

## 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 correct value for 1924 is 23° 26' 57.02", and it decreases about 0.47" per annum, the areas within the tropical and temperate zones are approximately as follows:—

## AUSTRALIA—AREAS OF TROPICAL AND TEMPERATE REGIONS.

(STATES AND TERRITORY PARTIALLY WITHIN TROPICS.)

Areas.	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-thirteenth of the whole of Australia (0.386).

2. **Area of Australia compared with Areas of other Countries.**—It is not always realized that the area of Australia is nearly as great as that of the United States of America, that it is four-fifths of that of Canada, that it is over one-fifth of the area of the whole of the British Empire, that it is more than three-fourths of the whole area of Europe, and that it is about 25 times as large as Great Britain and Ireland or Italy. This great area, coupled with a limited population, renders the solution of the problem of Australian development a particularly difficult one. The areas of Australia and of other countries are given in the following table:—

## AREA OF AUSTRALIA AND OF OTHER COUNTRIES.

Country.	Area.	Country.	Area.
<b>Continental Divisions—</b>	<b>Sq. miles.</b>	<b>Asia—</b>	<b>Sq. miles.</b>
Europe .. .. .	3,854,145	Russia .. .. .	5,460,390
Asia .. .. .	15,972,271	China and Dependencies ..	4,277,170
Africa .. .. .	12,413,292	British India and Adminis- tered Territories .. .. .	1,094,300
North and Central America and West Indies .. .. .	8,604,072	Arabia .. .. .	1,000,000
South America .. .. .	7,316,764	Feudatory Indian States ..	711,032
Australasia and Polynesia ..	3,464,891	Persia .. .. .	628,000
		Dutch East Indies .. .. .	572,950
Total, exclusive of Arctic and Antarctic Conts. ..	51,625,435	Turkey .. .. .	483,656
		Japan (and Dependencies) ..	260,738
<b>Europe—</b>		Afghanistan .. .. .	245,000
Russia .. .. .	1,680,730	Siam .. .. .	200,148
France .. .. .	212,659	Iraq (Mesopotamia) .. .. .	143,250
Spain .. .. .	194,800	Philippine Islands .. .. .	115,026
Germany .. .. .	182,213	Laos .. .. .	96,500
Sweden .. .. .	173,105	Oman .. .. .	82,000
Poland .. .. .	149,359	Bokhara .. .. .	79,440
Finland .. .. .	132,550	British Borneo, Brunei, and Sarawak .. .. .	77,106
Norway .. .. .	124,964	Syria .. .. .	60,000
Rumania .. .. .	122,282	Cambodia .. .. .	57,900
Italy and annexed Pro- vinces .. .. .	117,982	Nepal .. .. .	54,000
Serb, Croat, and Slovene State .. .. .	96,134	Tonking .. .. .	40,530
Great Britain and Northern Ireland .. .. .	94,633	Annam .. .. .	39,758
Lithuania .. .. .	59,633	Federated Malay States ..	27,506
Czecho-Slovakia .. .. .	54,191	Ceylon .. .. .	25,332
Bulgaria .. .. .	39,824	Khiva .. .. .	24,310
Iceland .. .. .	39,709	Malay Protectorate (inc. Johore) .. .. .	23,486
Hungary .. .. .	35,921	Cochin China .. .. .	22,000
Portugal .. .. .	35,490	Bhutan .. .. .	20,000
Azerbaijan .. .. .	33,970	Armenia .. .. .	15,240
Greece .. .. .	33,378	Aden and Dependencies ..	9,000
Austria .. .. .	32,396	Palestine .. .. .	9,000
Irish Free State .. .. .	27,000	Timor, etc. (Portuguese In- dian Archipelago) .. .. .	7,330
Georgia .. .. .	25,760	Cyprus .. .. .	3,584
Latvia .. .. .	25,000	Goa, Damao, and Diu ..	1,638
Spitzbergen, Bear and ad- jacent islands .. .. .	25,000	Straits Settlements .. .. .	1,600
Albania .. .. .	17,374	Sokotra .. .. .	1,382
Denmark .. .. .	17,144	Kwantung .. .. .	538
Estonia .. .. .	16,955	Hong Kong and Dependen- cies .. .. .	391
Switzerland .. .. .	15,975	Wei-hai-wei .. .. .	285
Netherlands .. .. .	13,205	Bahrein Islands .. .. .	250
Belgium .. .. .	11,752	French India (Pondicherry, etc.) .. .. .	196
Turkey .. .. .	10,882	Kwang Chau Wan .. .. .	190
Luxemburg .. .. .	999	Maldiv Islands .. .. .	115
Danzig .. .. .	754	Macao, etc. .. .. .	4
Andorra .. .. .	191		
Malta .. .. .	118	Total, Asia .. .. .	15,972,271
Liechtenstein .. .. .	65		
San Marino .. .. .	38	<b>Africa—</b>	
Monaco .. .. .	8	French Sahara .. .. .	1,544,000
Gibraltar .. .. .	2	Anglo-Egyptian Sudan ..	1,014,400
		French Equatorial Africa ..	982,049
Total, Europe .. .. .	3,854,145		

AREA OF AUSTRALIA AND OF OTHER COUNTRIES—*continued.*

Country.	Area.	Country.	Area.
	Sq. miles.		Sq. miles.
<b>AFRICA—<i>continued.</i></b>		<b>AFRICA—<i>continued.</i></b>	
Belgian Congo .. ..	909,654	Comoro Islands, Mayotte, etc. .. ..	790
French Sudan .. ..	617,600	St. Thomas and Principe Islands .. ..	360
Angola .. ..	484,800	*Seychelles .. ..	156
South African Union .. ..	473,089	St. Helena .. ..	47
Rhodesia .. ..	440,000	Ascension .. ..	34
Portuguese East Africa .. ..	428,132		
Tripolitania and Cyrenaica .. ..	406,000	Total, Africa .. ..	12,413,292
Tanganyika Territory .. ..	365,000		
Abyssinia .. ..	350,000		
Egypt .. ..	350,000		
Territory of the Niger .. ..	347,400		
Mauritania .. ..	347,400		
Nigeria and Protectorate .. ..	335,700		
South-west Africa .. ..	322,400	<b>North and Central America and West Indies—</b>	
Bechuanaland Protectorate .. ..	275,000	Canada .. ..	3,729,665
Kenya Colony and Protec- torate .. ..	245,060	United States .. ..	3,026,789
Madagascar .. ..	228,000	Mexico .. ..	767,198
Morocco .. ..	223,800	Alaska .. ..	590,884
Algeria (inc. Algerian Sahara) .. ..	222,180	Newfoundland and Labra- dor .. ..	162,734
Cameroon (French) .. ..	166,489	Nicaragua .. ..	51,660
Upper Volta .. ..	154,400	Guatemala .. ..	48,290
Italian Somaliland .. ..	139,430	*Greenland .. ..	46,740
Ivory Coast .. ..	121,976	Honduras .. ..	44,275
Uganda Protectorate .. ..	110,300	Cuba .. ..	44,164
Rio de Oro and Adrar .. ..	109,200	Costa Rica .. ..	23,000
French Guinea .. ..	95,218	Santo Domingo .. ..	19,332
Gold Coast Protectorate (with Nth. Territories) .. ..	80,000	Salvador .. ..	13,176
Senegal .. ..	74,112	Haiti .. ..	10,204
British Somaliland .. ..	68,000	British Honduras .. ..	8,598
Tunis .. ..	50,000	Jamaica, inc. Turks, Caicos and Cayman Is. .. ..	4,431
Eritrea .. ..	45,783	Bahamas .. ..	4,404
Dahomey .. ..	42,460	Porto Rico .. ..	3,435
Liberia .. ..	40,000	Trinidad and Tobago .. ..	1,976
Nyasaland Protectorate .. ..	39,573	Leeward Islands .. ..	715
Cameroon (British) .. ..	31,000	Guadeloupe and Dependen- cies .. ..	688
Sierra Leone and Protec- torate .. ..	31,000	Windward Islands .. ..	516
Togoland (French) .. ..	21,893	Curaçao and Dependencies .. ..	403
Portuguese Guinea .. ..	13,940	Martinique .. ..	385
Togoland (British) .. ..	12,600	Barbados .. ..	166
Basutoland .. ..	11,716	Virgin Islands of U.S.A., St. Pierre and Miquelon .. ..	132
Spanish Guinea (Rio Muni, etc.) .. ..	10,810	Bermudas .. ..	93
Spanish Morocco .. ..	7,700		19
Swaziland .. ..	6,678	Total, N. and C. America and W. Indies .. ..	8,604,072
French Somali Coast .. ..	5,790		
Gambia and Protectorate .. ..	4,134		
Cape Verde Islands .. ..	1,480	<b>South America—</b>	
Zanzibar .. ..	1,020	Brazil .. ..	3,275,510
Réunion .. ..	970	Argentine Republic .. ..	1,153,119
Ifni .. ..	965	Peru .. ..	722,461
Mauritius and Dependencies .. ..	809	Bolivia .. ..	514,155
Fernando Po, etc. .. ..	795	Colombia (exc. of Panama) .. ..	440,846

\* Danish colony only. Total area has been estimated as between 827,000 and 850,000 square miles.

AREA OF AUSTRALIA AND OF OTHER COUNTRIES—*continued.*

Country.	Area.	Country.	Area.
<b>SOUTH AMERICA—<i>continued.</i></b>	<b>Sq. miles.</b>	<b>AUSTRALASIA AND POLYNESIA</b>	<b>Sq. miles.</b>
Venezuela .. ..	398,594	<i>—continued.</i>	
Chile .. ..	289,828	British Solomon Islands ..	11,000
Ecuador .. ..	174,155	New Caledonia and Depen-	
British Guiana .. ..	89,480	dencies .. ..	8,548
Uruguay .. ..	72,153	Fiji .. ..	7,983
Paraguay .. ..	61,647	Hawaii .. ..	6,449
Dutch Guiana .. ..	54,291	New Hebrides .. ..	5,700
Panama .. ..	32,380	French Establishments in	
French Guiana .. ..	32,000	Oceania .. ..	1,520
Falkland Islands and		Territory of Western Samoa	1,250
South Georgia .. ..	5,618	Gilbert and Ellice Islands	1,011
Panama Canal Zone ..	527	Marianne, Caroline, and	
		Marshall Islands ..	960
<b>Total, South America ..</b>	<b>7,316,764</b>	Tonga .. ..	385
		Guam .. ..	210
<b>Australasia and Polynesia—</b>		Samoa (U.S.A. part) ..	77
Commonwealth of Australia	2,974,581	Norfolk Island .. ..	13
Dutch New Guinea ..	160,692	Nauru Island .. ..	10
New Zealand and Depen-			
dencies .. ..	103,862	<b>Total, Australasia and</b>	<b>3,464,891</b>
Territory of New Guinea	91,000	<b>Polynesia .. ..</b>	
Papua .. ..	90,540	<b>British Empire .. ..</b>	<b>13,406,145</b>

The figures quoted in the table have, in most cases, been extracted from the Statesman's Year-Book for 1924.

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.
	<b>Sq. miles.</b>	
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
<b>Total .. ..</b>	<b>2,974,581</b>	<b>100.00</b>

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 ÷ Coast-line.	State.	Coast-line.	Area ÷ 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 recognised 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.

## § 2. Climate and Meteorology of Australia.\*

1. **Introductory.**—In preceding Year Books 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. (See Year Book No. 3, pp. 79, 80.) 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 of 1907. Space will not permit of the inclusion of this matter in the present issue.

2. **Meteorological Publications.**—The following publications are issued daily from the Central Meteorological Bureau, viz.:—(i) Weather charts. (ii) Rainfall maps.

\* Prepared from data supplied by the Commonwealth Meteorologist, H. A. Hunt, Esquire, P.R. Met. Soc.

(iii) Bulletins, Victorian and Interstate, showing pressure, temperature, wind, rain, cloud extent, and weather. Similar publications are also issued from the divisional offices in each of the State Capitals.

Commencing with January, 1910, the "Australian Monthly Weather Report," containing statistical records from representative selected stations, with rain maps and diagrams, etc., is being published. Complete rainfall and other climatological data are published in volumes of meteorological statistics for each State separately.

The first text book of Australian meteorology, "Climate and Weather of Australia," was published in 1913.

In addition, fifteen Bulletins of Climatology have been published, particulars of which are given in preceding issues of the Official Year Book (see No. 12, page 54).

**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 1.591). 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.* The Commonwealth Meteorologist has divided Australia, for climatological and meteorological purposes, into five divisions. The boundaries between these may be thus defined:—(a) Between divisions I. and II., the boundary between South and Western Australia, viz., the 129th meridian of east longitude; (b) between divisions II. and III., a line starting at the Gulf of Carpentaria, along the Norman River to Normanton, thence a straight line to Wilcannia on the Darling River, New South Wales; (c) between divisions II. and IV., a line from Wilcannia along the Darling River to its junction with the Murray; (d) between divisions II. and V., a line from the junction of the Darling and Murray Rivers, along the latter to Encounter Bay; (e) between divisions III. and IV., a line starting at Wilcannia, along the Darling, Barwon, and Dumaresq Rivers to the Great Dividing Range, and along that range and along the watershed between the Clarence and Richmond Rivers to Evans Head on the east coast of Australia; (f) between divisions IV. and V., a line from the junction of the Darling and Murray Rivers along the latter to its junction with the Murrumbidgee, along the Murrumbidgee to the Tumut River, and along the Tumut River to Tumut, thence a straight line to Cape Howe; (g) Tasmania is included in division V.

The population included within these boundaries at the Census of the 4th April, 1921, was approximately as follows:—

Division	I.	II.	III.	IV.	V.
Population	332,000	500,000	824,000	1,915,000	1,866,000

In these divisions, the order in which the capitals occur is as follows:—(a) Perth, (b) Adelaide, (c) Brisbane, (d) Sydney, (e) Melbourne, and (f) Hobart; and the climatological and meteorological statistics relating to the capital cities are dealt with herein in accordance with that order.

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

#### SPECIAL CLIMATOLOGICAL STATIONS—AUSTRALIA.

Locality.	Height above Sea Level.	Latitude. S.	Longitude. E.	Locality.	Height above Sea Level.	Latitude. S.	Longitude. E.
	Feet.	deg. min.	deg. min.		Feet.	deg. min.	deg. min.
Perth ..	197	31 57	115 50	Darwin ..	97	12 28	130 51
Adelaide ..	140	34 56	138 35	Daly Waters	691	16 16	133 23
Brisbane ..	137	27 28	153 2	Alice Springs	1,926	23 38	133 37
Sydney ..	138	33 52	151 12	Dubbo ..	870	32 18	148 35
Melbourne ..	115	37 49	144 58	Laverton, W.A.	1,530	28 40	122 23
Hobart ..	177	42 53	147 20	Coolgardie ..	1,389	30 57	121 10

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

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

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

Along the northern shores of Australia the temperatures are very equable. At Darwin, for example, the difference in the means for the hottest and coldest months is only 8.3°, and the extreme readings for the year, or the highest maximum in the hottest month and the lowest reading in the coldest month, show a difference of under 50°.

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

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

In the interior of Australia, and during exceptionally dry summers, the temperature occasionally reaches or exceeds 120° in the shade, and during the dry winters the major portion of the country to the south of the tropics is subject to ground frosts. An exact knowledge of temperature disposition cannot be determined until the interior becomes more settled, but from data procurable it would appear that the hottest area of the continent is situated in the northern part of Western Australia about the Marble Bar and Nullagine goldfields, where the maximum shade temperature during the summer sometimes exceeds 100° continuously for days and weeks. The coldest part of Australia is the extreme south-east of New South Wales and extreme east of Victoria—the region of the Australian Alps. Here the temperature seldom, if ever, reaches 100°, even in the hottest of seasons.

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

(iii) *Monthly Maximum and Minimum Temperatures.* The normal monthly maximum and minimum temperatures can be best shown by means of graphs, which exhibit the

nature of the fluctuation of each for all available years. In the diagram herein for nine representative places in Australia, the upper heavy curves show the mean maximum, and the lower heavy curves the mean minimum temperatures based upon daily observations, while the other curves show the humidities.

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

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

The mean monthly vapour pressure has also been added to the tables of climatological data for the capital cities on pp. 72 to 77.

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 about midway between the extremes.

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

**7. Evaporation.**—(i) *General.* The rate and quantity of evaporation in any territory is influenced by the prevailing temperature, and by atmospheric humidity, pressure, and movement. In Australia, the question is of perhaps more than ordinary importance, since in its drier regions water has often to be conserved in "tanks" and dams. The magnitude of the economic loss by evaporation will be appreciated from the tabular records herein, which show that the yearly amount varies from about 32 inches at Hobart to 94 inches at Alice Springs in the centre of the Continent. Over the *inland* districts of the Continent it has been calculated that evaporation equals the rainfall where the annual totals are about 36 inches, the variations above and below this quantity being inverse.

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

(iii) *Loss by Evaporation.* In the interior of Australia the possible evaporation is greater than the actual rainfall. Since the loss by evaporation depends largely on the exposed area, tanks and dams so designed that the surface shall be a minimum are advantageous. Further, the more protected from the direct rays of the sun and from winds, by means of suitable tree planting, the less will be the loss by evaporation. These matters are naturally of more than ordinary concern in the drier districts of Australia.

**8. Rainfall.**—(i) *General.* As even a casual reference to climatological maps indicating the distribution of rainfall and prevailing direction of wind would clearly show, the rainfall of any region is determined mainly by the direction and route of the prevailing winds, by the varying temperatures of the earth's surface over which they blow, and by the physiographical features generally.

Australia lies within the zones of the south-east trades and prevailing westerly winds. The southern limit of the south-east trade strikes the eastern shores at about 30° south latitude, and, with very few exceptions, the heaviest rains of the Australian continent are precipitated along the Pacific slopes to the north of that latitude, the varying quantities being more or less regulated by the differences in elevation of the shores and of the chain of mountains upon which the rain-laden winds blow from the New South Wales northern

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



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 144 and 165 inches. The maximum and minimum falls there are:—Goondi, 241.53 in 1894 and 67.88 inches in 1915, or a range of 173.65 inches; Innisfail, 211.24 in 1894 and 69.87 inches in 1902, or a range of 141.37 inches; Harvey Creek, 254.77 in 1921 and 80.47 inches in 1902, or a range of 174.30 inches.

On four occasions more than 200 inches have been recorded at Goondi, the last of these being in 1910, when 204.82 inches were registered. The record at this station covers a period of 32 years.

Harvey Creek, in the shorter period of 24 years has three times exceeded 200 inches, the total for 1921 being 254.77 inches, and at the South Johnstone Sugar Experiment Station, where a gauge has recently been established; 202.52 inches were recorded in 1921.

The driest known part of the continent is about the Lake Eyre district in South Australia (the only part of the continent below sea level), where the annual average is but 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 the 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 greatly and progressively from the southern to the northern shores of the continent, and similarly also at all parts of the continent subject to capricious monsoonal rains, as the comparisons hereunder will show. The general distribution is best seen from the rainfall map herein which shows the areas subject to average annual rainfalls lying between certain limits. The areas enjoying varying quantities of rainfall determined from the latest available information are shown in the following table:—

AVERAGE ANNUAL RAINFALL DISTRIBUTION.

Average Annual Rainfall.	N.S.W. (a)	Victoria.	Queens- land.	South Australia.	Northern Territory	Western Australia.	Tas. mania. (b)	Total. (b)
	sqr. mls.	sqr. mls.	sqr. mls.	sqr. mls.	sqr. mls.	sqr. mls.	sqr. mls.	sqr. mls.
Under 10 inches	44,997	nil	91,012	317,600	138,190	513,653	nil	1,105,452
10—15 "	77,268	19,912	87,489	33,405	141,570	232,815	nil	592,459
15—20 "	57,639	12,626	112,738	14,190	62,920	89,922	937	350,972
20—30 "	77,202	29,317	213,779	13,827	93,470	95,404	7,559	530,558
30—40 "	30,700	14,029	69,880	984	40,690	40,750	4,588	201,621
Over 40 "	22,566	12,000	95,602	64	46,780	3,376	10,101	190,489
Total area ..	310,372	87,884	670,500	380,070	523,620	975,920	26,215	2,974,581

(a) Including Federal Capital Territory. (b) Over an area of 3,030 square miles no records are available.

Referring first to the capital cities, the complete records of which are given in the next table, it will be seen that Sydney, with a normal rainfall of 47.73 inches, occupies the chief place; Brisbane, Perth, Melbourne, Hobart and Adelaide following in that order, Adelaide with 21.20 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 of 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 about 10 to 20 inches.

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

(vii) *Tables of Rainfall.* The table of rainfall for a long period of years for each of the various Australian capitals affords information as to the variability of the fall in successive years, and the list of the more remarkable falls furnishes information as to what may be expected on particular occasions. As pointed out in 4 *ante*, the capitals are dealt with in the order in which they occur in the adopted meteorological divisions.

#### RAINFALL—AUSTRALIAN CAPITAL CITIES, 1901 TO 1924.

Year.	PERTH.			ADELAIDE.			BRISBANE.			SYDNEY.			MELBOURNE.			HOBART.		
	Amount.	No. of Days.	10 Years' Means.	Amount.	No. of Days.	10 Years' Means.	Amount.	No. of Days.	10 Years' Means.	Amount.	No. of Days.	10 Years' Means.	Amount.	No. of Days.	10 Years' Means.	Amount.	No. of Days.	10 Years' Means.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
1901	36.75	122	..	18.01	124	..	38.48	110	..	40.10	149	..	27.45	113	..	25.11	149	..
2	27.06	93	..	18.02	123	..	16.17	87	..	43.07	180	..	23.08	102	..	21.85	150	..
3	35.69	140	..	25.47	134	..	49.27	136	..	38.62	173	..	28.43	130	..	25.86	139	..
4	34.35	125	..	20.31	117	..	33.23	124	..	45.93	158	..	29.72	128	..	22.41	139	..
5	34.61	116	..	22.28	131	..	36.76	108	..	35.03	145	..	25.64	129	..	32.09	168	..
6	32.37	121	..	26.51	127	..	42.85	125	..	31.89	160	..	22.29	114	..	23.31	155	..
7	40.12	132	..	17.78	125	..	31.46	119	..	31.32	132	..	22.26	102	..	25.92	166	..
8	30.52	106	34.05	24.56	125	21.15	44.01	125	36.55	45.65	167	43.41	17.72	130	25.36	16.50	148	23.29
9	39.11	107	..	27.69	138	..	34.06	111	..	32.45	177	..	25.66	171	..	27.29	170	..
1910	37.02	135	..	24.62	116	..	49.00	133	..	46.91	160	..	24.61	167	..	25.22	205	..
11	23.38	108	..	15.99	127	..	35.21	128	..	50.24	155	..	36.61	168	..	26.78	193	..
12	27.85	123	..	19.57	116	..	41.30	114	..	47.51	172	..	20.37	157	..	23.14	181	..
13	38.28	141	..	18.16	102	..	40.81	115	..	57.70	141	..	21.17	157	..	19.36	165	..
14	20.21	128	..	11.39	91	..	33.99	141	..	56.42	149	..	18.57	129	..	15.42	154	..
15	43.61	164	..	19.38	117	..	25.66	93	..	34.83	117	..	20.95	167	..	20.91	196	..
16	35.16	128	..	28.16	142	..	52.80	136	..	44.91	161	..	38.04	170	..	43.39	203	..
17	45.64	146	..	28.90	153	..	40.92	127	..	52.40	151	..	30.57	171	..	30.62	214	..
18	39.58	138	34.98	17.41	107	21.13	24.95	121	37.87	42.99	149	46.64	27.13	160	26.39	26.04	179	25.82
19	30.66	120	..	17.21	108	..	19.36	96	..	58.71	152	..	24.89	141	..	22.48	153	..
20	40.35	124	..	26.70	119	..	39.72	122	..	43.42	159	..	28.27	162	..	18.00	182	..
21	41.09	135	..	22.64	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	33.79	119	..	23.44	143	..	41.08	114	..	37.01	136	..	36.48	171	..	28.76	197	..
Aver.	34.08	119	..	21.20	124	..	44.98	128	..	47.73	153	..	26.31	137	..	23.83	148	..
No. of Yrs.	49	49	..	86	86	..	75	65	..	85	85	..	81	69	..	82	82	..

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

9. Remarkable Falls of Rain.—The following are the more 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 15 inches in the twenty-four hours are not included. Reference, however, to them may be found in preceding Official Year Books (see No. 14, pp. 60–63) :—

#### HEAVY RAINFALLS—NEW SOUTH WALES, UP TO 1924, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Anthony ..	28 Mar., 1887	17.14	Madden's Creek ..	13 Jan., 1911	18.68
Bega ..	27 Feb., 1919	17.88	Morpeth ..	9 Mar., 1893	21.52
Broger's Creek ..	14 „, 1898	20.05	Mount Kembla ..	13 Jan., 1911	18.25
„ „ ..	13 Jan., 1911	20.83	Numbugga ..	27 Feb., 1919	17.87
Bulli Mountain ..	13 Dec., 1898	17.14	Tongarra Farm ..	14 „, 1898	15.12
Burrigate ..	27 „, 1919	16.38	Towamba ..	5 Mar., 1893	20.00
Candelo ..	27 Feb., „	18.58	South Head (near		
Condong ..	27 Mar. 1887	18.66	Sydney) ..	29 Apr., 1841	20.12
Cordeaux River ..	14 Feb., 1898	22.58	„ „ ..	16 Oct., 1844	20.41
Kembla Heights ..	13 Jan., 1911	17.46			

#### HEAVY RAINFALLS—QUEENSLAND, UP TO 1924, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Anglesey ..	26 Dec., 1909	18.20	Flying Fish Point	31 Jan., 1913	16.10
Atherton (Cairns) ..	31 Jan., 1913	16.69	Gladstone ..	4 Feb., 1911	18.83
Babinda (Cairns) ..	1 Feb., „	20.51	Glen Boughton ..	5 Apr., 1894	18.50
„ „ ..	24 Jan., 1916	22.30	Goldsborough		
„ „ ..	21 Apr., 1920	16.05	(Cairns) ..	31 Jan., 1913	19.92
Babinda ..	25 Mar., 1921	15.76	Goondi Mill (Innis-		
Bloombsbury ..	14 Feb., 1893	17.40	fail) ..	6 Apr., 1894	15.69
„ „ ..	10 Jan., 1901	16.62	„ „ ..	29 Dec., 1903	17.83
Brisbane ..	21 „, 1887	18.31	„ „ ..	10 Feb., 1911	17.68
Buderim Mountain	11 „, 1898	26.20	„ „ ..	6 Apr., 1912	15.55
Bundaberg ..	16 „, 1913	16.94	Goondi ..	30 Jan., 1913	24.10
Burnett Head			Goorganga ..	23 „, 1918	18.17
(Bundaberg) ..	16 „, 1913	15.22	Halifax ..	5 Feb., 1899	15.37
Cairns ..	11 Feb., 1911	15.17	„ „ ..	6 Jan., 1901	15.68
„ „ ..	2 Apr., „	20.16	Hambledon Mill ..	2 „, 1911	18.61
Carbrook ..	23 Jan., 1918	22.66	„ „ ..	1 Apr., „	19.62
„ „ ..	24 „, „	15.77	„ „ ..	30 Jan., 1913	17.32
Cardwell ..	18 Mar., 1904	18.24	Hampden ..	23 Apr., 1918	17.30
Carmilla ..	23 Jan., 1918	15.92	„ „ ..	24 „, „	17.19
Clare ..	26 „, 1896	15.30	Harvey Creek ..	8 Mar., 1899	17.72
Collaroy ..	23 „, 1918	18.06	„ „ ..	11 Jan., 1905	16.96
Crohamhurst			„ „ ..	3 „, 1911	27.75
(Blackall Range)	2 Feb., 1893	35.71	„ „ ..	2 Apr., „	16.46
„ „ ..	9 Jan., 1898	19.55	„ „ ..	31 Jan., 1913	24.72
„ „ ..	6 Mar., „	16.01	„ „ ..	25 Mar., 1921	15.80
Croydon ..	29 Jan., 1908	15.00	„ „ ..	12 Mar., 1924	16.50
Dungeness ..	16 Mar., 1893	22.17	„ „ ..	13 Mar., „	15.78
Dunira ..	9 Jan., 1898	18.45	Houghton Valley ..	26 Jan., 1896	18.10
„ „ ..	6 Mar., „	15.95	Holmwood (Wood-		
Fairymead Planta-			ford) ..	2 Feb., 1893	16.19
tion (Bundaberg)	16 Jan., 1913	15.32	Howard ..	15 Jan., 1905	19.55
Flying Fish Point	7 Apr., 1912	16.06	Huntley ..	27 Dec., 1916	18.94

HEAVY RAINFALLS—QUEENSLAND—*continued.*

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Innisfail (formerly Geraldton) ..	11 Feb., 1889	17.13	Mourilyan ..	11 Feb., 1911	17.40
" " ..	6 Apr., 1894	16.02	" " ..	7 Apr., 1912	18.97
" " ..	24 Jan., 1900	15.22	" " ..	31 Jan., 1913	15.05
" " ..	29 Dec., 1903	21.22	Mundoolun ..	21 " 1887	17.95
" " ..	2 Apr., 1911	15.00	Nambour ..	9 " 1898	21.00
" " ..	7 " 1912	20.50	" " ..	27 Dec., 1909	16.80
" " ..	31 Jan., 1913	20.91	Netherdale ..	22 Jan., 1918	19.50
Kamerunga (Cairns)	2 Apr., 1911	21.00	Oxenford ..	14 Mar., 1908	15.65
" " ..	31 Jan., 1913	16.00	Palmwoods ..	10 Jan., 1898	15.85
Koumala ..	23 " 1918	22.31	" " ..	25 Dec., 1909	17.75
" " ..	24 " " 1918	20.65	Pialba (Marybor'gh)	16 Jan., 1913	17.22
Kuranda (Cairns) ..	11 Feb., 1911	16.30	Plane Creek ..		
" " ..	17 Mar., " 1911	15.10	(Mackay) ..	26 Feb., " 1904	16.34
" " ..	31 " " 1911	18.60	Port Douglas ..	10 Mar., 1904	16.10
" " ..	1 Apr., " 1911	24.30	" " ..	17 " 1911	31.53
" " ..	2 " " 1911	28.80	" " ..	1 Apr., " 1911	18.17
" " ..	31 Jan., 1913	16.34	Proserpine ..	23 Jan., 1918	17.00
Landsborough ..	2 Feb., 1893	15.15	Ravenswood ..	24 Mar., 1890	17.35
Low Island ..	10 Mar., 1904	15.07	Redcliffe ..	16 Feb., 1893	17.35
" " ..	1 Apr., 1911	15.30	Rosedale ..	16 Jan., 1913	18.90
Lyndon (via Brixton)	3 " 1917	17.00*	Sarina ..	23 " 1918	22.60
Mackay ..	21 Jan., 1918	24.70†	St. Lawrence ..	30 " 1896	15.00
" " ..	22 " " 1918	17.25‡	The Hollow (Mac-		
Sugar Experimental			kay) ..	23 Feb., 1888	15.12
Farm, Mackay ..	21 " " 1918	16.80	Thornborough ..	20 Apr., 1903	18.07
" " ..	22 " " 1918	17.20	Townsville ..	24 Jan., 1892	19.20
Macnade Mill ..	5 Feb., 1899	15.20	" " ..	28 Dec., 1903	15.00
" " ..	6 Jan., 1901	23.33	Victoria Mill ..	6 Jan., 1901	16.67
" " ..	4 Mar., 1915	22.00	Woodlands (Yepp'n)	31 " 1893	23.07
Mapleton ..	26 Dec., 1909	15.72	Wootha ..	10 Feb., 1915	15.93
Mirani ..	12 Jan., 1901	16.59	Yandina ..	1 " 1893	20.08
Miriam Vale (B'berg)	17 " 1913	15.80	" " ..	9 Jan., 1898	19.25
Mooloolah ..	13 Mar., 1892	21.53	" " ..	28 Dec., 1909	15.80
" " ..	2 Feb., 1893	19.11	Yarrabah ..	2 Apr., 1911	30.65
Mount Cuthbert ..	8 Jan., 1911	18.00	" " ..	24 Jan., 1916	27.20
Mount Molloy ..	31 Mar., " 1911	20.00	" " ..	25 " " 1916	18.60
" " ..	1 Apr., " 1911	20.00	Yeppoon ..	31 " 1893	20.05
" " ..	2 " " 1911	20.00	" " ..	8 " 1898	18.05
			" " ..	8 Oct., 1914	21.70

## HEAVY RAINFALLS—WESTERN AUSTRALIA, UP TO 1924, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Alice Downs ..	15 Mar., 1922	10.58	Exmouth Gulf ..	2 Feb., 1918	12.50
Balla Balla ..	21 " 1899	14.40	Fortescue ..	3 May, 1890	23.36
Bamboo Creek ..	22 " " 1899	10.10	Frazier Downs ..	3 Mar., 1916	11.25
Boodarie ..	21 " " 1899	14.53	Gnaraloo ..	20 " 1923	11.00
" " ..	3 Jan., 1896	10.03	Kerdiadary ..	7 Feb., 1901	12.00
Booloogooroo ..	16 " 1923	10.76	Meda ..	2 Mar., 1916	10.55
Broome ..	6 Jan., 1917	14.00	Millstream ..	5 " 1900	10.00
Carlton ..	11 " 1903	10.64	Minilya ..	15 Jan., 1923	11.50
Cossack ..	3 Apr., 1898	12.82	Obagama ..	28 Feb., 1910	12.00
" " ..	16 " 1900	13.23	" " ..	24 Dec., 1920	13.02
Croydon ..	3 Mar., 1903	12.00	Pilbara ..	2 Apr., 1898	14.04
Derby ..	29 Dec., 1898	13.09	Point Cloates ..	20 Jan., 1909	10.87
" " ..	7 Jan., 1917	16.47			

\* Mr. Jas. Laidlaw, of Lyndon, states that this fell in 4 hours. † 37½ hours. ‡ 22½ hours.

HEAVY RAINFALLS, WESTERN AUSTRALIA—*continued*.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Point Torment ..	17 Dec., 1906	11.86	Whim Creek ..	21 Mar., 1899	18.17
Port George IV. ..	17 Jan., 1915	11.24	" " ..	6 " 1900	10.03
Roebourne ..	3 Apr., 1898	11.44	" " ..	3 " 1903	10.44
" ..	6 Mar., 1900	10.32	Winderrie ..	17 Jan., 1923	14.23
Roebuck Plains ..	5 Jan., 1917	14.01	Woodstock ..	21 " 1912	13.00
" " ..	6 " "	22.36	Wyndham ..	27 Jan., 1890	11.60
Springvale ..	14 Mar., 1922	12.25	" " ..	4 Mar., 1919	12.50
Tambray ..	6 " 1900	11.00	Yardie Creek ..	3 Feb., 1918	10.00
" ..	3 " 1903	10.47	Yeeda ..	2 Mar., 1916	10.70
Thangoc ..	17-19 Feb. '96	24.18	" ..	6 Jan., 1917	10.20
" ..	28 Dec., 1898	11.15	" ..	7 " "	11.75
Whim Creek ..	3 Apr., 1898	29.41			

## HEAVY RAINFALLS—NORTHERN TERRITORY, UP TO 1924, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Bonrook ..	24 Dec., 1915	10.60	Darwin ..	7 Dec., 1915	11.67
Borroloola ..	14 Mar., 1899	14.00	Groote Eylandt ..	30-31 Mar., '22	12.00a
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			
Cosmopolitan Gold Mine ..	24 Dec., 1915	10.60			

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

## HEAVY RAINFALLS—SOUTH AUSTRALIA, UP TO 1924, INCLUSIVE.

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

## HEAVY RAINFALLS—VICTORIA, UP TO 1924, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Balook ..	26 Sept., 1917	5.32	Mt. Buffalo ..	6 June, 1917	8.53
" " ..	27 " "	7.23	" " ..	7 " "	6.56
" " ..	28 " "	2.08			

## HEAVY RAINFALLS—TASMANIA, UP TO 1924, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Cullenswood ..	5 June, 1923	10.50	Mathinna ..	8-10 Mar., '11	15.79
Gould's Country ..	8-10 Mar., '11	15.33	The Springs ..	30-31 Jan., '16	10.75
Lottah ..	8-10 " "	18.10	Triabunna ..	5 June, 1923	10.20

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

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

11. **Hail.**—Hail falls most frequently along the southern shores of the continent in the winter, and over south-eastern Australia during the summer months. The size of the hailstones generally increases with distance from the coast, a fact which lends strong support to the theory that hail is brought about by ascending currents. A summer rarely passes without some station experiencing a fall of stones exceeding in size an ordinary hen-egg, and many riddled sheets of light-gauge galvanized iron bear evidence of the weight and penetrating power of the stones.

The hailstorms occur most frequently when the barometric readings indicate a flat and unstable condition of pressure. They are almost invariably associated with tornadoes or tornadic tendencies, and on the east coast the clouds from which the stones fall are generally of a remarkable sepia-coloured tint.

12. **Barometric Pressures.**—The mean annual barometric pressure (corrected to sea-level and standard gravity) in Australia varies from 29.80 inches on the north coast to 29.92 inches over the central and 30.03 inches in the southern parts of the continent. In January, the mean pressure ranges from 29.70 inches in the northern and central areas to 29.95 inches in the southern. The July mean pressure ranges from 29.90 inches at Darwin to 30.12 inches at Alice Springs. Barometer readings corrected to mean sea level and standard gravity have, under anticyclonic conditions in the interior of the continent, ranged as high as 30.77 inches (at Kalgoorlie on the 28th July, 1901) and have fallen as low as 27.55 inches. This lowest record was registered at Mackay during a tropical hurricane on the 21st January, 1918. An almost equally abnormal reading of 27.88 inches was recorded at Innisfail during a similar storm on the 10th March, 1918. The mean annual fluctuations of barometric pressure for the capitals of Australia are shown on the graph herein.

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

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

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

The north-east coast of Queensland is occasionally visited by hurricanes from the north-east tropics. During the first four months of the year, these hurricanes appear to have their origin in the neighbourhood of the South Pacific Islands, their path being a parabolic curve first to the S.W. and finally towards the S.E. Only a small percentage, however, reach Australia, the majority recurving in their path to the east of New Caledonia.

Very severe cyclones, locally known as "willy willies," are peculiar to the north-west coast of Western Australia from the months of November to April inclusive. They apparently originate in the ocean in the vicinity of Cambridge Gulf, and travel in a south-westerly direction with continually increasing force, displaying their greatest energy near Cossack and Onslow, between latitudes  $20^{\circ}$  and  $22^{\circ}$  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.

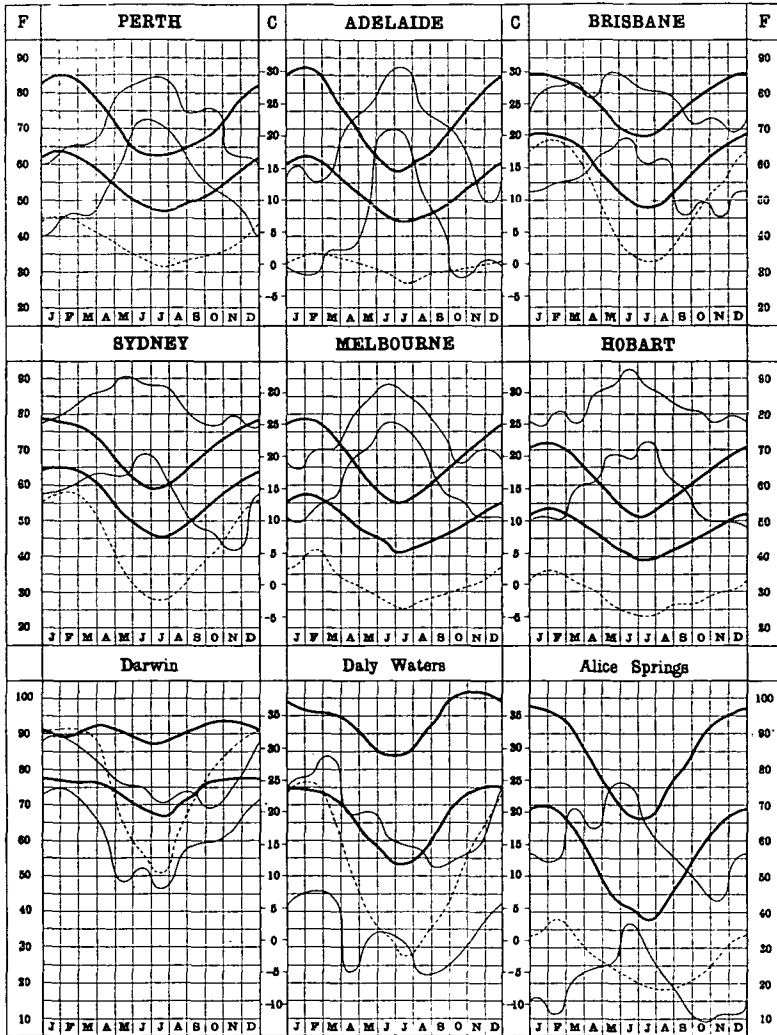
(iii) *Direct Influence of Forests on Rainfall.* Whether forests have a direct influence on rainfall is a debatable question, some authorities alleging that precipitation is undoubtedly induced by forests, while others take the opposite view.

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 Temperature, Various Cities.**—The following table shows rainfall and temperature for various important cities throughout the world, for the site of the Federal capital, and for the capitals of the Australian States.

## ANNUAL FLUCTUATIONS OF NORMAL MAXIMUM AND MINIMUM TEMPERATURE AND HUMIDITY.



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

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

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

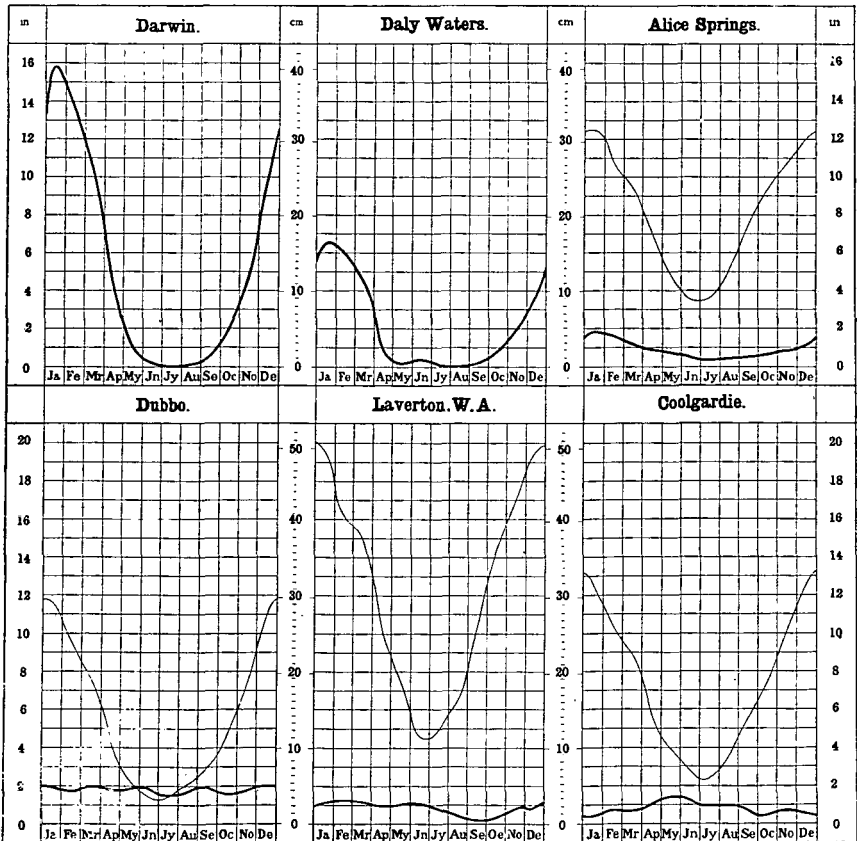
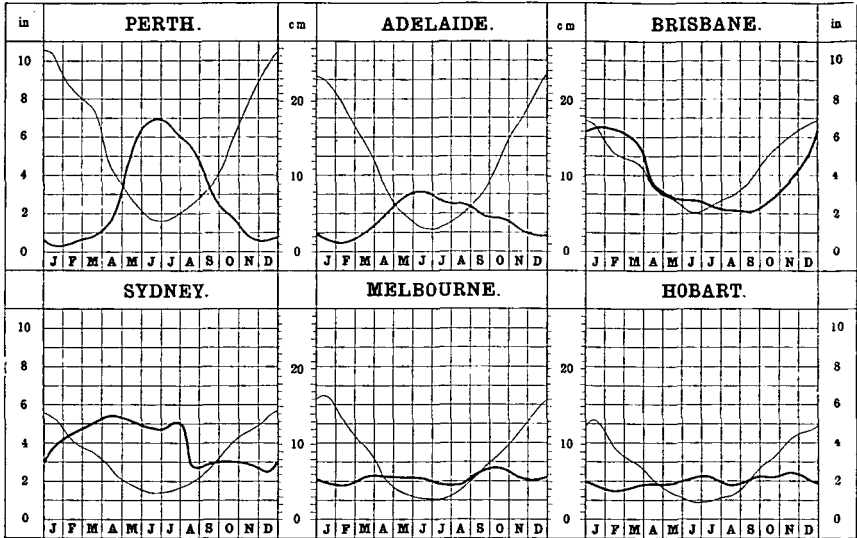
The curves for temperature and vapour pressure joining the mean monthly values serve to show the annual fluctuation of these elements, but the relative humidity graphs joining the extreme values for each month do not indicate any normal annual variation.

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.

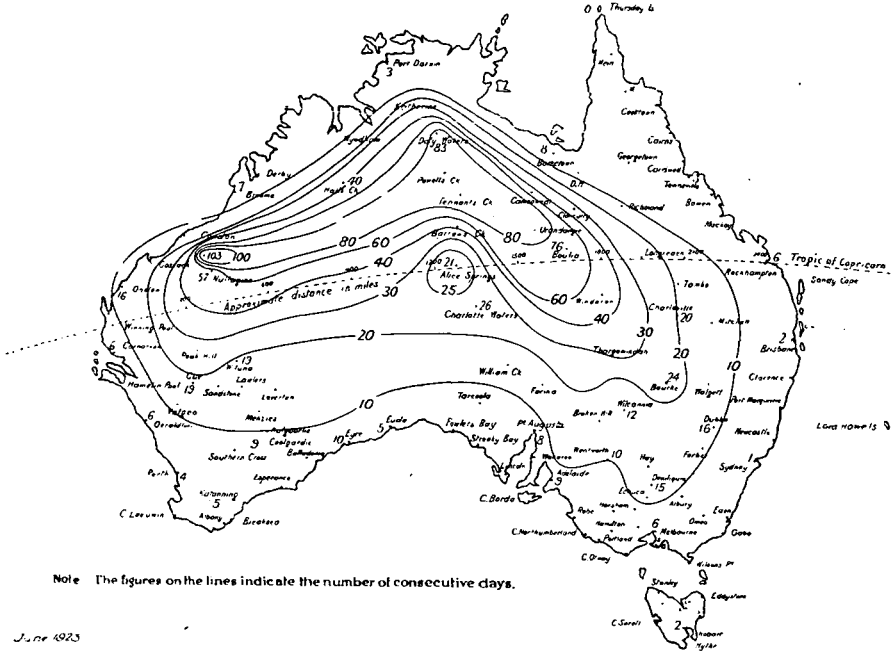
The relative humidity curves illustrate the extreme range of the mean monthly humidity over a number of years.



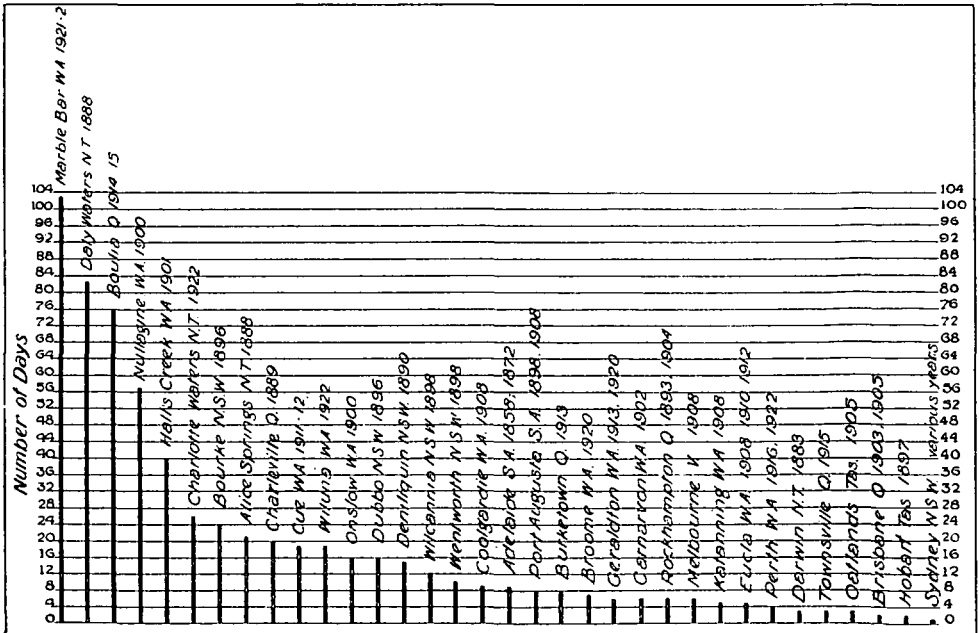
## MEAN MONTHLY RAINFALL AND EVAPORATION.



**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.**



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

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

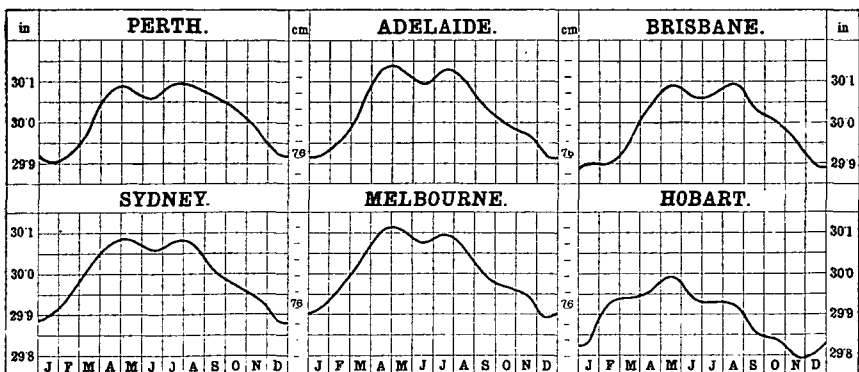
The distance for any date from the zero line to the curve represents the average number of inches, reckoned as per month, of rainfall at that date. Thus, taking the curves for Adelaide, in the middle of January the rain falls on the average at the rate of about three-fourths of an inch per month, or, 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 ..	34.10	65.80	Darwin ..	62.07	—
Adelaide ..	21.18	54.55	Daly Waters ..	26.58	—
Brisbane ..	45.20	53.37	Alice Springs ..	11.24	93.99
Sydney ..	47.74	38.43	Dubbo ..	21.82	66.37
Melbourne ..	25.61	38.60	Laverton, W.A.	9.76	141.45
Hobart ..	23.77	32.10	Coolgardie ..	10.07	87.69

MEAN BAROMETRIC PRESSURE—CAPITAL CITIES.



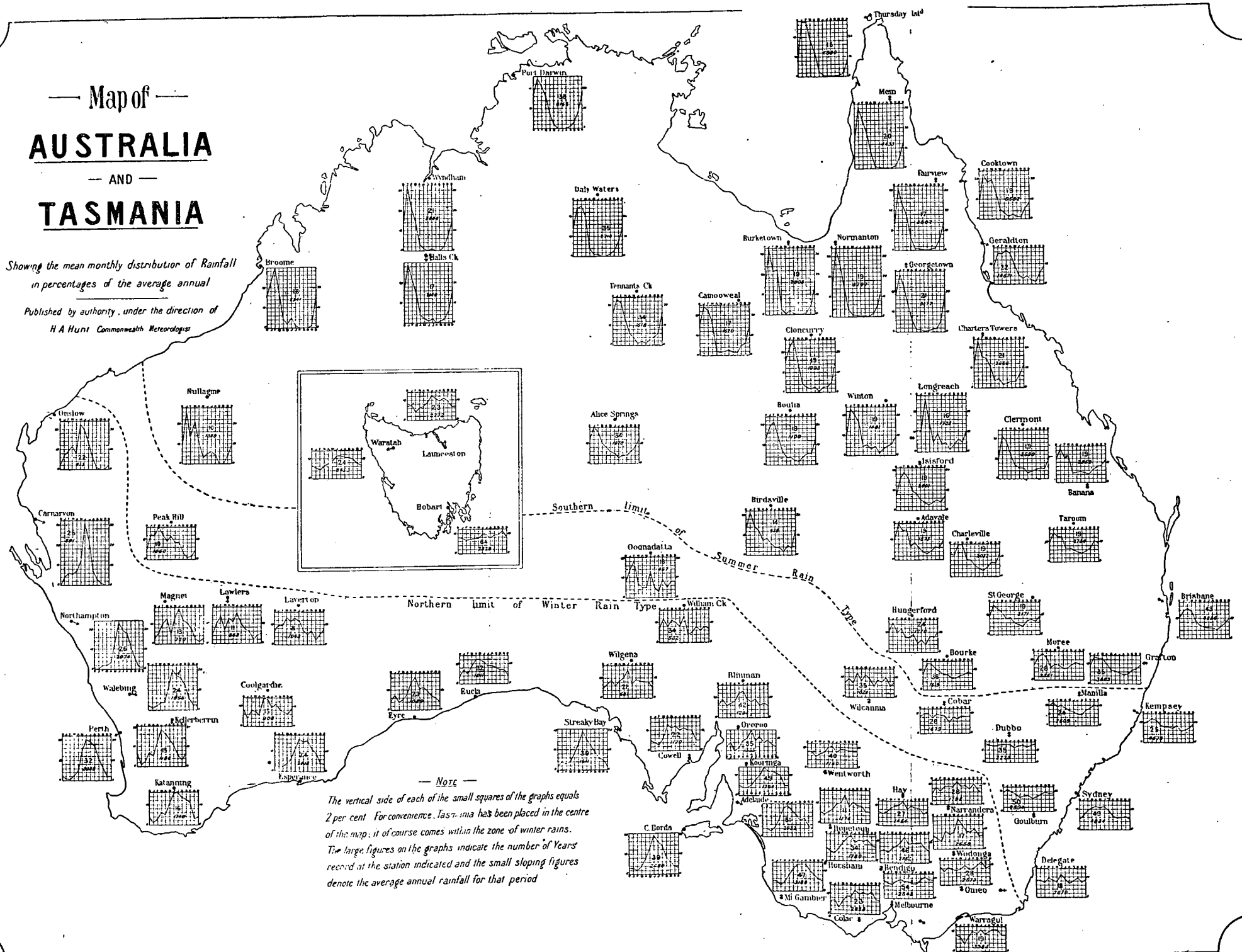
EXPLANATION.—The lines representing the yearly fluctuations of barometric pressure at the State capital cities are means for long periods, and are plotted from the Climatological Tables herein. The pressures are shown in inches on about  $2\frac{1}{4}$  times the natural scale, and the corresponding pressures in centimetres are also shown in the two inner columns, in which each division represents one millimetre.

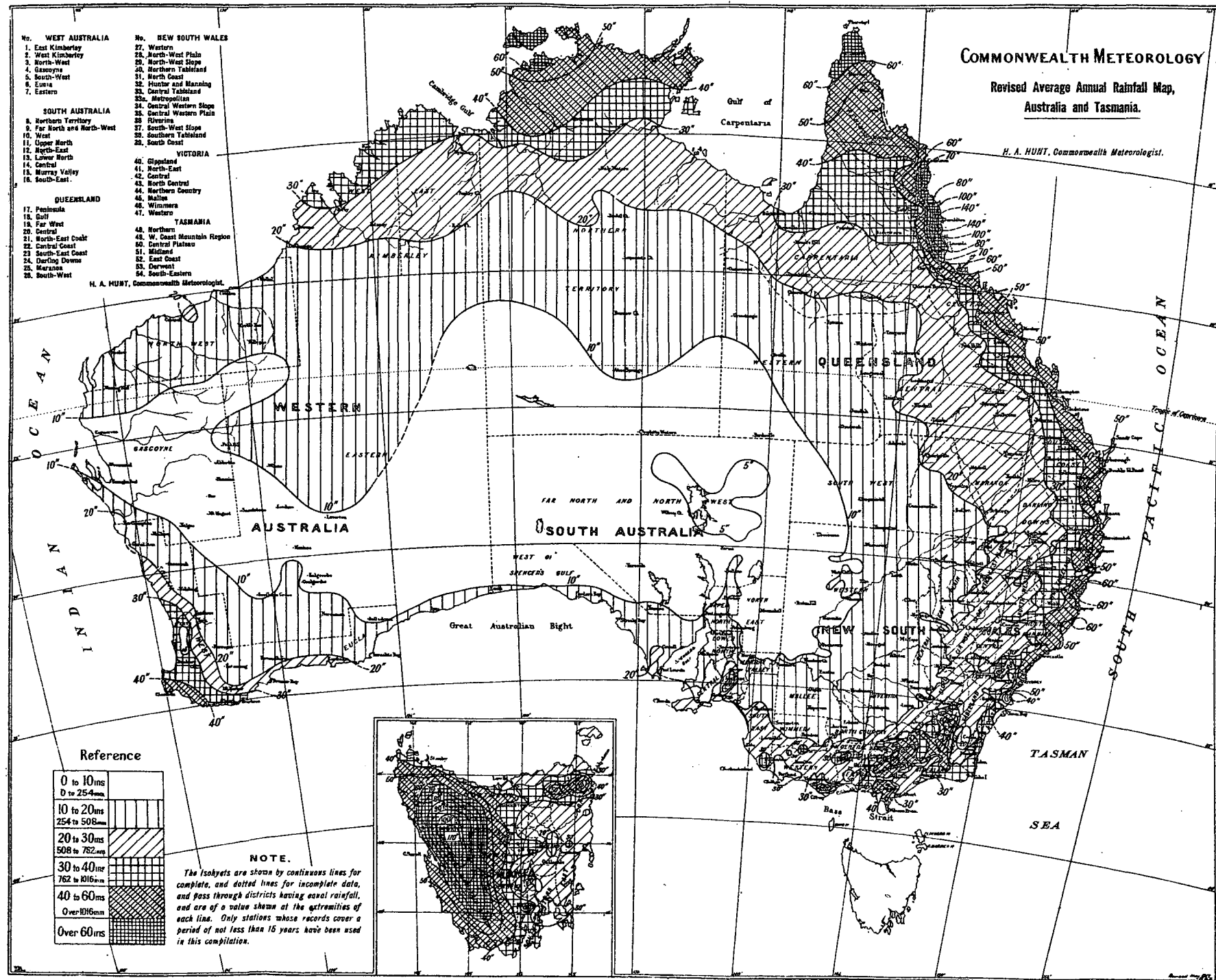
INTERPRETATION.—Taking the Brisbane graph for purposes of illustration, it will be seen that the mean pressure in the middle of January is about 29.87 inches, and there are maxima in the middle of May and August of about 30.09 inches.

— Map of —  
**AUSTRALIA**  
— AND —  
**TASMANIA**

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

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





## RAINFALL AND TEMPERATURE—VARIOUS CITIES.

Place.	Height above M.S.L.	Annual Rainfall.			Temperature.							
		Average.	Highest.	Lowest.	(a) Mean Summer.	(b) Mean Winter.	Highest on Record.	Lowest on Record.	Average Hottest Month.	Average Coldest Month.		
		Ins.	Ins.	Ins.	Fahr.	Fahr.	Fahr.	Fahr.	Fahr.	Fahr.		
Amsterdam ..	6	27.29	40.59	17.60	63.2	36.8	90.0	4.1	64.4	35.4		
Auckland ..	125	43.88	74.15	26.32	66.2	52.5	91.0	31.9	67.1	51.8		
Athens ..	351	15.48	33.33	4.56	79.2	49.1	109.4	10.6	81.0	47.4		
Bergen ..	72	77.09	111.58	44.49	56.8	34.2	88.5	4.8	57.9	33.6		
Berlin ..	161	22.72	30.04	14.25	64.8	33.0	98.6	-13.0	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 ..	37	71.15	114.89	33.41	83.5	75.1	100.0	-55.9	84.8	74.2		
Breslau ..	482	22.52	32.56	16.50	64.1	33.5	100.0	-23.4	65.5	29.3		
Brussels ..	328	28.35	41.18	17.73	62.6	36.0	95.5	-4.4	63.7	34.5		
Budapest ..	500	25.20	35.28	16.79	68.6	30.2	98.6	-5.1	70.4	28.2		
Buenos Ayres ..	82	38.78	79.72	20.04	72.7	50.9	103.1	22.3	73.8	50.0		
Calcutta ..	21	61.82	98.48	38.43	85.6	68.0	108.2	44.2	86.0	66.4		
Capetown ..	40	25.50	36.72	17.71	68.1	54.7	102.0	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 ..	25	25.16	35.30	13.54	61.3	43.3	95.7	21.3	61.6	42.4		
Christiania (Oslo) ..	75	23.23	32.21	16.26	61.0	24.5	95.0	-21.1	62.6	23.9		
Colombo ..	40	83.83	139.70	51.60	81.5	79.9	95.8	65.0	82.6	79.1		
Constantinople ..	245	28.75	42.74	14.78	74.0	43.5	103.6	13.0	75.7	42.0		
Copenhagen ..	10	20.79	25.83	15.47	60.4	33.3	85.5	-3.3	61.9	32.4		
Dresden ..	115	26.80	34.49	17.72	62.9	32.4	93.4	-15.3	64.4	31.6		
Dublin ..	47	27.66	35.56	16.60	59.4	42.0	87.2	13.3	60.5	41.7		
Dunedin ..	300	36.96	54.51	22.15	56.3	42.6	94.0	23.0	57.0	41.5		
Durban ..	260	40.79	71.27	27.24	75.6	64.4	110.6	41.1	76.7	63.8		
Edinburgh ..	441	25.21	32.05	16.44	55.8	38.8	87.7	5.0	57.2	38.3		
Geneva ..	1,328	33.48	46.89	21.14	64.4	33.7	95.5	..	66.2	32.2		
Genoa ..	157	51.29	108.22	28.21	73.8	46.8	94.5	16.7	75.4	45.5		
Glasgow ..	184	38.49	56.18	29.05	52.7	41.0	84.9	6.6	58.0	38.4		
Greenwich ..	149	23.50	35.54	16.38	62.0	39.5	100.0	6.9	63.5	38.5		
Hong Kong ..	109	84.28	119.72	45.84	86.2	64.8	97.0	32.0	86.7	62.9		
Johannesburg ..	5,750	31.63	50.00	21.66	65.4	54.4	94.0	23.3	68.2	48.9		
Leipzig ..	384	24.69	31.37	17.10	63.1	31.5	97.3	-14.8	64.8	30.6		
Lisbon ..	312	29.18	52.79	17.32	69.6	51.3	94.1	32.5	70.2	49.3		
London (Kew) ..	18	23.80	38.20	16.64	61.2	39.8	94.0	9.4	62.7	38.9		
Madras ..	22	49.85	88.41	18.45	89.0	76.8	113.0	57.5	89.9	76.1		
Madrid ..	2,149	16.23	27.48	9.13	73.0	41.2	107.1	10.5	75.7	39.7		
Marseilles ..	246	22.24	43.03	12.28	70.5	45.3	100.4	11.7	72.3	44.6		
Moscow ..	526	18.94	29.28	12.07	63.4	14.7	99.5	-44.5	66.1	11.9		
Naples ..	489	34.00	56.58	21.75	73.6	48.0	99.1	23.9	75.4	46.8		
New York ..	314	44.63	58.68	33.17	71.4	31.8	102.0	-13.0	73.5	30.2		
Ottawa ..	236	33.40	53.79	25.63	67.2	14.1	98.0	-33.0	69.7	12.0		
Paris ..	164	22.64	29.57	16.46	63.5	37.2	101.1	-14.1	64.9	36.1		
Pekin ..	143	24.40	36.00	18.00	77.7	26.6	114.0	-5.0	79.2	23.6		
Petrograd ..	16	21.30	29.52	13.75	61.1	17.4	97.0	-38.2	63.7	15.2		
Quebec ..	296	40.50	53.79	32.12	63.5	12.4	96.0	-34.0	66.3	10.1		
Rome ..	168	32.57	57.89	12.72	74.3	46.0	104.2	17.2	76.1	44.6		
San Francisco ..	155	22.27	38.82	9.00	58.8	50.5	101.0	29.0	59.3	49.5		
Shanghai ..	21	45.00	62.52	27.92	78.0	41.1	102.9	10.2	80.4	37.8		
Singapore ..	8	91.99	158.68	32.71	81.2	78.6	94.2	63.4	81.5	78.3		
Stockholm ..	144	19.09	28.27	11.81	59.5	27.3	96.8	-25.6	61.9	26.4		
Tokio ..	65	61.45	86.37	45.72	74.8	39.2	97.9	17.2	77.7	37.5		
Trieste ..	85	42.94	63.14	26.57	73.9	41.3	99.5	14.0	78.3	39.0		
Vienna ..	663	24.50	33.90	16.50	65.7	30.4	97.7	-8.0	67.1	28.0		
Vladivostok ..	55	19.54	33.60	9.39	63.9	11.0	95.7	-21.8	69.4	6.1		
Washington ..	112	43.50	61.33	30.85	74.7	34.5	106.0	-15.0	76.8	32.9		
Wellington (N.Z.) ..	10	48.65	67.68	27.83	61.8	48.6	88.0	28.6	62.5	47.7		
Zürich ..	1,542	45.15	78.27	29.02	63.3	31.3	94.1	-0.8	65.1	29.5		

## FEDERAL CAPITAL SITE.

Canberra (Dist.)	{ 2,000 to (2,900)	22.50	41.29	10.45	(a) 68.0	(b) 44.0	102.6	14.0	68.6	42.7
Queanbeyan										

## STATE CAPITALS.

					(a)	(b)				
Perth ..	197	34.08	46.73	20.21	73.0	56.0	108.4	34.2	74.2	55.2
Adelaide ..	140	21.21	30.87	11.39	72.6	53.1	118.3	32.0	74.1	51.7
Brisbane ..	137	45.14	82.26	16.17	76.7	59.7	108.9	36.1	77.2	58.5
Sydney ..	138	47.58	82.76	21.49	71.0	54.1	108.5	35.9	71.7	52.6
Melbourne ..	115	25.73	44.25	15.61	66.6	50.0	111.2	27.0	67.5	48.6
Hobart ..	177	23.83	43.39	13.43	61.6	46.8	105.2	27.0	62.3	45.6

(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 1924. These are given in the following tables:—

## CLIMATOLOGICAL DATA—PERTH, WESTERN AUSTRALIA.

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

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

Month.	Bar. corrected to 32° F. Mm. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind.				Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m. 3 p.m. & 9 p.m.	No. of Clear Days.
		Greatest Number of Miles in one day.	Mean Hourly Pressure. (lbs.)	Total Miles.	Prevailing Direction.				
No. of yrs. over which observation extends	40	27	27	27	27	26	27	28	28
January ..	29.906	797 27/98	0.67	11,192	S S E	10.35	1.7	2.9	13.9
February ..	29.924	650 6/08	0.63	9,786	S S E	8.59	1.5	2.9	11.6
March ..	29.987	651 6/13	0.53	9,950	S S E	7.65	1.4	3.2	12.0
April ..	30.075	955 25/00	0.39	8,343	S E	4.75	1.3	4.2	7.9
May ..	30.073	768 5/12	0.34	8,073	E N E	2.72	2.3	5.3	5.1
June ..	30.058	861 27/10	0.35	7,966	N	1.75	2.2	5.9	3.2
July ..	30.092	949 11/99	0.38	8,485	N	1.75	2.4	5.4	5.0
August ..	30.086	966 15/03	0.40	8,803	W	2.35	1.6	5.4	5.0
September ..	30.060	864 11/05	0.42	8,618	S W	3.30	1.3	4.9	5.7
October ..	30.030	809 6/16	0.52	9,876	S S W	5.22	1.0	4.9	5.9
November ..	29.988	777 18/97	0.53	10,099	S	7.60	1.3	3.8	8.1
December ..	29.927	776 6/22	0.63	10,955	S	9.77	1.8	2.9	12.3
Year { Totals ..	—	—	—	—	—	65.80	19.8	—	95.7
Averages ..	30.017	—	0.48	9,346	S	—	—	4.3	—
Extremes ..	—	966 15/8/03	—	—	—	—	—	—	—

## TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.).			Extreme Shade Temperature (Fahr.).		Extreme Range.	Extreme Temperature (Fahr.).		Mean Hours of Sunshine.
	Mean.	Max.	Min.	Highest.	Lowest.		Highest in Sun.	Lowest on Grass.	
No. of yrs. over which observation extends	28	28	28	28	28	28	26	26	27
January ..	84.3	63.1	73.7	108.4 28/21	49.9 1/21	58.5	177.3 22/14	40.4 1/21	318.4
February ..	85.0	63.5	74.2	107.4 4/23	47.7 1/02	59.7	169.0 4/99	39.8 1/13	270.8
March ..	81.5	60.9	71.2	106.4 14/22	45.8 8/03	60.6	167.0 19/18	36.7 8/03	269.5
April ..	76.2	57.2	66.7	99.7 9/10	39.3 20/14	60.4	157.0 8/16	31.0 20/14	218.7
May ..	68.7	52.5	60.6	90.4 2/07	34.3 11/14	56.1	144.2 8/24	25.3 11/14	176.5
June ..	63.9	49.5	56.7	81.7 2/14	35.0 30/20	46.7	135.5 9/14	26.5 30/20	144.2
July ..	62.7	47.8	55.2	76.4 21/21	34.2 7/16	42.2	133.2 13/15	25.1 30/20	166.7
August ..	63.8	48.1	56.0	81.0 12/14	35.3 31/08	45.7	145.1 29/21	27.9 10/11	184.9
September ..	66.0	50.1	58.0	90.9 30/18	38.9 17/13	52.0	153.6 29/16	29.2 21/16	203.2
October ..	69.1	52.6	60.8	95.3 30/22	40.5 5/24	54.8	154.0 29/14	30.5 4/17	235.9
November ..	75.5	56.5	66.6	104.6 24/13	42.0 1/04	62.6	166.6 23/15	35.5 (a)	285.7
December ..	80.7	60.4	70.6	107.9 20/04	48.0 2/10	59.9	168.7 25/15	39.0 12/20	324.4
Year { Averages ..	73.1	55.2	64.1	—	—	—	—	—	2798.9b
Extremes ..	—	—	—	108.4 28/1/21	34.2 7/7/16	74.2	177.3 22/1/14	25.1 30/7/20	—

(a) 6/10 and 14/12.

(b) Total for year.

## HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches).	Rel. Hum. (%)				Rainfall (inches).				Dew. Mean No. Days Dew.
	Mean 9 a.m.	Mean 9 a.m.	Highest Mean.	Lowest Mean.	Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	
No. of yrs. over which observation extends	23	28	28	28	49	49	49	49	49	28
January ..	.440	52	61	42	0.34	3	2.17 1879	nil (a)	1.74 28/79	2.6
February ..	.443	54	65	46	0.45	2	2.98 1915	nil (a)	1.63 26/15	3.2
March ..	.423	56	66	46	0.76	4	4.50 1896	nil (a)	2.06 26/23	5.6
April ..	.398	63	72	53	1.59	7	4.97 1882	nil 1920	2.62 30/04	9.1
May ..	.368	73	81	61	4.94	14	12.13 1879	0.98 1903	2.80 20/79	12.4
June ..	.339	78	83	68	6.89	17	12.80 1922	2.16 1877	3.00 10/20	12.8
July ..	.318	77	84	69	6.44	17	11.29 1917	2.42 1876	3.00 4/91	13.3
August ..	.325	74	79	67	5.70	18	10.33 1882	0.46 1902	2.79 7/03	11.3
September ..	.300	68	75	58	3.40	15	7.84 1922	0.34 1916	1.73 23/09	9.3
October ..	.350	68	75	54	2.18	12	7.87 1890	0.46 1892	1.88 15/10	5.3
November ..	.380	55	63	46	0.80	6	2.78 1916	nil 1891	1.11 30/03	3.8
December ..	.417	52	62	44	0.59	4	3.05 1888	nil 1886	1.72 1/88	3.0
Year { Totals ..	—	—	—	—	34.08	119	—	—	—	91.1
Averages ..	.375	62	—	—	—	—	12.80 6/22	nil (b)	3.90 10/6/20	—
Extremes ..	—	—	84	42	—	—	—	—	—	—

(a) Various years.

(b) January, February, March, November, and December, various years.

## CLIMATOLOGICAL DATA—ADELAIDE. SOUTH AUSTRALIA.

LAT. 34° 56' S., LONG. 138° 35' E. HEIGHT ABOVE M.S.L. 140 FT.  
BAROMETER, WIND, EVAPORATION, LIGHTNING, CLOUDS, AND CLEAR DAYS.

Month.	Bar. corrected to 32° F. Mm. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind.				Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m. 3 p.m. & 9 p.m.	No. of Clear Days.
		Greatest Number of Miles in one day.	Mean Hourly Pressure. (lbs.)	Total Miles.	Prevailing Direction.				
No. of yrs. over which observation extends	68	47	47	47	47	55	53	57	43
January ..	29.915	758 19/99	0.34	7,907	S	8.96	2.3	3.5	8.2
February ..	29.952	691 22/96	0.29	6,713	S	7.34	2.0	3.4	7.2
March ..	30.038	628 9/12	0.24	6,660	S	5.80	2.1	3.9	7.0
April ..	30.122	773 10/96	0.21	6,079	S x W	3.43	1.5	5.0	4.1
May ..	30.122	760 9/80	0.21	6,253	N x E	2.02	1.7	5.8	1.9
June ..	30.033	750 12/78	0.25	6,589	N	1.23	2.1	6.2	1.6
July ..	30.129	674 25/82	0.24	6,721	N	1.23	1.6	5.8	1.8
August ..	30.099	773 31/97	0.28	7,146	N N W	1.87	2.1	5.6	2.6
September ..	30.037	720 2/87	0.31	7,296	W	2.84	2.5	5.2	3.1
October ..	29.997	763 28/98	0.34	7,869	S W x W	4.75	3.4	4.9	3.9
November ..	29.974	677 2/04	0.33	7,549	S S W	6.54	3.6	4.6	5.2
December ..	29.918	675 12/91	0.34	7,892	S S W	8.39	2.7	3.8	7.4
Year { Totals ..	—	—	—	—	—	54.45	27.6	—	54.0
Averages ..	30.033	—	0.28	7,057	S W x S	—	—	4.8	—
Extremes ..	—	773 (a)	—	—	—	—	—	—	—

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

## TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.).			Extreme Shade Temperature (Fahr.).		Extreme Range.	Extreme Temperature (Fahr.).		Mean Hours of Sunshine.
	Mean Max.	Mean Min.	Mean.	Highest.	Lowest.		Highest in Sun.	Lowest on Grass.	
No. of yrs. over which observation extends	68	68	68	68	68	68	47	64	43
January ..	86.3	61.6	73.9	116.3 26/58	45.1 21/84	71.2	180.0 18/82	36.5 14/79	309.5
February ..	86.2	62.1	74.1	113.6 12/99	45.5 23/18	68.1	170.5 10/00	36.7 (c)	263.3
March ..	80.7	58.8	69.8	108.0 12/61	44.8 -/57	63.2	174.0 17/83	33.8 27/80	239.7
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	178.0
May ..	65.6	50.3	57.9	89.5 4/21	36.9 (a)	52.6	148.2 12/79	25.9 10/91	148.1
June ..	60.3	46.7	53.5	76.0 23/65	32.5 27/76	43.5	138.8 18/79	22.9 12/13	121.0
July ..	58.9	44.6	51.7	74.0 11/06	32.0 24/08	42.0	134.5 26/90	23.3 25/11	137.6
August ..	62.0	45.9	54.0	85.0 31/11	32.3 17/59	52.7	140.0 31/92	23.5 7/88	168.7
September ..	66.2	47.9	57.1	90.7 23/82	32.7 4/58	58.0	160.5 23/82	26.2 15/08	183.1
October ..	72.4	51.4	61.9	102.9 21/22	36.0 -/57	66.9	162.0 30/21	27.8 2/18	227.2
November ..	78.6	55.3	67.0	113.5 21/65	40.8 2/09	72.7	166.9 20/78	31.5 2/09	262.4
December ..	83.3	58.9	71.1	114.2 14/76	43.0 (b)	71.2	175.7 7/99	32.5 4/84	302.4
Year { Averages ..	72.8	53.2	63.0	—	—	—	—	—	2536.5d
Extremes ..	—	—	—	116.3 26/1/58	32.0 24/7/08	84.3	180.0 18/1/82	22.9 12/6/13	—

(a) 26/1895 and 24/1904.

(b) 16/1861 and 4/1906.

(c) 24/78 and 23/18.

(d) Total for year.

## HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches)	Rel. Hum. (%)				Rainfall (inches).				Dew. Mean No. Days 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	57	57	57	57	86	86	86	86	86	53
January ..	.342	38	59	30	0.73	4	4.00 1850	nil (a)	2.30 2/89	4.2
February ..	.359	41	56	30	0.66	4	2.89 1919	nil (b)	2.24 14/13	5.7
March ..	.348	47	58	36	1.05	6	4.60 1878	nil (c)	3.50 5/78	11.1
April ..	.336	56	72	37	1.76	9	6.78 1853	0.03 1923	3.15 5/60	13.9
May ..	.319	67	76	49	2.76	14	7.75 1875	0.20 1891	2.75 1/53	15.7
June ..	.300	77	84	69	3.15	16	8.58 1916	0.42 1886	2.11 1/20	15.7
July ..	.276	76	87	68	2.65	16	5.38 1865	0.37 1899	1.75 10/65	17.3
August ..	.246	69	77	54	2.51	16	6.24 1852	0.35 1914	2.23 10/51	16.5
September ..	.297	61	72	44	2.04	14	5.83 1923	0.45 1896	1.59 20/23	15.7
October ..	.300	51	67	29	1.74	11	3.83 1870	0.17 1914	2.24 16/08	12.7
November ..	.312	43	57	31	1.16	8	3.55 1851	0.04 1885	1.88 28/58	7.0
December ..	.325	39	50	33	1.00	6	3.98 1861	nil 1904	2.42 23/13	4.9
Year { Totals ..	—	—	—	—	21.21	124	—	—	—	140.4
Averages ..	.311	53	—	—	—	—	8.58 6/16	nil (d)	3.50 5/3/78	—
Extremes ..	—	—	87	29	—	—	—	—	—	—

(a) 1848, &amp;c.

(b) 1848, &amp;c.

(c) 1859, &amp;c.

(d) January, February, March and 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. & 9 p.m.	No. of Clear Days.
		Greatest Number of Miles in one day.	Mean Hourly Pressure. (lbs.)	Total Miles.	Prevailing Direction.				
No. of yrs. over which observation extends.	38	14	14	14	38	16	38	33	16
January ..	29.867	361 1/22	0.12	4,696	E & S E	6.881	6.0	5.7	3.3
February ..	29.902	347 5/22	0.13	4,600	S E	5.332	5.3	5.7	1.9
March ..	29.958	305 29/16	0.10	4,272	S E & S	4.947	4.6	5.2	5.1
April ..	30.050	370 27/23	0.09	3,980	S	3.784	3.2	4.6	7.7
May ..	30.086	307 20/22	0.08	3,759	S	2.882	3.3	4.3	8.8
June ..	30.064	400 12/24	0.10	3,701	S	2.235	2.2	4.2	8.8
July ..	30.072	359 2/23	0.08	3,804	S to W	2.463	2.4	3.7	11.5
August ..	30.096	331 6/23	0.09	4,042	S	3.056	3.6	3.5	11.8
September ..	30.036	322 14/23	0.08	3,766	S	3.922	5.9	3.5	12.2
October ..	30.003	325 25/18	0.09	4,149	N E	5.382	6.9	4.0	8.4
November ..	29.955	274 18/23	0.12	4,503	N E	6.009	8.4	4.7	6.6
December ..	29.888	303 24/24	0.13	4,846	N E	6.831	8.8	5.2	3.7
Year { Totals ..	—	—	—	—	S to E and N E	53.814	60.6	—	89.8
Averages ..	29.998	—	0.10	4,176	—	—	—	4.5	—
Extremes ..	—	400 12/6/24	—	—	—	—	—	—	—

## 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.	38	38	38	38	38	38	38	38	16
January ..	85.5	68.9	77.2	108.9 14/02	58.8 4/93	50.1	166.4 10/17	49.9 4/93	225.4
February ..	84.5	68.3	76.4	101.9 11/04	58.7 (a)	43.2	165.2 6/10	49.3 9/89	203.8
March ..	82.4	66.3	74.4	99.4 5/19	52.4 29/13	47.0	160.0 1/87	45.4 29/13	210.1
April ..	79.0	61.6	70.3	95.2 (b)	48.6 17/00	46.6	153.8 11/16	37.0 17/00	203.7
May ..	73.7	55.4	64.6	90.3 21/23	41.3 24/99	47.5	147.0 1/10	29.8 8/97	197.5
June ..	69.4	51.0	60.2	88.9 19/18	36.3 29/08	52.6	136.0 3/18	25.4 23/88	169.9
July ..	68.4	48.6	58.5	83.4 28/98	36.1 (c)	47.3	146.1 20/15	23.9 11/90	196.1
August ..	71.1	49.8	60.4	87.5 28/07	37.4 6/87	50.1	141.9 20/17	27.1 9/99	231.2
September ..	75.8	54.9	65.4	95.2 16/12	40.7 1/96	54.5	155.5 26/03	30.4 1/89	233.5
October ..	79.8	59.9	69.8	101.4 18/93	43.3 3/99	58.1	157.4 31/18	34.9 8/89	249.9
November ..	82.9	64.2	73.6	106.1 18/13	48.5 2/05	57.6	162.3 7/89	38.8 1/05	243.2
December ..	85.2	67.5	76.4	105.9 26/93	56.4 13/12	49.5	160.4 7/14	49.1 3/94	241.1
Year { Averages ..	78.1	59.7	68.9	—	—	—	—	—	2605.4d
Extremes ..	—	—	—	108.9 14/1/02	36.1 (c)	72.8	166.4 10/1/17	23.9 11/7/90	—

(a) 10 and 11/04.

(b) 9/96 and 5/03.

(c) 12/94 and 2/96.

(d) Total for year.

## HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (Inches).	Rel. Hum. (%)				Rainfall (Inches).				Dew.
		Mean 9 a.m.	Mean 3 p.m.	Highest Mean.	Lowest Mean.	Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	
No. of yrs. over which observation extends.	38	38	38	38	73	65	73	73	73	38
January ..	.654	67	79	53	6.31	14	27.72 1895	0.32 1919	18.31 21/87	6.4
February ..	.655	70	82	55	6.31	14	40.39 1893	0.58 1849	8.36 16/93	6.5
March ..	.628	72	85	56	5.76	15	34.04 1870	nil 1849	11.18 14/08	9.9
April ..	.533	73	80	60	3.61	12	15.28 1867	0.04 1897	4.47 13/16	12.3
May ..	.430	74	85	64	2.83	10	13.85 1876	nil 1846	5.62 9/79	13.5
June ..	.352	74	84	67	2.67	8	14.03 1873	nil 1847	6.01 9/93	11.5
July ..	.333	74	81	61	2.35	8	8.46 1889	nil 1841	3.54 (a)	12.8
August ..	.348	69	80	61	2.11	7	14.67 1879	nil (b)	4.89 12/87	10.8
September ..	.418	65	76	47	2.08	9	5.43 1886	0.10 1907	2.46 2/94	10.7
October ..	.485	61	72	49	2.57	9	9.99 1882	0.14 1900	1.95 20/89	8.8
November ..	.551	60	72	46	3.65	10	12.40 1917	nil 1842	4.46 16/86	5.8
December ..	.618	63	70	52	4.89	12	13.99 1910	0.35 1865	6.60 23/71	5.3
Year { Totals ..	—	—	—	—	45.14	128	—	—	—	114.3
Averages ..	.500	68	—	—	—	—	—	—	—	—
Extremes ..	—	—	85	46	—	—	40.39 2/1893	nil (c)	18.31 21/1/87	—

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

## CLIMATOLOGICAL DATA—SYDNEY, NEW SOUTH WALES.

LAT. 33° 52' S., LONG. 151° 12' E. HEIGHT ABOVE M.S.L., 138 FT.

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

Month.	Bar. corrected to 32° F. M.n. Sea Level and Standard Gravity from 24 hourly readings.	Wind.				Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m. & 9 p.m.	No. of Clear Days.
		Greatest Number of Miles in One Day.	Mean Hourly Pressure. (lbs.)	Total Miles.	Prevailing Direction.				
No. of yrs. over which observation extends	66	58	58	58	58	45	65	63	61
January ..	29.898	721 1/71	0.33	8,066	N E	5.292	4.8	5.8	2.4
February ..	29.945	871 12/69	0.31	6,921	N E	4.145	4.2	6.0	1.7
March ..	30.011	943 20/70	0.24	6,714	N E	3.576	4.1	5.5	2.3
April ..	30.074	803 6/82	0.21	6,065	N E	2.556	3.8	5.1	3.2
May ..	30.081	758 6/98	0.22	6,281	W	1.774	3.3	4.8	3.8
June ..	30.056	712 7/00	0.27	6,834	W	1.426	2.2	4.8	4.2
July ..	30.075	930 17/79	0.27	7,033	W	1.512	2.4	4.4	5.0
August ..	30.070	756 22/72	0.25	6,790	W	1.877	3.2	4.0	5.4
September ..	30.005	964 6/74	0.29	7,040	W	2.654	4.1	4.4	4.5
October ..	29.969	926 4/72	0.31	7,688	N E	3.836	4.9	4.9	3.0
November ..	29.939	720 13/68	0.32	7,523	N E	4.565	5.4	5.5	2.2
December ..	29.881	938 3/84	0.32	7,937	N E	5.332	5.7	5.6	2.4
Year { Totals ..	—	—	—	—	—	38.545	48.1	—	40.1
Averages ..	30.000	—	0.28	7,074	N E	—	—	5.1	—
Extremes ..	—	964 6/9/74	—	—	—	—	—	—	—

## 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	66	66	66	66	66	66	63	66	14
January ..	78.5	64.9	71.7	108.5 13/96	51.2 14/65	57.3	164.3 26/15	44.2 18/97	210.0
February ..	77.6	64.9	71.2	101.9 18/23	49.3 28/63	52.6	156.5 7/64	43.4 25/91	182.2
March ..	75.7	62.9	69.3	102.6 3/69	48.8 14/86	53.8	158.0 19/11	39.9 17/13	193.1
April ..	71.2	58.1	64.6	91.0 20/22	44.6 27/64	46.4	144.1 10/77	33.3 24/09	151.4
May ..	65.4	52.2	58.8	86.0 1/19	40.2 22/59	45.8	129.7 1/96	29.3 25/17	138.1
June ..	60.9	48.2	54.6	79.8 2/23	38.0 5/20	41.8	125.5 2/23	28.1 24/11	125.8
July ..	59.4	45.9	52.6	74.9 17/71	35.9 12/90	39.0	124.7 19/77	24.0 4/93	136.8
August ..	62.6	47.5	55.0	82.0 31/84	36.8 3/72	45.2	149.0 30/78	26.1 4/09	185.8
September ..	66.9	51.5	59.2	92.3 27/19	40.8 18/64	51.5	142.2 12/78	30.1 17/05	187.6
October ..	71.2	55.8	63.5	99.7 19/98	42.3 3/18	57.4	151.9 (a)	32.7 9/05	208.0
November ..	74.5	59.6	67.1	102.7 21/78	45.8 1/05	56.9	158.5 28/99	36.0 6/08	200.4
December ..	77.3	62.9	70.1	107.5 31/04	48.4 3/24	59.1	164.5 27/89	41.4 3/24	203.8
Year { Averages ..	70.1	56.2	63.2	—	—	—	—	—	2125.06
Extremes ..	—	—	—	108.5 13/1/96	35.9 12/7/90	72.6	164.5 27/12/89	24.0 4/7/03	—

(a) 30 and 31/14.

(b) 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	66	66	66	66	66	66
January ..	.556	67	78	58	3.65	14	15.26 1911	0.42 1888	7.08 13/11	1.2
February ..	.567	70	81	59	4.33	14	18.56 1873	0.34 1902	8.90 25/73	2.0
March ..	.534	72	85	62	4.92	15	18.70 1870	0.42 1876	6.52 9/13	3.3
April ..	.459	76	87	63	5.42	14	24.49 1861	0.06 1868	7.52 29/60	5.5
May ..	.335	74	90	63	5.04	15	23.03 1919	0.18 1860	8.36 28/89	6.2
June ..	.292	78	89	68	4.78	13	16.30 1885	0.19 1904	5.17 16/84	5.3
July ..	.269	75	88	65	4.97	12	13.21 1900	0.12 1862	5.72 28/08	5.3
August ..	.294	71	84	56	3.02	11	14.89 1899	0.04 1885	5.33 2/60	4.9
September ..	.352	67	79	49	2.90	12	14.05 1879	0.08 1882	5.69 10/79	3.4
October ..	.402	63	77	46	2.91	12	11.14 1916	0.21 1867	6.37 13/02	3.0
November ..	.466	64	79	42	2.82	12	9.89 1865	0.07 1915	4.23 19/00	2.1
December ..	.530	66	77	52	2.82	13	15.82 1920	0.23 1913	4.75 13/10	1.4
Year { Totals ..	—	—	—	—	47.58	157	—	—	—	43.6
Averages ..	.421	70	—	—	—	—	—	—	—	—
Extremes ..	—	—	90	42	—	—	24.49 April/61	0.04 Aug./85	8.90 25/2/73	—

## 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 59° F. M.S.L. Level and Standard Gravity from 9 a.m., 3, & 9 p.m. readings.	Wind.				Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds 9 a.m. 3 p.m. & 9 p.m.	No. of Clear Days.
		Greatest Number of Miles in One Day.	Mean Hourly Pressure. (lbs.)	Total Miles.	Prevailing Direction.				
No. of yrs. over which observation extends	67	51	51	51	51	52	17	67	17
January ..	29.910	583 10/97	0.27	7,269	S W, S E	6.426	1.8	5.1	7.4
February ..	29.960	566 8/68	0.25	6,308	S W, S E	5.056	2.7	5.0	7.1
March ..	30.033	677 9/81	0.20	6,275	S W, S E	3.976	1.6	5.5	5.1
April ..	30.105	597 7/68	0.19	5,066	S W, N W	2.375	0.8	5.8	4.6
May ..	30.103	693 12/65	0.19	5,819	N W, N E	1.469	0.6	6.5	3.2
June ..	30.071	761 13/76	0.22	6,345	N W, N E	1.094	0.8	6.7	3.2
July ..	30.094	755 8/74	0.21	6,305	N W, N E	1.050	0.5	6.3	3.2
August ..	30.065	637 14/75	0.24	6,762	N W, N E	1.468	1.1	6.3	3.9
September ..	29.996	617 11/72	0.26	6,943	N W, S W	2.299	1.6	6.1	3.6
October ..	29.965	899 5/66	0.27	7,231	S W, N W	3.341	2.2	6.0	4.1
November ..	29.948	734 13/66	0.27	6,953	S W, S E	4.535	2.5	5.9	3.5
December ..	29.897	655 1/75	0.27	7,393	S W, S E	5.761	1.9	5.5	4.2
Year { Totals ..	—	—	—	—	—	—	—	—	—
Averages ..	30.012	—	0.24	6,608	S W, N W	38.853	18.1	—	51.1
Extremes ..	—	899 5/10/66	—	—	—	—	—	5.9	—

## 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	69	69	69	69	69	69	65	65	43
January ..	78.1	56.8	67.4	111.2 14/62	42.0 28/85	69.2	178.5 14/62	30.2 28/85	266.8
February ..	78.0	57.1	67.5	109.5 7/01	40.2 24/24	69.3	167.5 15/70	30.9 6/91	244.4
March ..	74.3	54.6	64.5	105.5 2/93	37.1 17/84	68.4	164.5 1/68	28.9 (b)	207.3
April ..	68.4	50.7	59.5	94.0 (a)	34.8 24/88	59.2	152.0 8/61	25.0 23/97	163.1
May ..	61.5	46.7	54.1	83.7 7/05	29.9 29/16	53.8	142.6 2/59	21.1 26/16	141.3
June ..	56.8	44.1	50.4	72.2 1/07	25.0 11/66	44.2	129.0 11/61	20.4 17/95	111.5
July ..	55.6	41.7	48.6	68.4 24/78	27.0 21/69	41.4	125.8 27/80	20.5 12/03	106.8
August ..	58.7	43.4	51.0	77.0 20/85	28.3 11/63	48.7	137.4 28/69	21.3 14/02	155.5
September ..	62.6	45.6	54.1	85.0 19/19	31.1 16/08	53.9	142.1 20/67	22.8 8/18	172.1
October ..	67.0	48.2	57.6	98.4 24/14	32.1 3/71	66.3	154.3 28/68	24.8 22/18	206.7
November ..	71.3	51.2	61.3	105.7 27/94	36.5 2/96	69.2	159.6 29/65	24.6 2/96	244.2
December ..	75.3	54.2	64.8	110.7 15/76	40.0 4/70	70.7	170.3 20/69	33.2 1/04	256.9
Year { Averages ..	67.3	49.5	58.4	—	—	—	—	—	2277.0c
Extremes ..	—	—	—	111.2 14/1/62	27.0 21/7/69	84.2	178.5 14/1/62	20.4 17/6/95	—

(a) 6/1865 and 17/1922.

(b) 17/1884 and 20/1897.

(c) Total for year.

## HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches)	Rel. Hum. (%)				Rainfall (inches).				Dew. Mean No. of Days Dew.
	Mean 9 a.m.	Mean 9 a.m.	Highest Mean.	Lowest Mean.	Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	
No. of yrs. over which observation extends	17	17	17	17	69	69	69	69	66	17
January ..	.383	58	65	50	1.87	8	5.68 1904	0.04 1878	2.97 9/97	2.1
February ..	.417	62	69	53	1.74	7	6.24 1904	0.03 1870	3.37 18/19	2.7
March ..	.376	64	71	57	2.23	9	7.50 1911	0.18 1859	3.55 5/19	7.2
April ..	.338	71	78	66	2.21	11	6.71 1901	Nil 1923	2.28 22/01	8.4
May ..	.318	78	84	71	2.18	13	4.31 1862	0.45 1901	1.85 7/91	8.6
June ..	.283	83	88	77	2.08	14	4.51 1859	0.73 1877	1.74 21/04	8.3
July ..	.260	82	86	76	1.85	14	7.02 1891	0.57 1902	2.71 12/91	10.0
August ..	.272	76	82	70	1.89	14	4.04 1924	0.48 1903	1.94 26/24	8.3
September ..	.292	69	76	60	2.47	14	7.93 1916	0.52 1907	2.62 12/80	6.4
October ..	.304	62	67	56	2.67	13	7.61 1869	0.29 1914	3.00 17/69	6.2
November ..	.330	59	69	52	2.26	11	6.71 1916	0.25 1895	2.57 16/76	1.9
December ..	.358	57	69	51	2.33	9	7.18 1863	0.11 1904	2.62 28/07	2.0
Year { Totals ..	—	—	—	—	25.78	137	—	—	—	72.1
Averages ..	.319	68	—	—	—	—	—	—	—	—
Extremes ..	—	—	88	50	—	—	7.93 9/16	Nil 4/23	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 Cloud, 9 a.m. 3 p.m. & 9 p.m.	No. of Clear Days.
		Greatest Number of Miles in One Day.	Mean Hourly Pressure. (lbs.)	Total Miles.	Prevailing Direction. 9 a.m. 3 p.m.				
No. of yrs. over which observation extends	40	14	14	14	19	14	17	62	18
January ..	29.826	500 30/16	0.19	5,995	NNW SE	5.045	0.9	5.9	2.5
February ..	29.925	393 19/13	0.13	4,567	NNW SE	3.714	1.4	6.0	2.5
March ..	29.937	407 16/21	0.13	4,962	NNW SE	2.967	1.2	5.9	2.0
April ..	29.965	475 12/22	0.14	4,877	NNW NW	1.990	0.8	6.0	1.8
May ..	29.982	411 3/16	0.12	4,844	NNW NNW	1.379	0.6	6.0	2.1
June ..	29.938	569 27/20	0.13	4,757	NNW NNW	0.891	0.7	6.1	1.7
July ..	29.934	425 16/21	0.12	4,767	NNW NNW	0.899	0.6	5.8	2.6
August ..	29.927	459 30/11	0.13	4,873	NNW NNW	1.247	0.6	5.9	2.1
September ..	29.844	516 26/15	0.18	5,514	NNW NW	1.985	0.9	6.1	1.7
October ..	29.834	461 8/12	0.18	5,757	NNW SE	3.116	0.9	6.3	1.6
November ..	29.798	508 18/15	0.20	5,873	NNW SE	4.030	0.9	6.3	1.6
December ..	29.808	486 30/20	0.18	5,725	NNW SE	4.562	1.1	6.2	1.1
Year { Totals ..	—	—	—	—	—	31.825	10.6	—	23.3
Averages ..	29.893	—	0.15	5,210	NNW SE & NNW	—	—	6.0	—
Extremes ..	—	569 27/6/20	—	—	—	—	—	—	—

## 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	54	54	54	78	78	78	37	57	30
January ..	71.3	52.9	62.1	105.0 1/00	40.3 (a)	64.7	160.0	30.6 19/97	210.2
February ..	71.3	53.3	62.3	104.4 12/99	39.0 20/87	65.4	165.0 24/98	28.3 -/87	177.2
March ..	68.0	50.8	59.4	98.8 5/46	36.0 31/05	62.8	150.0 3/05	27.5 30/02	173.0
April ..	62.7	47.6	55.2	90.0 2/56	30.0 25/56	60.0	142.0 18/93	25.0 -/86	140.5
May ..	57.4	43.6	50.5	77.8 5/21	29.2 20/02	48.6	128.0 (c)	20.0 19/02	132.3
June ..	52.8	41.0	46.9	75.0 7/74	28.0 22/79	47.0	122.0 12/94	21.0 6/87	102.9
July ..	52.0	39.3	45.6	72.0 22/77	27.0 18/66	45.0	121.0 12/93	18.7 16/86	124.1
August ..	55.0	41.1	48.0	77.0 3/76	30.0 10/73	47.0	129.0 -/87	20.1 7/09	142.2
September ..	58.8	43.2	51.0	80.0 9/72	30.0 12/41	50.0	138.0 23/93	22.3 20/14	144.5
October ..	62.7	45.4	54.0	92.0 24/14	32.0 12/89	60.0	156.0 9/93	23.8 (d)	168.9
November ..	66.1	48.3	57.2	98.0 20/88	35.2 5/13	62.8	154.0 19/92	26.0 1/08	198.1
December ..	69.4	51.2	60.3	105.2 30/97	38.0 13/06	67.2	157.0 30/18	27.2 -/86	194.1
Year { Averages ..	62.3	46.5	54.4	—	—	—	—	—	1908.0e
Extremes ..	—	—	—	105.2 30/12/97	27.0 18/7/66	78.2	165.0 24/2/08	18.7 16/7/86	—

(a) 3/72 and 2/00. (b) 5/86 and 13/05. (c) -/88 and -/92. (d) 1/86 and -/99. (e) 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	41	41	41	41	82	81	82		82	58		15	
January ..	.348	63	77	51	1.85	10	5.91	1893	0.03	1841	2.96	30/16	0.7
February ..	.356	65	80	51	1.14	8	9.15	1854	0.07	1847	4.50	25/54a	1.9
March ..	.323	68	78	58	1.71	10	7.60	1854	0.02	1843	2.79	5/19	4.4
April ..	.307	73	84	61	1.86	12	6.50	1909	0.07	1904	5.02	20/09	10.6
May ..	.267	78	88	68	1.87	13	6.37	1905	0.10	1843	3.22	14/58	13.3
June ..	.245	82	92	68	2.21	14	8.15	1889	0.22	1852	4.11	14/89	8.4
July ..	.234	80	88	72	2.17	14	6.02	1922	0.30	1850	2.51	18/22	8.2
August ..	.249	77	85	64	1.84	14	10.16	1858	0.23	1854	4.35	12/58	9.0
September ..	.266	71	82	60	2.11	14	7.14	1844	0.39	1847	3.50	29/44	4.7
October ..	.273	66	80	51	2.24	15	6.67	1906	0.26	1850	2.58	4/06	3.1
November ..	.294	63	78	50	2.52	14	8.92	1849	0.16	1868	3.97	6/49	1.3
December ..	.312	61	79	49	1.99	11	9.00	1875	0.11	1842	2.48	13/16	0.9
Year { Totals ..	—	—	—	—	23.83	149	—		—		—		66.5
Averages ..	.282	70	—	—	—	—	—		—		—		—
Extremes ..	—	—	92	49	—	—	10.16	8/1858	0.02	3/1843	5.02	20/4/09	—

(a) 4.18 on 26/54 also.