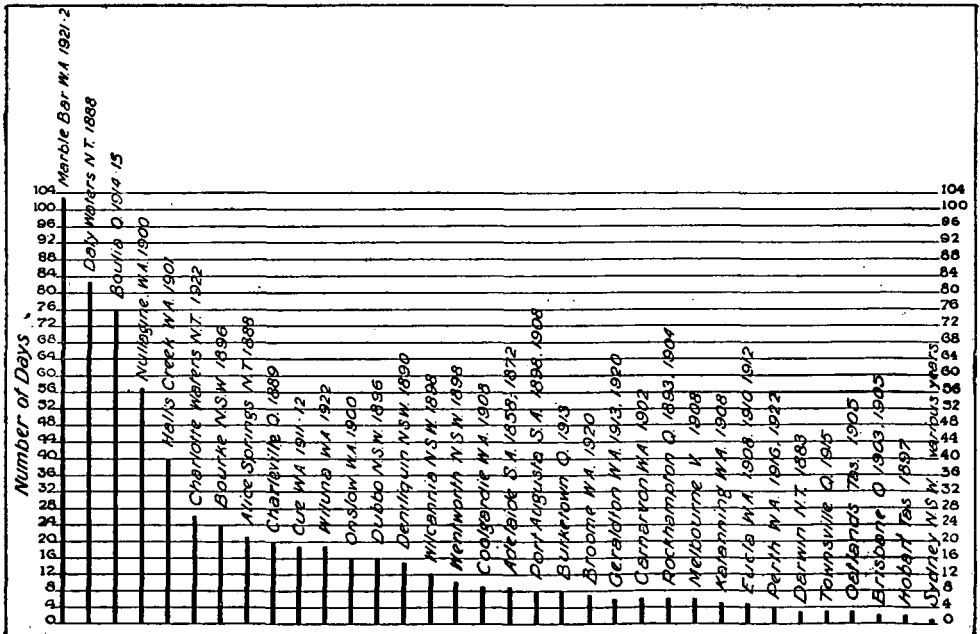
EXPLANATION.—The lines representing the yearly fluctuations of barometric pressure at the State capital cities are means for long periods, and are plotted from the Climatological Tables herein. The pressures are shown in inches on about $2\frac{1}{2}$ times the natural scale, and the corresponding pressures 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.



REFERENCE TO DISTRICTS

WESTERN AUSTRALIA	QUEENSLAND	NEW SOUTH WALES
10 Perth	30 Queensland	40 Newcastle
20 North Kimberley	31 Central Highlands	50 Murrumbidgee
30 East Kimberley	32 Central Coast/Land	70 Northern Portland
40 Pilbara	33 Darling Downs	80 N. Slopes
50 Dry	34 Lower Waters	90 Northern Table
60 F. Coast	35 Darling Downs	100 Riverina
70 West Tasmanian	36 Murrumbidgee	110 Riverina
80 Central Coast	37 Upper Darling Downs	120 Riverina
90 North Coast	38 Darling Downs	
	39 Darling Downs	
SOUTHERN AUSTRALIA	40 Darling	VICTORIA
10 Adelaide	41 Far South Coast	20 Melbourne North
20 Adelaide		30 Melbourne North
30 South Coast	NEW SOUTH WALES	40 Wimmera North
	41 Far South Coast	50 Wimmera North
NORTHERN TERRITORY	42 Far South Coast	60 Lat. to North
10 Darwin	43 Far South Coast	70 Lat. to North
20 Northern Plains	44 Far South Coast	80 Lat. to North
	45 Far South Coast	90 Lat. to North
SOUTH AUSTRALIA	46 Far South Coast	100 Lat. to North
10 Adelaide	47 Far South Coast	110 Lat. to North
20 Adelaide	48 Far South Coast	120 Lat. to North
30 Adelaide	49 Far South Coast	130 Lat. to North
40 Adelaide	50 Far South Coast	140 Lat. to North
50 Adelaide	51 Far South Coast	150 Lat. to North
60 Adelaide	52 Far South Coast	160 Lat. to North
70 Adelaide	53 Far South Coast	170 Lat. to North
80 Adelaide	54 Far South Coast	180 Lat. to North
90 Adelaide	55 Far South Coast	190 Lat. to North
	56 Far South Coast	200 Lat. to North
	57 Far South Coast	210 Lat. to North
	58 Far South Coast	220 Lat. to North
	59 Far South Coast	230 Lat. to North
	60 Far South Coast	240 Lat. to North
	61 Far South Coast	250 Lat. to North
	62 Far South Coast	260 Lat. to North
	63 Far South Coast	270 Lat. to North
	64 Far South Coast	280 Lat. to North
	65 Far South Coast	290 Lat. to North
	66 Far South Coast	300 Lat. to North
	67 Far South Coast	310 Lat. to North
	68 Far South Coast	320 Lat. to North
	69 Far South Coast	330 Lat. to North
	70 Far South Coast	340 Lat. to North
	71 Far South Coast	350 Lat. to North
	72 Far South Coast	360 Lat. to North
	73 Far South Coast	370 Lat. to North
	74 Far South Coast	380 Lat. to North
	75 Far South Coast	390 Lat. to North
	76 Far South Coast	400 Lat. to North
	77 Far South Coast	410 Lat. to North
	78 Far South Coast	420 Lat. to North
	79 Far South Coast	430 Lat. to North
	80 Far South Coast	440 Lat. to North
	81 Far South Coast	450 Lat. to North
	82 Far South Coast	460 Lat. to North
	83 Far South Coast	470 Lat. to North
	84 Far South Coast	480 Lat. to North
	85 Far South Coast	490 Lat. to North
	86 Far South Coast	500 Lat. to North
	87 Far South Coast	510 Lat. to North
	88 Far South Coast	520 Lat. to North
	89 Far South Coast	530 Lat. to North
	90 Far South Coast	540 Lat. to North
	91 Far South Coast	550 Lat. to North
	92 Far South Coast	560 Lat. to North
	93 Far South Coast	570 Lat. to North
	94 Far South Coast	580 Lat. to North
	95 Far South Coast	590 Lat. to North
	96 Far South Coast	600 Lat. to North
	97 Far South Coast	610 Lat. to North
	98 Far South Coast	620 Lat. to North
	99 Far South Coast	630 Lat. to North
	100 Far South Coast	640 Lat. to North
	101 Far South Coast	650 Lat. to North
	102 Far South Coast	660 Lat. to North
	103 Far South Coast	670 Lat. to North
	104 Far South Coast	680 Lat. to North
	105 Far South Coast	690 Lat. to North
	106 Far South Coast	700 Lat. to North
	107 Far South Coast	710 Lat. to North
	108 Far South Coast	720 Lat. to North
	109 Far South Coast	730 Lat. to North
	110 Far South Coast	740 Lat. to North
	111 Far South Coast	750 Lat. to North
	112 Far South Coast	760 Lat. to North
	113 Far South Coast	770 Lat. to North
	114 Far South Coast	780 Lat. to North
	115 Far South Coast	790 Lat. to North
	116 Far South Coast	800 Lat. to North
	117 Far South Coast	810 Lat. to North
	118 Far South Coast	820 Lat. to North
	119 Far South Coast	830 Lat. to North
	120 Far South Coast	840 Lat. to North
	121 Far South Coast	850 Lat. to North
	122 Far South Coast	860 Lat. to North
	123 Far South Coast	870 Lat. to North
	124 Far South Coast	880 Lat. to North
	125 Far South Coast	890 Lat. to North
	126 Far South Coast	900 Lat. to North
	127 Far South Coast	910 Lat. to North
	128 Far South Coast	920 Lat. to North
	129 Far South Coast	930 Lat. to North
	130 Far South Coast	940 Lat. to North
	131 Far South Coast	950 Lat. to North
	132 Far South Coast	960 Lat. to North
	133 Far South Coast	970 Lat. to North
	134 Far South Coast	980 Lat. to North
	135 Far South Coast	990 Lat. to North
	136 Far South Coast	1000 Lat. to North
	137 Far South Coast	1010 Lat. to North
	138 Far South Coast	1020 Lat. to North
	139 Far South Coast	1030 Lat. to North
	140 Far South Coast	1040 Lat. to North
	141 Far South Coast	1050 Lat. to North
	142 Far South Coast	1060 Lat. to North
	143 Far South Coast	1070 Lat. to North
	144 Far South Coast	1080 Lat. to North
	145 Far South Coast	1090 Lat. to North
	146 Far South Coast	1100 Lat. to North
	147 Far South Coast	1110 Lat. to North
	148 Far South Coast	1120 Lat. to

COMMONWEALTH OF AUSTRALIA.
BUREAU OF METEOROLOGY.
MELBOURNE.

AVERAGE ANNUAL RAINFALL MAP
OF

AUSTRALIA

REVISÉD 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.

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 25 years have been used in this compilation.

COMMONWEALTH OF AUSTRALIA.
BUREAU OF METEOROLOGY.
MELBOURNE.

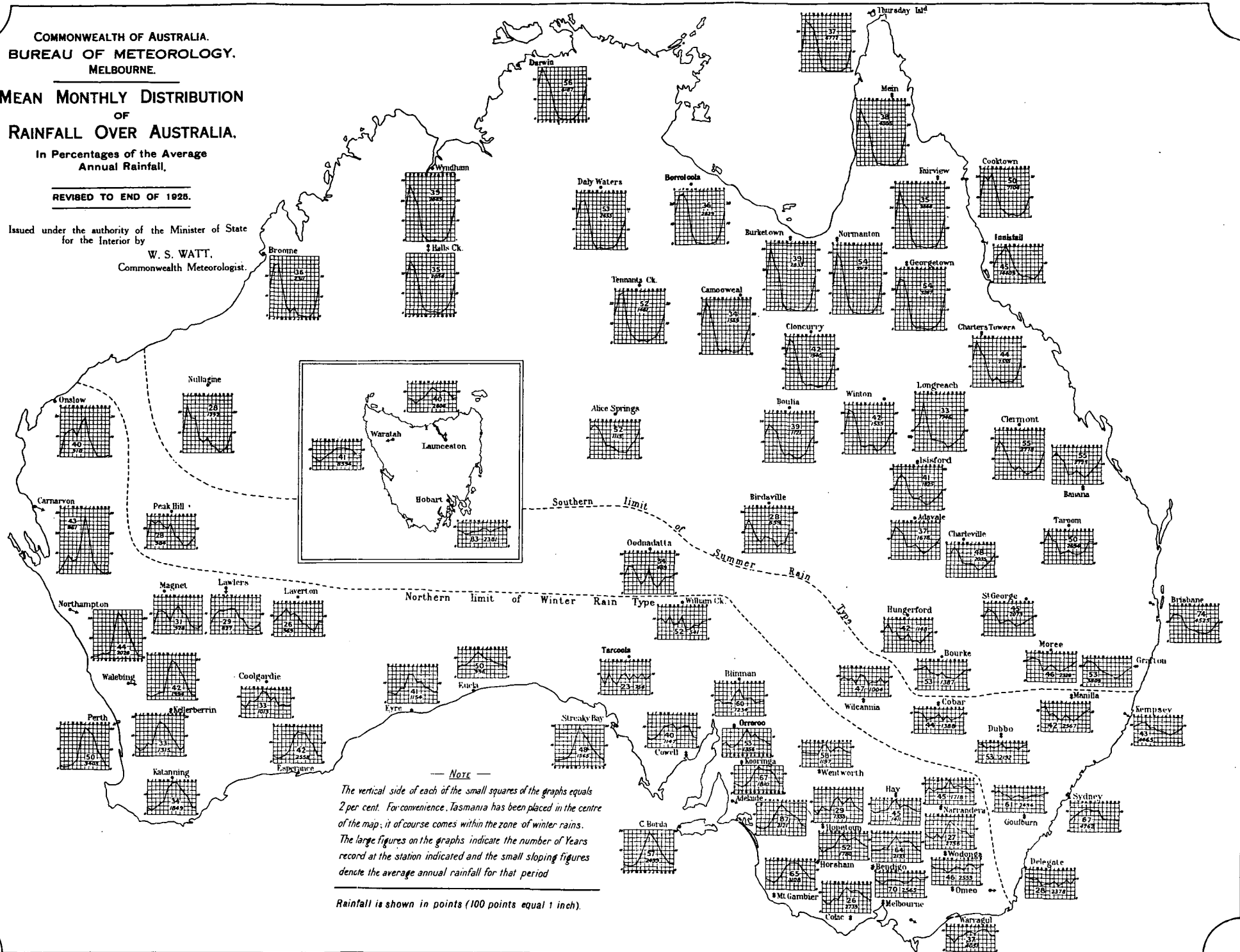
MEAN MONTHLY DISTRIBUTION
OF
RAINFALL OVER AUSTRALIA.

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.



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 30.11 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 recurring 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 TEMPERATURES—VARIOUS CITIES.

Place.	Height above M.S.L. Ft.	Annual Rainfall.			Temperature.					
		Average.	Highest.	Lowest.	(a) Mean Summer.	(b) Mean Winter.	Highest on Record.	Lowest on Record.	Average Hottest Month.	Average Coldest Month.
		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	100.9	-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	40.85	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	57.59	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
Vladivostok (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.

				(a)	(b)					
Canberra ..	1,837	22.28	33.71	16.31	68.0	43.8	104.2	14.0	68.8	42.7

STATE CAPITALS.

				(a)	(b)					
Perth ..	197	34.82	49.22	20.21	73.0	56.0	112.2	34.2	74.0	55.3
Adelaide ..	140	21.15	30.87	11.39	72.9	53.1	116.3	32.0	74.0	51.8
Brisbane ..	137	45.34	88.26	16.17	76.7	59.8	108.9	36.1	77.3	58.6
Sydney ..	138	47.30	82.76	21.49	71.0	54.3	108.5	35.7	71.6	52.9
Melbourne ..	115	25.36	38.04	15.61	66.6	50.0	111.2	27.0	67.6	48.7
Hobart ..	177	23.98	43.39	13.43	61.5	46.9	105.2	27.0	62.3	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 1933. 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. 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., and 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.	16	(a) 5	5	5	17	17	12	6	15	8
January ..	29.834	358 23/33	0.13	4,806	S E	W	7.75	3	3.8	11
February ..	29.898	366 24/33	0.08	3,695	E S E	W	6.09	4	4.2	9
March ..	29.996	351 22/31	0.07	3,486	S E	E	4.59	5	4.4	9
April ..	30.070	326 29/29	0.07	3,257	S E	W & N W	2.73	2	4.5	7
May ..	30.128	302 3/30	0.05	3,024	E	N	1.75	1	5.0	8
June ..	30.112	386 2/30	0.08	3,485	N	N	1.03	1	5.3	6
July ..	30.102	562 7/31	0.06	3,404	N W	W	1.18	1	5.2	7
August ..	30.083	325 12/31	0.07	3,585	N	N W	1.68	1	4.9	8
September ..	30.035	416 10/30	0.11	4,265	S E	N	2.80	2	4.2	10
October ..	29.948	253 30/30	0.09	3,971	W	N W	4.20	2	4.5	8
November ..	29.902	402 14/30	0.09	3,998	W	N W	5.69	4	4.5	8
December ..	29.844	380 6/29	0.10	4,367	E	W	6.92	7	4.7	6
Year {	Totals ..	—	—	—	—	—	46.41	33	—	97
	Averages ..	29.996	—	0.08	3,779	S E	W	—	4.6	—
	Extremes ..	—	562 7/7/31	—	—	—	—	—	—	—

(a) Earlier records discarded.

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.	17	17	17	17	17	17	(a)	15	10
January ..	82.3	55.1	68.7	104.2 28/32	38.8 25/28	65.4	—	33.2 17/33	235.9
February ..	82.5	55.1	68.8	102.6 16/19	33.0 21/33	69.6	—	26.8 21/33	198.6
March ..	76.0	51.2	63.6	97.0 18/27	32.2 22/20	64.8	—	25.5 24/17	215.4
April ..	66.9	44.0	55.4	83.0 1/25	26.5 29/17	56.5	—	17.5 29/17	197.3
May ..	59.0	37.8	48.4	74.7 9/19	19.0 30/24	55.7	—	12.0 28/20	150.7
June ..	53.4	34.7	44.0	66.2 5/17	18.2 (d)	48.0	—	12.1 15/29	127.6
July ..	51.8	33.5	42.7	65.0 8/19	14.0 19/24	51.0	—	10.0 19/24	142.5
August ..	55.3	34.4	44.8	73.0 (b)	18.0 5/19	55.0	—	11.8 5/10	173.7
September ..	61.2	38.4	49.8	83.2 27/19	25.0 1/18	58.2	—	18.5 25/27	198.4
October ..	67.7	42.9	55.3	93.8 31/19	27.0 2/18	66.8	—	20.0 (e)	230.2
November ..	74.7	48.2	61.4	96.6 1/19	28.1 24/15	68.5	—	25.8 2/18	223.4
December ..	79.6	53.2	66.4	98.0 (c)	32.0 3/24	66.0	—	31.0 (f)	238.9
Year { Averages ..	67.5	44.0	55.8	—	—	—	—	—	(g) 2,332.6
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 and 15 and 16/1931.

(g) Yearly total.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches).	Rel. Hum. (%).			Rainfall (inches).					Dew	
		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
No. of yrs. over which observation extends.	15	15	15	15	19	19	19	19	19	1	
January ..	0.364	54	69	39	1.40	6	4.30 1927	0.07 1910-1932	2.92 6/27	0	
February ..	0.390	59	70	47	1.48	6	3.73 1924	0.00 1933	2.75 23/16	0	
March ..	0.374	67	79	56	2.25	7	5.81 1914	0.21 1924	1.86 7/20	1	
April ..	0.312	75	86	63	1.54	6	2.87 1916	0.20 1925	1.94 8/21	2	
May ..	0.245	81	92	67	2.22	8	13.37 1925	0.20 1912	6.84 27/25	7	
June ..	0.218	84	93	73	2.12	8	5.86 1931	0.45 1927	3.95 22/25	12	
July ..	0.206	84	91	74	1.80	9	3.77 1912	0.25 1913	2.40 13/33	7	
August ..	0.218	80	87	67	1.93	9	3.23 1929	0.01 1914	1.90 18/25	5	
September ..	0.251	72	81	55	1.69	8	5.26 1915	0.36 1928	2.18 20/15	5	
October ..	0.280	63	73	48	1.84	9	4.59 1917	0.64 1914	1.50 7/30	14	
November ..	0.327	58	78	37	1.97	8	6.95 1924	0.09 1918	2.38 5/23	16	
December ..	0.369	57	70	45	2.04	8	4.49 1919	0.11 1925	2.10 28/29	0	
Year {	Totals ..	—	—	—	22.28	92	—	—	—	69	
	Averages ..	0.296	70	—	—	—	—	—	—	—	
	Extremes ..	—	—	93	37	—	—	13.37 5/25	0.00 2/1911	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. 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 Clouds, 9 a.m. to 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.	49	36	36	36	36 36	35	36	26	37
January ..	29.908	797 27/98	0.66	11,071	ESE ESE	10.45	1.6	2.8	14.5
February ..	29.926	650 6/08	0.60	9,600	ESE ESE	8.59	1.4	3.1	12.1
March ..	29.986	651 6/13	0.52	9,830	ESE ESE	7.61	1.3	3.5	12.2
April ..	30.069	955 25/00	0.38	8,158	ESE ESE	4.74	1.4	4.4	8.3
May ..	30.068	825 29/32	0.35	8,119	NNE W	2.75	2.3	5.5	5.5
June ..	30.056	914 19/27	0.36	7,966	NNE W	1.77	2.3	5.9	3.8
July ..	30.087	1,015 20/26	0.39	8,569	NNE W	1.76	2.3	5.7	5.0
August ..	30.087	966 15/03	0.41	8,723	NNE W	2.35	1.5	5.6	5.4
September ..	30.062	864 11/05	0.44	8,807	NNE W	3.37	1.3	4.9	6.2
October ..	30.029	809 6/16	0.51	9,779	SSW S	5.29	1.0	4.8	6.3
November ..	29.993	777 18/97	0.57	9,997	SE S	7.69	1.3	3.9	8.6
December ..	29.925	776 6/22	0.63	10,812	SE SSW	9.86	1.8	3.1	12.6
Year { Totals ..	—	—	—	—	—	66.23	19.3	—	100.5
Averages ..	30.016	—	0.48	9,296	E SW	—	—	4.4	—
Extremes ..	—	1,015 20/7/26	—	—	—	—	—	—	—

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.	
No. of yrs. over which observation extends.	37	37	37	37	37	37	35	35	36
January ..	84.6	63.2	73.9	108.4 28/21	48.6 20/25	59.8	177.3 22/14	40.4 1/21	322.6
February ..	84.8	63.3	74.0	112.2 8/33	47.7 1/02	64.5	169.0 4/99	39.8 1/21	272.2
March ..	81.3	61.4	71.3	106.4 14/22	45.8 8/03	60.6	167.0 19/18	36.7 8/03	269.2
April ..	76.2	57.3	66.7	99.7 9/10	39.3 20/14	60.4	157.0 8/16	31.0 20/14	217.5
May ..	68.8	52.6	60.7	90.4 2/07	34.3 11/14	56.1	146.0 4/25	25.3 11/14	175.7
June ..	64.1	49.6	56.8	81.7 2/14	35.3 30/20	46.7	133.5 9/14	26.5 30/20	143.4
July ..	62.7	47.9	55.3	76.4 21/21	34.2 7/16	42.2	133.2 13/15	25.1 30/20	164.4
August ..	63.7	48.2	55.9	81.0 12/14	35.3 31/08	45.7	145.1 29/21	27.9 10/11	184.5
September ..	66.4	50.3	58.3	90.9 30/18	38.8 18/00	52.1	153.6 29/16	29.2 21/16	207.2
October ..	69.1	52.6	60.8	95.3 30/22	40.0 16/31	55.3	154.0 29/14	29.8 16/31	239.8
November ..	75.7	56.8	66.2	104.6 24/13	42.0 1/04	62.6	167.0 30/25	35.5 (a)	288.6
December ..	81.3	60.9	71.1	107.9 20/04	48.0 2/10	59.9	168.8 11/27	39.0 (b)	325.2
Year { Averages ..	73.2	55.4	64.3	—	—	—	—	—	2810.3
Extremes ..	—	—	—	112.2 8/2/33	34.2 7/7/16	78.0	177.3 22/1/14	25.1 30/7/20	(c)

(a) Various years.

(b) 2/1910 and 12/1920.

(c) Total for year.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches).	Rel. Hum. (%).				Rainfall (inches).				Dew.
		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.	37	37	37	37	58	58	58	58	58	37
January ..	0.439	52	61	41	0.34	3	2.17 1879	0.00 (a)	1.74 27/79	2.7
February ..	0.446	53	65	46	0.41	3	2.98 1915	0.00 (a)	1.63 26/15	3.9
March ..	0.430	57	66	46	0.77	5	4.50 1896	0.00 (a)	2.06 26/23	6.4
April ..	0.397	62	73	51	1.69	7	5.85 1926	0.00 1920	2.62 30/04	10.0
May ..	0.374	74	81	61	5.11	14	12.13 1879	0.98 1903	2.80 20/79	12.8
June ..	0.339	78	83	68	7.01	17	12.80 1923	2.16 1877	3.90 10/20	12.8
July ..	0.326	78	84	69	6.74	17	12.28 1926	2.42 1876	3.00 4/91	13.2
August ..	0.323	74	79	62	5.74	18	12.21 1928	0.46 1902	2.79 7/03	11.8
September ..	0.341	68	75	58	3.44	15	7.84 1923	0.34 1916	1.82 4/31	10.5
October ..	0.350	62	75	54	2.24	12	7.87 1890	0.49 1892	1.73 3/33	6.5
November ..	0.382	55	63	46	0.77	6	2.78 1916	0.00 1891	1.11 30/03	3.8
December ..	0.411	50	63	44	0.56	4	3.05 1888	0.00 { 1886 1924	1.72 1/88	2.8
Year { Totals ..	—	—	—	—	34.82	121	—	—	—	97.2
Averages ..	0.374	62	—	—	—	—	—	—	—	—
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.	No. of yrs. over which observation extends.	Bar. corrected to 32° 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. to 3 p.m. and 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.					
77	56	56	56	56	56	64	62	66	52			
January ..	29.917	758 19/99	0.33	7,850	S W	S W	9.04	2.4	3.5	8.6		
February ..	29.952	691 22/96	0.28	6,628	N E	S W	7.37	2.0	3.5	7.6		
March ..	30.038	628 9/12	0.23	6,595	S	S W	5.90	2.2	4.0	7.1		
April ..	30.119	773 10/96	0.21	6,079	N E	S W	3.50	1.6	5.0	4.5		
May ..	30.123	760 9/80	0.21	6,257	N E	N W	2.04	1.7	5.8	2.3		
June ..	30.100	750 12/78	0.24	6,496	N E	N	1.25	2.0	6.2	1.8		
July ..	30.124	674 25/82	0.24	6,683	N E	N W	1.29	1.6	5.9	1.8		
August ..	30.098	773 31/97	0.27	7,128	N E	S W	1.88	2.1	5.6	2.6		
September ..	30.041	720 2/87	0.30	7,210	N N E	S W	2.86	2.3	5.2	3.4		
October ..	29.996	768 28/98	0.33	7,827	N N E	S W	4.78	3.3	5.0	4.0		
November ..	29.978	677 2/04	0.32	7,487	S W	S W	6.62	3.3	4.6	5.4		
December ..	29.920	675 12/91	0.33	7,843	S W	S W	8.49	2.6	3.9	7.4		
Year { Totals ..	—	—	—	—	—	—	—	—	—	—		
Averages ..	30.034	—	0.27	7,007	N E	S W	55.02	27.1	—	56.5		
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 unshin.
	Mean Max.	Mean Min.	Mean.	Highest.	Lowest.		Highest in Sun.	Lowest on Grass.	
No. of yrs. over which observation extends.	77	77	77	77	77	77	56	73	52
January ..	86.0	61.5	73.7	116.3 26/58	45.1 21/84	71.2	180.0 18/82	36.5 14/79	309.6
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	263.8
March ..	80.7	58.8	69.8	108.0 12/61	43.9 21/33	64.1	174.0 17/83	32.1 21/33	239.4
April ..	73.3	54.6	63.9	98.0 10/66	39.6 15/59	58.4	155.0 1/83	30.2 16/17	181.5
May ..	65.7	50.3	58.0	89.5 4/21	36.9 (a)	52.6	148.2 12/79	25.6 19/28	148.4
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	51.8	74.0 11/06	32.0 24/08	42.0	134.5 26/90	22.1 30/29	137.2
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	164.0
September ..	66.3	48.0	57.1	90.7 23/82	32.7 4/58	58.0	160.5 23/82	25.0 25/27	134.6
October ..	72.4	51.4	61.9	102.9 21/22	36.0 —/57	66.9	162.0 30/21	27.8 (c)	227.3
November ..	78.6	55.4	67.0	113.3 21/65	40.8 2/09	72.7	166.9 20/78	31.5 2/09	263.9
December ..	83.3	58.9	71.1	114.6 29/31	43.0 (b)	71.6	175.7 7/99	32.5 4/84	302.9
Year { Averages ..	72.8	53.2	63.0	—	—	—	—	—	2546.2
Extremes ..	—	—	—	116.3 26/1/58	32.0 24/7/08	84.3	180.0 18/1/82	22.1 30/7/29	(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).	Rel. Hum. (%).				Rainfall (Inches).				Dew.
		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.	66	66	66	66	95	95	95	95	95	62
January ..	0.339	38	59	30	0.72	4	4.00 1850	Nil (a)	2.30 2/89	3.7
February ..	0.354	40	56	30	0.73	4	6.09 1925	Nil (a)	5.57 7/25	5.6
March ..	0.345	46	58	36	1.02	6	4.60 1878	Nil (a)	3.50 5/78	10.5
April ..	0.334	55	72	37	1.73	9	6.78 1853	0.03 1923	3.15 5/60	13.8
May ..	0.316	67	76	49	2.76	14	7.75 1875	0.20 1891	2.75 1/53	15.8
June ..	0.297	76	84	67	3.11	16	8.58 1916	0.42 1886	2.11 1/20	16.0
July ..	0.276	76	87	68	2.65	16	5.38 1865	0.37 1899	1.75 10/65	17.2
August ..	0.285	69	77	54	2.53	16	6.24 1852	0.35 1914	2.23 10/51	16.6
September ..	0.297	61	72	44	2.07	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	12.8
November ..	0.307	42	57	31	1.11	7	3.55 1851	0.04 1885	1.88 28/58	6.7
December ..	0.320	39	50	31	1.00	6	3.98 1861	Nil 1904	2.42 23/13	4.4
Year { Totals ..	—	—	—	—	21.15	123	—	—	—	138.7
Averages ..	0.309	53	87	29	—	—	8.58 6/16	Nil (b)	5.57 7/2/25	—
Extremes ..	—	—	—	—	—	—	—	—	—	—

(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. 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. to 3 p.m., and 9 p.m. to 3 a.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.	47	23	23	23	47	47	25	47	42	25
January ..	29.868	361 1/22	0.13	4,986	S E	E & N E	6.687	7.3	5.7	3.4
February ..	29.903	503 5/31	0.15	4,763	S & S E	N E & E	5.490	5.6	5.7	2.4
March ..	29.963	488 1/29	0.11	4,600	S	S E & E	5.064	4.6	5.3	4.9
April ..	30.044	400 3/25	0.10	4,201	S	S E & E	3.961	3.8	4.5	7.9
May ..	30.084	363 7/16	0.09	4,042	S	S E	3.073	3.3	4.3	8.8
June ..	30.071	455 14/28	0.10	4,098	S W & S	S & W	2.361	2.5	4.3	8.7
July ..	30.071	359 2/23	0.09	4,025	S & S W	S W	2.689	2.6	3.7	12.9
August ..	30.099	331 6/23	0.10	4,208	S & S W	S W & N E	3.433	3.8	3.4	12.5
September ..	30.043	329 4/31	0.10	4,123	S & S W	N E & E	4.329	6.0	3.5	12.2
October ..	30.003	325 25/18	0.11	4,555	S	N E	5.648	6.9	4.1	8.9
November ..	29.961	371 10/28	0.13	4,757	S E & N E	N E	6.266	8.8	4.8	5.9
December ..	29.889	467 15/26	0.14	5,136	S E	N E	6.959	9.3	5.3	3.8
Year { Totals ..	—	—	—	—	—	—	55.960	64.5	—	92.3
Year { Averages ..	30.000	—	0.11	4,458	S	N E	—	—	4.6	—
Year { Extremes ..	—	503 5/2/31	—	—	—	—	—	—	—	—

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.	47	47	47	47	47	47	41	47	25
January	85.5	69.0	77.3	108.9 14/02	58.8 4/93	50.1	166.4 10/17	49.9 4/93	229.4
February	84.5	68.6	76.6	105.7 21/25	58.5 23/31	47.2	165.2 6/10	49.1 22/31	207.7
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	214.2
April	79.0	61.0	70.3	95.2 (a)	44.4 25/25	50.8	153.8 11/16	36.7 24/25	210.6
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	203.7
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	179.9
July	68.5	48.6	58.6	83.4 28/98	36.1 (b)	47.3	146.1 20/15	23.9 11/90	112.1
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	236.1
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	238.3
October	79.6	60.0	69.8	101.4 18/93	43.3 3/99	58.1	157.4 31/18	34.9 8/89	255.7
November ..	82.6	64.2	73.4	106.1 18/13	48.5 2/05	57.6	162.3 7/89	38.8 1/05	243.8
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	247.2
Year { Averages ..	78.1	59.8	68.9	—	—	—	—	—	2678.7
Year { Extremes ..	—	—	—	108.9 14/1/02	36.1 (c)	72.8	166.4 10/1/17	23.9 11/7/90	(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).	Rel. Hum. (%).				Rainfall (inches).					Dew.
		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.	47	47	47	47	82	74	82	82	64	47	
January ..	0.640	66	79	53	6.49	14	27.72 1895	0.32 1919	18.31 21/87	8.5	
February ..	0.646	69	82	55	6.30	14	40.39 1893	0.58 1849	10.61 6/31	8.7	
March ..	0.615	72	85	56	5.71	15	34.04 1870	Nil 1849	11.18 14/08	12.1	
April ..	0.523	72	80	60	3.83	12	15.28 1867	0.05 1897	4.97 19/28	14.6	
May ..	0.424	73	85	61	2.78	10	13.85 1876	Nil 1846	5.62 9/79	15.7	
June ..	0.360	74	84	67	2.77	9	14.03 1873	Nil 1847	6.01 9/93	13.7	
July ..	0.328	72	81	61	2.21	8	8.46 1889	Nil 1841	3.54 (c)	15.2	
August ..	0.349	69	80	56	2.00	7	14.67 1879	Nil (a)	4.89 12/87	14.0	
September ..	0.410	64	76	47	2.03	8	5.43 1886	0.10 1907	2.46 2/94	13.2	
October ..	0.473	60	72	48	2.55	9	9.99 1882	0.14 1900	3.75 3/27	12.3	
November ..	0.536	60	72	45	3.78	10	12.41 1917	Nil 1842	4.46 16/86	8.4	
December ..	0.595	61	69	51	4.89	12	13.99 1910	0.35 1865	6.60 28/71	8.1	
Year { Totals ..	—	—	—	—	45.34	128	—	—	—	144.5	
Year { Averages ..	0.492	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. M.S.L. 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., and 9 p.m.	
		Greatest Number of Miles in One Day.	Mean Hourly Pres- sure. (lb.)	Total Miles.	Prevailing Direction.				No. of Clear Days.	
					9 a.m.	3 p.m.				
No. of yrs. over which observation extends.	75	67	67	67	67	67	54	74	72	23
January	29.895	627 3/93	0.27	7,032	N E	E N E	5.382	5.0	5.8	5.0
February .. .	29.942	697 12/69	0.24	6,042	N E	E N E	4.239	4.3	5.9	5.5
March .. .	30.012	754 20/70	0.19	5,866	W	E N E	3.628	4.1	5.5	5.8
April .. .	30.071	642 6/82	0.17	5,338	W	E N E	2.602	3.8	5.0	7.5
May .. .	30.081	682 6/98	0.17	5,499	W	N E	1.822	3.0	4.7	7.8
June .. .	30.063	642 13/08	0.20	5,902	W	W	1.436	3.0	4.8	8.8
July .. .	30.060	744 17/79	0.20	6,094	W	W	1.530	2.3	4.4	10.2
August .. .	30.070	649 22/72	0.19	5,908	W	N E	1.932	3.1	4.0	11.2
September ..	30.009	771 6/74	0.22	6,166	W	N E	2.708	3.9	4.4	9.7
October .. .	29.967	741 4/72	0.24	6,697	W	E N E	3.894	4.8	4.9	7.7
November ..	29.941	583 12/87	0.25	6,571	E N E	E N E	4.620	5.4	5.5	5.8
December ..	29.882	750 3/84	0.26	6,959	E N E	E N E	5.409	5.7	5.6	5.3
Year { Totals ..	—	—	—	—	—	—	39.202	47.4	—	90.3
Averages ..	30.000	—	0.22	6,173	—	W	—	—	5.1	—
Extremes ..	—	771 6/9/74	—	—	—	E N E	—	—	—	—

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.).			Extreme Shade Temperature (Fahr.).		Extreme Range.	Extreme Temperature (Fahr.).		Mean Hour of Sunshine.
	Mean Max.	Mean Min.	Mean.	Highest.	Lowest.		Highest in Sun.	Lowest on Grass.	
No. of yrs. over which observation extends.	75	75	75	75	75	75	72	75	13†
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	229.8
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	205.4
March ..	75.7	62.9	69.3	102.6 3/69	48.8 14/86	53.8	158.3 10/26	39.9 17/13	196.5
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	178.8
May ..	65.5	52.2	58.8	86.0 1/19	40.2 22/59	45.8	129.7 1/06	29.3 25/17	172.0
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	157.2
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	186.3
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	222.9
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	217.1
October ..	71.3	55.8	63.6	98.9 10/98	42.2 6/27	56.7	152.2 20/33	32.7 9/05	237.8
November ..	74.4	59.6	67.0	102.7 21/78	45.8 1/05	56.9	158.5 28/99	36.0 6/06	232.9
December ..	77.1	62.9	70.0	107.5 31/04	48.4 3/24	59.1	164.5 27/89	41.4 3/24	229.8
Year { Averages ..	70.2	56.2	63.2	—	—	—	—	—	2,466.5
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).	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. Days Dew.
No. of yrs. over which observation extends.	75	75	75	75	75	75	75	75	75	75	73
January ..	0.546	67	78	58	3.60	14	15.26 1911	0.25 1932	7.08 13/11		1.3
February ..	0.561	70	81	59	4.21	13	18.56 1873	0.23 1933	8.90 25/73		2.4
March ..	0.529	72	85	62	4.93	15	18.70 1870	0.42 1876	6.52 9/13		4.3
April ..	0.448	76	87	63	5.53	13	24.49 1861	0.06 1868	7.52 29/60		6.9
May ..	0.359	78	90	63	5.16	15	23.03 1919	0.18 1860	8.36 28/89		7.7
June ..	0.301	78	89	68	4.73	13	16.30 1885	0.19 1904	5.17 16/84		6.5
July ..	0.277	76	88	63	4.84	12	13.21 1900	0.12 1862	7.80 7/31		7.1
August ..	0.290	71	84	56	2.86	11	14.89 1899	0.04 1885	5.33 2/60		6.6
September ..	0.333	66	79	49	2.86	12	14.05 1879	0.08 1882	5.69 10/79		4.5
October ..	0.382	63	77	46	2.87	12	11.14 1916	0.21 1867	6.37 13/02		3.2
November ..	0.444	63	79	42	2.83	12	9.88 1865	0.07 1915	4.23 19/00		2.2
December ..	0.505	65	77	52	2.88	13	15.82 1920	0.23 1913	4.75 13/10		1.6
Year { Totals ..	—	—	—	—	47.30	155	—	—	—	—	54.3
Averages ..	0.403	70	—	—	—	—	24.49 4/1861	0.04 8/1885	8.90 25/2/73	—	—
Extremes ..	—	—	90	42	—	—	—	—	—	—	—

* Early records revised during 1929. Values for period 1867—September, 1885, reduced 20 per cent.; for period September, 1885—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. M. Sea Level and Stan- dard Gravity from hourly readings.	Wind.						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.
		Greatest Number of Miles in One Day.	Mean Hourly Pres- sure. (lb.)	Total Miles.	Prevailing Direction.						
					9 a.m.	3 p.m.					
No. of yrs over which observation extends.	76	60	60	60	60	60	61	26	76	26	
January ..	29.910	583	10/97	0.26	6,981	S W	S E	6.454	1.9	5.0	7.1
February ..	29.959	566	8/68	0.24	6,034	S W	S E	5.061	2.3	4.9	6.8
March ..	30.033	677	9/81	0.20	6,023	S W	S E	3.991	1.8	5.5	5.3
April ..	30.102	597	7/68	0.17	5,435	S W	N W	2.409	1.1	5.8	4.7
May ..	30.105	693	12/65	0.17	5,586	N W	N E	1.486	0.6	6.5	2.9
June ..	30.080	761	13/76	0.21	5,984	N W	N E	1.122	0.5	6.6	2.4
July ..	30.087	755	8/74	0.20	6,048	N W	N E	1.083	0.4	6.3	2.9
August ..	30.064	637	14/75	0.23	6,475	N W	N E	1.493	1.0	6.3	2.8
September ..	29.998	617	11/72	0.25	6,621	N W	S W	2.321	1.2	6.1	3.2
October ..	29.965	899	5/66	0.26	6,940	S W	N W	3.374	1.9	6.0	3.7
November ..	29.952	734	13/66	0.26	6,680	S W	S E	4.553	2.5	5.9	3.9
December ..	29.899	655	1/75	0.27	7,109	S W	S E	5.766	2.1	5.5	4.6
Year { Totals ..	—	—	—	—	—	—	—	39.113	17.3	—	50.3
Year { Averages ..	30.013	—	—	0.23	6,326	S W	N W	—	—	5.9	—
Year { Extremes ..	—	899	5/10/66	—	—	—	—	—	—	—	—

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.	78	76	78	78	78	78	73	74	52
January	78.0	56.7	67.4	111.2	14/62	69.2	178.5	14/62	260.1
February	78.0	57.1	67.6	109.5	7/01	69.3	167.5	15/70	238.7
March	74.4	54.7	64.5	105.5	2/93	68.4	164.5	1/68	205.2
April	68.2	50.7	59.4	94.0	(a)	59.2	152.0	8/61	162.9
May	61.5	46.8	54.1	83.7	7/05	53.8	142.6	2/59	136.9
June	56.8	44.0	50.4	72.2	1/07	44.2	129.0	11/61	110.6
July	55.6	41.9	48.7	69.3	22/26	42.3	125.8	27/80	130.9
August	58.6	43.3	51.0	77.0	20/85	48.7	137.4	29/69	153.3
September ..	62.7	45.6	54.1	88.6	28/28	57.5	142.1	20/67	171.4
October	67.1	48.3	57.7	98.4	24/14	66.3	154.3	28/68	202.0
November ..	71.4	51.3	61.3	105.7	27/94	69.2	159.6	29/65	234.3
December ..	75.3	54.4	64.8	110.7	15/76	70.7	170.3	20/69	248.6
Year { Averages ..	67.3	49.6	58.4	—	—	—	—	—	22,254.9
Year { Extremes ..	—	—	—	111.2	27.0	84.2	178.5	19.9	—
				14/1/62	21/7/69		14/1/62	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 Pres- sure (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. Days Dew.	
No. of yrs. over which observation extends.	26	26	26	26	78	78	78	78	75	26	
January ..	0.382	58	65	50	1.86	8	5.68	1904	0.01	1932	2.4
February ..	0.414	62	69	48	1.75	7	6.24	1904	0.03	1870	3.8
March ..	0.382	64	73	57	2.26	10	7.50	1911	0.18	1859	7.9
April ..	0.343	72	82	66	2.20	11	6.71	1901	Nil	1923	9.4
May ..	0.310	79	86	71	2.15	13	4.31	1862	0.45	1901	9.9
June ..	0.280	83	89	76	2.06	14	4.51	1859	0.73	1877	8.7
July ..	0.264	82	86	76	1.86	14	7.02	1891	0.57	1902	8.9
August ..	0.271	76	82	70	1.90	15	4.04	1924	0.48	1903	8.0
September ..	0.290	69	76	60	2.34	14	7.93	1916	0.52	1907	6.7
October ..	0.305	62	67	53	2.62	13	7.61	1860	0.29	1914	5.5
November ..	0.335	60	69	52	2.23	11	6.71	1916	0.25	1895	2.0
December ..	0.367	59	69	51	2.33	9	7.18	1863	0.11	1904	1.9
Year { Totals ..	—	—	—	—	25.56	139	—	—	—	—	75.1
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. 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., and 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.	49	23	23	23	27	27	23	26	71	27
January	29.825	500 30/16	0.20	6,025	N N W & N	S E	4.866	0.9	6.0	2.4
February	29.914	605 4/27	0.15	4,789	N & N W	S E	3.723	1.1	6.0	2.4
March	29.944	443 19/27	0.13	4,931	N N W & N	S E	2.943	1.4	5.9	2.4
April	29.970	533 27/26	0.13	4,823	N & N W	N W & S E	1.963	0.7	6.1	1.6
May	29.990	423 15/27	0.12	4,724	N W to N	N to N W	1.380	0.5	6.1	2.2
June	29.958	569 27/20	0.12	4,528	N W & N	N & N W	0.904	0.5	6.1	2.2
July	29.929	489 22/29	0.13	4,865	N N W & N W	N to N W	0.932	0.5	5.8	2.2
August	29.922	612 19/26	0.13	5,009	N & N W	N & N W	1.279	0.5	6.0	2.1
September ..	29.849	516 26/15	0.18	5,617	N & N W	N W & S E	1.948	0.7	6.1	1.5
October	29.826	461 8/12	0.20	6,090	N to N W	S E & N W	3.025	0.6	6.4	1.8
November ..	29.812	508 18/15	0.19	5,760	N to N W	S E	3.819	0.8	6.4	1.5
December ..	29.812	486 30/20	0.18	5,694	N to N W	S E	4.453	0.8	6.3	1.3
Year { Totals	—	—	—	—	—	—	31.235	9.0	—	23.0
Averages ..	29.896	—	0.16	5,238	N to N W	S E & N W	—	—	6.1	—
Extremes ..	—	612 19/8/26	—	—	—	—	—	—	—	—

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.).			Extremes 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.	63	63	63	87	87	87	46	66	13°
January	71.0	52.8	61.9	105.0 (a)	40.0 3/72	55.0	160.0 (b)	30.6 19/97	242.5
February	71.3	53.3	62.3	104.4 12/99	39.0 20/87	65.4	165.0 24/98	28.3 -/37	199.4
March	67.9	50.8	59.4	99.0 -/61	35.2 31/26	63.8	150.0 3/05	27.5 30/02	201.7
April	62.6	47.7	55.1	90.0 1/56	30.0 25/56	60.0	142.0 18/93	25.0 -/86	147.5
May	57.4	43.8	50.6	77.8 5/21	29.2 20/02	48.6	128.0 (c)	20.0 19/02	140.0
June	52.8	41.1	46.9	75.0 7/74	28.0 22/79	47.0	122.0 12/94	21.0 6/87	118.6
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	128.7
August	55.0	41.0	48.0	77.0 3/76	30.0 10/73	47.0	129.0 -/87	20.1 7/09	161.7
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	169.4
October	62.6	45.5	54.0	92.0 24/14	32.0 12/89	60.0	156.0 9/93	23.8 (d)	188.8
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	225.4
December ..	69.2	51.2	60.2	105.2 30/97	38.0 13/06	67.2	157.0 30/18	27.2 -/86	230.1
Year { Averages ..	62.2	46.5	54.4	—	—	78.2	—	—	2,152.8
Extremes ..	—	—	—	105.2 30/12/97	27.0 18/7/66	—	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.	47	47	47	47	91	90	91	91	67	24
January ..	0.334	59	72	46	1.85	10	5.91 1893	0.03 1841	2.96 30/16	0.6
February ..	0.355	63	77	52	1.48	9	9.15 1834	0.07 1847	4.50 27/54a	1.4
March ..	0.329	66	77	58	1.76	10	7.60 1834	0.02 1843	3.27 11/32	5.3
April ..	0.299	72	84	58	1.92	12	6.50 1909	0.07 1904	5.02 20/09	9.7
May ..	0.265	78	89	65	1.87	13	6.37 1909	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	8.6
July ..	0.230	80	94	72	2.16	14	6.02 1922	0.30 1850	2.51 13/22	9.0
August ..	0.238	75	92	64	1.83	14	10.16 1858	0.23 1854	4.35 12/58	3.4
September ..	0.255	67	85	59	2.09	15	7.14 1844	0.39 1847	2.75 18/44	5.1
October ..	0.273	64	73	51	2.33	15	6.67 1906	0.26 1850	2.58 4/06	2.3
November ..	0.292	59	72	50	2.46	14	8.94 1849	0.16 1868	3.97 7/49	1.2
December ..	0.317	57	67	45	2.01	12	9.00 1875	0.11 1842	2.82 21/29	0.9
Year { Totals ..	—	—	—	—	23.98	152	—	—	—	65.8
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