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 1927 is 23° 26′ 55.6″), 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-thirteenths of the whole of Australia (0.386).

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

AREA OF AUSTRALIA AND OF OTHER COUNTRIES.

Country.	Area.
Continental Divisions—	Sq. miles.
Europe	3,886,132
Asia	15,936,125
Africa	13,044,244
North and Central America and West Indies	8,665,836
South America	7,134,460
Australasia and Polynesia	3,463,146
Total, exclusive of Arctic and Antarctic Conts.	52,129,943
Europe—	
Russia	1,680,730
France	212,659
Spain	194,800
Germany	181,714
Sweden	173,105
Poland	149,958
Finland	132,642
Norway	124,964
Rumania	122,282
Italy and annexed Provinces	119,714
Serb, Croat, and Slovene State	96,134
Great Britain and Northern Ireland	94,633
Lithuania	59,633
Czecho-Slovakia	54,207
Greece	49,912
Bulgaria	39,814
Iceland	39,709
Georgia	39,000
Hungary	35,911
Portugal	35,490
Azerbaijan	32,950
Austria	32,369
Irish Free State	27,000
Latvia	25,000
Spitzbergen, Bear and adjacent islands	25,000
Estonia	18,354
Albania	17,374
Denmark	17,108
Switzerland	15,940
Netherlands	13,210
Belgium	11,755
Turkey	10,882
Luxemburg	999
Danzig	754
Andorra	191
Malta	122
Liechtenstein	65
San Marino	38
Monaco	8
Gibraltar	2
Total, Europe	3,886,132

Country.	Area.
Asia—	Sq. miles.
Russia	5,460,390
China and Dependencies	4,279,170
British India and Administered Territories	1,094,300
Arabia	1,000 000
Feudatory Indian States	711,032
Persia	628,000
Dutch East Indies	572,950
Turkey	483,656
Japan (and Dependencies)	260,707
Afghanistan	245,000
Siam	200,148
Iraq (Mesopotamia)	143,250
Philippine Islands	115,026
Laos	82,604
Oman	82,000
British Borneo, Brunei, and Sarawak	77,106
Uzbekistan	71,346
Cambodia	67,550
Syria	60,000
Nepál	54,000
Tonking	40,530
Annam	39,758
Federated Malay States	27,506
Cochin China	26,476
Ceylon	25,332
Malay Protectorate (inc. Johore)	22,486
Bhután	20,000
Armenia	11,680
Aden and Dependencies	9,000
Palestine	9,000
Timor, etc. (Portuguese Indian Archipelago)	7,330
Cyprus	3,584
Goa, Damao, and Diu	1,638
Straits Settlements	1,600
Kwantung	538
Hong Kong and Dependencies	391
Wei-hai-wei	285
Bahrein Islands	250
French India (Pondicherry, etc.)	196
Kwang Chau Wan	190
Maldive Islands	115
Macao, etc.	4
Tientsin	1
Total, Asia	15,936,125
Africa—	
French Sahara	1,500,000
Anglo-Egyptian Sudan	1,014,400
French Equatorial Africa	982,049
Belgian Congo	909,654

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

Country.	Area.
AFRICA—*continued.*	Sq. miles.
Tripolitania and Cyrenaica	1,260,980
Angola	484,800
South African Union ..	471,917
Portuguese East Africa ..	428,132
Italian Somaliland ..	405,000
Territory of the Niger ..	404,914
Egypt	383,000
Tanganyika Territory ..	365,000
French Sudan	356,471
Abyssinia	350,000
Nigeria and Protectorate	335,700
South-west Africa ..	312,194
Bechuanaland Protectorate	275,000
Madagascar	228,707
Algeria (inc. Algerian Sahara)	222,180
Morocco	210,825
Kenya Colony and Protectorate	208,320
Northern Rhodesia ..	187,950
Cameroon (French) ..	166,489
Mauritania	154,400
Upper Volta	154,400
Southern Rhodesia ..	149,000
Ivory Coast	121,590
Rio de Oro and Adrar ..	109,200
Uganda Protectorate ..	98,776
French Guinea	89,436
Gold Coast Protectorate (with Nth. Territories)	80,000
Senegal	74,112
British Somaliland ..	68,000
Tunis	48,300
Eritrea	45,754
Liberia	43,000
Dahomey	41,302
Nyasaland Protectorate ..	37,890
Cameroon (British) ..	31,000
Sierra Leone and Protectorate	31,000
Togoland (French) ..	22,000
Portuguese Guinea ..	13,940
Togoland (British) ..	12,600
Basutoland	11,716
Spanish Guinea (Rio Muni, etc.)	10,036
Spanish Morocco ..	7,700
Swaziland	6,678
French Somali Coast ..	5,790
Gambia and Protectorate	4,134
Cape Verde Islands ..	1,480
Sokotra	1,382
Zanzibar	1,020
Réunion	970
Ifni	965
Mauritius and Dependencies	809
Fernando Po, etc. ..	795
Comoro Islands, Mayotte, etc.	790
St. Thomas and Principe Islands	360
Seychelles	156
St. Helena	47
Ascension	34
Total, Africa	13,044,244
North and Central America and West Indies—	
Canada	3,797,123
United States	3,026,789
Mexico	767,198
Alaska	590,884
Newfoundland and Labrador	162,734
Nicaragua	51,660
(a)Greenland	46,740
Honduras	44,275
Cuba	44,164
Guatemala	42,353
Costa Rica	23,000
Santo Domingo ..	19,332
Salvador	13,176
Haiti	10,204
British Honduras ..	8,598
Jamaica, inc. Turks, Caicos and Cayman Is. ..	4,674
Bahamas	4,404
Porto Rico	3,435
Trinidad and Tobago ..	1,976
Leeward Islands ..	715
Guadeloupe and Dependencies	688
Windward Islands ..	516
Curaçao and Dependencies	403
Martinique	385
Barbados	166
Virgin Islands of U.S.A. ..	132
St. Pierre and Miquelon ..	93
Bermudas	19
Total, N. and C. America and W. Indies ..	8,665,836
South America—	
Brazil	3,285,318
Argentine Republic ..	1,153,119
Peru	532,047
Bolivia	514,155
Colombia (exc. of Panama)	440,846

(a) 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.
SOUTH AMERICA—*continued.*	Sq. miles.
Venezuela	393,874
Chile	290,084
Ecuador	174,155
British Guiana	89,480
Uruguay	72,153
Paraguay	61,647
Dutch Guiana	54,291
Panama	32,380
French Guiana	34,740
Falkland Islands and South Georgia ..	5,618
Panama Canal Zone ..	553
Total, South America ..	7,134,460
Australasia and Polynesia—	
Commonwealth of Australia	2,974,581
Dutch New Guinea ..	160,692
New Zealand and Dependencies	103,862
Papua	90,540
Territory of New Guinea	89,252
British Solomon Islands ..	11,000
AUSTRALASIA AND POLYNESIA *—continued.*	Sq. miles.
New Caledonia and Dependencies	8,548
Fiji	7,083
Hawaii	6,449
New Hebrides	5,700
French Establishments in Oceania	1,520
Territory of Western Samoa	1,250
Gilbert and Ellice Islands	1,011
Marianne, Caroline, and Marshall Islands ..	960
Tonga	385
Guam	210
Samoa (U.S.A. part) ..	62
Phœnix Group	16
Norfolk Island	13
Nauru Island	10
Pitcairn Island	2
Total, Australasia and Polynesia	3,463,146
British Empire	13,397,160

The figures quoted in the table have, in most cases, been extracted from the Statesman's Year Book for 1927.

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 numeration 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.

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

§ 2. Climate and Meteorology of Australia.*

1. **Introductory.**—In 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. (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.

* Prepared from data supplied by the Commonwealth Meteorologist, H. A. Hunt, Esquire.

Commencing with January, 1910, the "Australian Monthly Weather Report," containing statistical records from representative selected stations, with rain maps and diagrams, etc., was published, but was suspended in September, 1913. 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, seventeen Bulletins of Climatology have been published, particulars of which are given in preceding issues of the Official Year Book (see No. 13, page 53, and No. 19, page 51).

The following publications have since been issued :—

Instructions for Marine Meteorological Observers.

Annnal Average Rainfall Map of Australia (revised to 1924).

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.* 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 8.4°, and the extreme readings for the year, or the highest maximum in the hottest month and the lowest reading in the coldest month, show a difference of under 50°.

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

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

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

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

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

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

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

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

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

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

7. **Evaporation.**—(i) *General.* The rate and quantity of evaporation in any territory is influenced by the prevailing temperature, and by atmospheric humidity, pressure, and movement. In Australia, the question is of perhaps more than ordinary importance, since in its drier regions water has often to be conserved in "tanks"* and dams. The magnitude of the economic loss by evaporation will be appreciated from the tabular records herein, which show that the yearly amount varies from about 32 inches at Hobart to 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

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

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 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 34 years.

Harvey Creek, in the shorter period of 26 years has three times exceeded 200 inches, the total for 1921 being 254.77 inches, and at the South Johnstone Sugar Experiment Station, where a gauge has recently been established, 202.52 inches were recorded in 1921.

In Tasmania the wettest part is in the West Coast region, the mean annual rainfall at Lake Margaret being 145.34, with a maximum of 175.12 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 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 progressively from the southern to the northern shores of the continent, and similarly also at all parts of the continent subject to capricious monsoonal rains, as the comparisons hereunder will show. The general distribution is best seen from the rainfall map herein, which shows the areas subject to average annual rainfalls lying between certain limits. The areas enjoying varying quantities of rainfall determined from the latest available information are shown in the following table :—

AVERAGE ANNUAL RAINFALL DISTRIBUTION.

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

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

Referring first to the capital cities, the records of which are given in the next table, it will be seen that Sydney, with a normal rainfall of 47.46 inches, occupies the chief place ; Brisbane, Perth, Melbourne, Hobart and Adelaide following in that order, Adelaide with 21.18 inches being the driest. The extreme range from the wettest to the driest year is greatest at Brisbane (72.09 inches) and least at Adelaide (19.48 inches).

In order to show how the rainfall is distributed throughout the year in various parts of the continent, the figures for representative towns have been selected. (See map.) The figures for Darwin, typical of the Northern Territory, show that nearly the whole of the rainfall occurs there in the summer months, while little or none falls in the middle of the year. The figures for Perth, as representing the south-western part of the continent, are the reverse, for while the summer months are dry, the winter ones are very wet. In Melbourne and Hobart the rain is fairly well distributed throughout the twelve months, with a maximum in October for the former, and in November for the latter. The records at Alice Springs and Daly Waters indicate that in the central parts of Australia the wettest months are in the summer and autumn. In Queensland, as in the Northern Territory, the heaviest rains fall in the summer months, but good averages are also maintained during the other seasons.

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

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

(vii) *Tables of Rainfall.* The table of rainfall for a long period of years for each of the various Australian capitals affords information as to the variability of the fall in successive years, and the list of the more remarkable falls furnishes information as to what may be expected on particular occasions. 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 1927.

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.
1901	36.75	122	..	18.01	124	..	38.48	110	..	40.10	149	..	27.15	113	..	25.11	149	
2	27.06	93	..	16.02	123	..	16.17	87	..	43.07	180	..	23.08	102	..	21.85	150	..
3	35.69	140	..	25.47	134	..	49.27	136	..	38.62	173	..	28.43	130	..	25.86	139	..
4	34.35	125	..	20.31	117	..	33.23	124	..	45.93	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	..	25.86	171	..	27.29	170	..
1910	37.02	135	..	24.62	116	..	49.00	133	..	46.91	160	..	24.61	167	..	25.22	205	..
11	23.38	108	..	15.99	127	..	35.21	128	..	50.24	155	..	36.61	168	..	26.78	193	..
12	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	..
25	31.41	126	..	21.91	118	..	53.10	139	..	50.35	145	..	17.57	144	..	22.40	171	..
26	49.22	167	..	22.20	116	..	30.82	111	..	37.07	127	..	20.81	149	..	25.79	187	..
27	36 59	133	..	16.92	101	..	62.08	130	..	48.56	138	..	17.98	135	..	20.02	183	..
Aver.	34.37	121	..	21.18	123	..	45.30	129	..	47.82	153	..	26.04	138	..	23.79	150	..
No.of Yrs.	52	52	..	89	89	..	78	68	..	88	88	..	84	72	..	85	85	..

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 1927, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Anthony ..	28 Mar., 1887	17.14	Dapto	11 May, 1925	15.00
Araluen	27 May, 1925	15.83	Kembla Heights ..	13 Jan., 1911	17.46
Bega	27 Feb., 1919	17.88	Madden's Creek ..	13 Jan., 1911	18.08
Broger's Creek ..	14 ,, 1898	20.05	Morpeth ..	9 Mar., 1893	21.52
,, ,, ..	13 Jan., 1911	20.83	Mount Kembla ..	13 Jan., 1911	18.25
Bulli Mountain ..	13 Dec., 1898	17.14	Numbugga .	27 Feb., 1919	17.87
Bulah Delah ..	16 Apr., 1927	19.80	Tongara Farm ..	14 ,, 1898	15.12
Burragate ..	27 Dec., 1919	16.38	Towamba ..	5 Mar., 1893	20.00
Candelo	27 Feb., ,,	18.58	South Head (near Sydney) ..	29 Apr., 1841	20.12
Condong ..	27 Mar., 1887	18.66	,, ,, ..	16 Oct., 1844	20.41
Cordeaux River ..	14 Feb., 1898	22.58			

HEAVY RAINFALLS—QUEENSLAND, UP TO 1927, 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	7 Apr., 1912	16.06
Atherton (Cairns) ..	31 Jan., 1913	16.69	,, ,, ,,	31 Jan., 1913	16.10
Babinda (Cairns) ..	1 Feb., ,,	20.51	Gadgarra ..	10 Feb., 1927	15.00
,, ,, ..	24 Jan., 1916	22.30	Gladstone ..	4 Feb , 1911	18.83
,, ,, ..	21 Apr., 1920	16.05	Glen Boughton ..	5 Apr., 1894	18.50
Babinda	25 Mar., 1921	15.76	Goldsborough (Cairns) ..	31 Jan., 1913	19.92
,, ...	14 Feb., 1927	15.20	Goondi Mill (Innisfail) ..	6 Apr., 1894	15.69
Banyan	1 Mar., 1925	16.43	,, ,, ..	29 Dec., 1903	17.83
Bloomsbury ..	14 Feb., 1893	17.40	,, ,, ..	10 Feb., 1911	17.68
,, ..	10 Jan., 1901	16.62	,, ,, ..	6 Apr., 1912	15.55
Brisbane ..	21 ,, 1887	18.31	Goondi	30 Jan., 1913	24.10
Buderim Mountain	11 ,, 1898	26.20	Goorganga ..	23 ,, 1918	18.17
Bundaberg ..	16 ,, 1913	16.94	Halifax	5 Feb., 1899	15.37
Burnett Heads (Bundaberg) ..	16 ,, 1913	15.22	,, ...	6 Jan., 1901	15.68
Cairns	11 Feb., 1911	15.17	Hambledon Mill ..	2 ,, 1911	18.61
,, ...	2 Apr., ,,	20.16	,, ,, ..	1 Apr., ,,	19.62
Carbrook ..	23 Jan., 1918	22.66	,, ,, ..	30 Jan., 1913	17.32
,, ..	24 Jan., 1918	15.77	Hampden ..	23 Apr., 1918	17.30
Cardwell ..	18 Mar., 1904	18.24	,, ..	24 ,, ,,	17.19
,, ...	11 Mar., 1918	16.65	Harvey Creek ..	8 Mar., 1899	17.72
Carmila	23 Jan., 1918	15.92	,, ,, ..	11 Jan., 1905	16.96
Clare	26 ,, 1896	15.30	,, ,, ..	3 ,, 1911	27.75
Clump Point ..	12 Feb., 1927	15.79	,, ,, ..	2 Apr., ,,	16.46
Collaroy	23 Jan., 1918	18.06	,, ,, ..	31 Jan., 1913	24.72
Crohamhurst (Blackall Range)	2 Feb., 1893	35.71	,, ,, ..	25 Mar., 1921	15.80
,, ,,	9 Jan., 1898	19.55	,, ,, ..	12 Mar., 1924	16.50
,, ,,	6 Mar., ,,	16.01	,, ,, ..	13 Mar., ,,	15.78
Croydon	29 Jan., 1908	15.00	Haughton Valley ..	26 Jan., 1896	18.10
Danbulla ..	13 Feb., 1927	17.09	Holmwood (Woodford)	2 Feb., 1893	16.19
Dungeness ..	16 Mar., 1893	22.17	Howard ..	15 Jan., 1905	19.55
Dunira	9 Jan., 1898	18.45	Huntley ..	27 Dec., 1916	18.94
,, ...	6 Mar., ,,	15.95	Innisfail (formerly Geraldton) ..	11 Feb., 1889	17.13
Dunwich	8 May, 1925	15.46	,, ,, ..	6 Apr., 1894	16.02
Fairymead Plantation (Bundaberg)	16 Jan., 1913	15.32			

HEAVY RAINFALLS—QUEENSLAND—*continued.*

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Innisfail (formerly Geraldton) ..	24 Jan., 1900	15.22	Mourilyan ..	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 ,, ,,	20.65	Pialba (Marybor'gh)	16 Jan., 1913	17.22
Kuranda (Cairns) ..	11 Feb., 1911	16.30	Plane Creek (Mackay) ..	26 Feb., ,,	27.73
,, ,, ..	17 Mar., ,,	15.10	Port Douglas ..	10 Mar., 1904	16.34
,, ,, ..	31 ,, ,,	18.60	,, ,, ..	17 ,, 1911	16.10
,, ,, ..	1 Apr., ,,	24.30	,, ,, ..	1 Apr., ,,	31.53
,, ,, ..	2 ,, ,,	28.80	Proserpine ..	23 Jan., 1918	18.17
,, ,, ..	31 Jan., 1913	16.34	Ravenswood ..	24 Mar., 1890	17.00
Landsborough ..	2 Feb., 1893	15.15	Redcliffe ..	16 Feb., 1893	17.35
Low Island ..	10 Mar., 1904	15.07	Rosedale ..	16 Jan., 1913	18.90
,, ..	1 Apr., 1911	15.30	Sarina	23 ,, 1918	22.60
Lyndon (*via* Brixton)	3 ,, 1917	17.00*a*	St. Lawrence ..	30 ,, 1896	15.00
Mackay	21 Jan., 1918	24.70*b*	The Hollow (Mackay) ..	23 Feb., 1888	15.12
,, ...	22 ,, ,,	17.25*c*	Thornborough ..	20 Apr., 1903	18.07
Sugar Experimental Farm, Mackay ..	21 ,, ,,	16.80	Townsville ..	24 Jan., 1892	19.20
,, ..	22 ,, ,,	17.20	,, ..	28 Dec., 1903	15.00
Macnade Mill ..	5 Feb., 1899	15.20	Tully	10 Feb., 1927	15.06
,, ..	6 Jan., 1901	23.33	,, ...	12 ,, ,,	23.86
,, ..	4 Mar., 1915	22.00	Victoria Mill ..	6 Jan., 1901	16.67
Mapleton ..	26 Dec., 1909	15.72	Woodlands (Yepp'n)	31 ,, 1893	23.07
Mirani	12 Jan., 1901	16.59	Wootha ..	10 Feb., 1915	15.93
Miriam Vale (B'berg)	17 ,, 1913	15.80	Yandina ..	1 ,, 1893	20.08
Mooloolah ..	13 Mar., 1892	21.53	,, ..	9 Jan., 1898	19.25
,, ..	2 Feb., 1893	19.11	,, ..	28 Dec., 1909	15.80
Mossman ..	14 ,, 1927	15.75	Yarrabah ..	2 Apr., 1911	30.65
Mount Cuthbert ..	8 Jan., 1911	18.00	,, ..	24 Jan., 1916	27.20
Mount Molloy ..	31 Mar., ,,	20.00	,, ..	25 ,, ,,	18.60
,, ..	1 Apr., ,,	20.00	Yeppoon ..	31 ,, 1893	20.05
,, ..	2 ,, ,,	20.00	,, ..	8 ,, 1898	18.05
Mourilyan ..	11 Feb., 1911	17.40	,, ..	8 Oct., 1914	21.70
,, ..	7 Apr., 1912	18.97			

HEAVY RAINFALLS—WESTERN AUSTRALIA, UP TO 1927, 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 ,, ,,	10.10	Frazier Downs ..	3 Mar., 1916	11.25
Boodarie ..	3 Jan., 1896	10.03	Gnaraloo ..	20 ,, 1923	11.00
,, ..	21 ,, ,,	14.53	Kerdiadary ..	7 Feb., 1901	12.00
Booloogooroo ..	17 ,, 1923	10.96	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	Point Torment ..	17 Dec., 1906	11.86

a Mr. Jas. Laidlaw, of Lyndon, states that this fell in 4 hours. *b* 37½ hours. *c* 22½ hours.

HEAVY RAINFALLS, WESTERN AUSTRALIA—*continued.*

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Port George IV. ..	17 Jan., 1915	11.24	Whim Creek ..	21 Mar., 1899	18.17
Roebourne ..	3 Apr., 1898	11.44	,, ,, ..	6 ,, 1900	10.03
,, ..	6 Mar., 1900	10.32	,, ,, ..	3 ,, 1903	10.44
Roebuck Plains ..	5 Jan., 1917	14.01	Winderrie ..	17 Jan., 1923	14.23
,, ,, ..	6 ,, ,,	22.36	Woodstock ..	21 ,, 1912	13.00
Springvale ..	14 Mar., 1922	12.25	Wyndham ..	27 Jan., 1890	11.60
Tambray ..	6 ,, 1900	11.00	,, ..	4 Mar., 1919	12.50
,, ..	3 ,, 1903	10.47	Yardie Creek ..	3 Feb., 1918	10.00
Thangoo	17-19 Feb. '96	24.18	Yeeda	2 Mar., 1916	10.70
,, ...	28 Dec., 1893	11.15	,, ...	6 Jan., 1917	10.20
Whim Creek ..	3 Apr., 1898	29.41	,, ...	7 ,, ,,	11.75

HEAVY RAINFALLS—NORTHERN TERRITORY, UP TO 1927, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Bathurst Island Mission ..	7 Apr., 1925	11.85	Cosmopolitan Gold Mine	24 Dec., 1915	10.60
Bonrook	24 Dec., 1915	10.60	Darwin	7 Dec., 1915	11.67
Borroloola ..	14 Mar., 1899	14.00	Groote Eylandt ..	30-31 Mar., '23	12.00*a*
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 1927, 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 1927, 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 1927, 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° S., and from the western to the eastern shores of the continent. During exceptional seasons, it has fallen simultaneously over two-thirds of the State of New South Wales, and has extended at times along the whole of the Great Dividing Range, from its southern extremity in Victoria so far north as Toowoomba in Queensland. During the winter, for several months, snow covers the ground to a great extent on the Australian Alps, where also the temperature falls below zero Fahrenheit during the night. In the ravines around Kosciusko and similar localities the snow never entirely disappears.

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

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

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

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

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

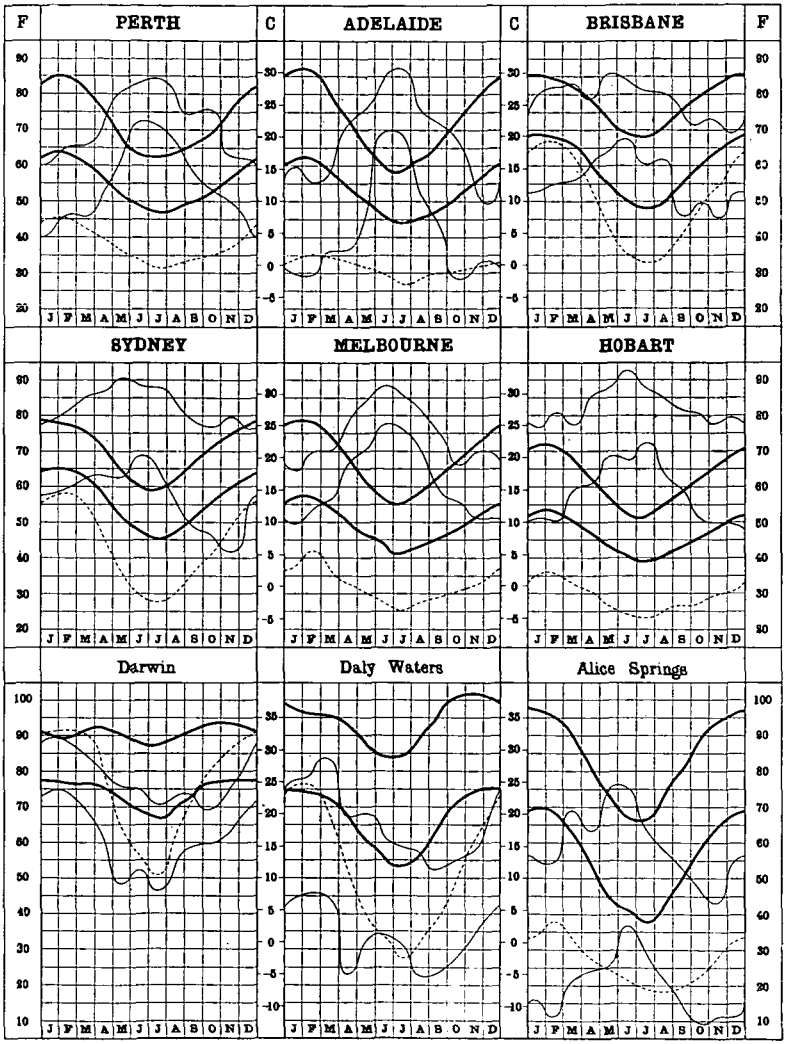
14. **Cyclones and Storms.**—The "elements" in Australia are ordinarily peaceful, and while destructive cyclones have visited various parts, more especially coastal areas, such visitations are rare, and may be properly described as erratic.

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

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

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

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.

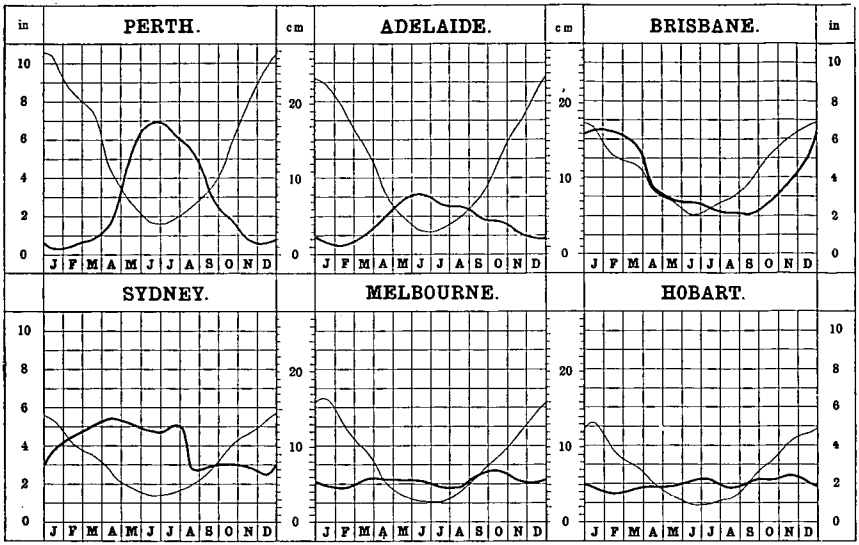
The upper and lower fine lines join the greatest and the least monthly means of relative humidity respectively, the figures under the outer columns " F " indicating percentage values.

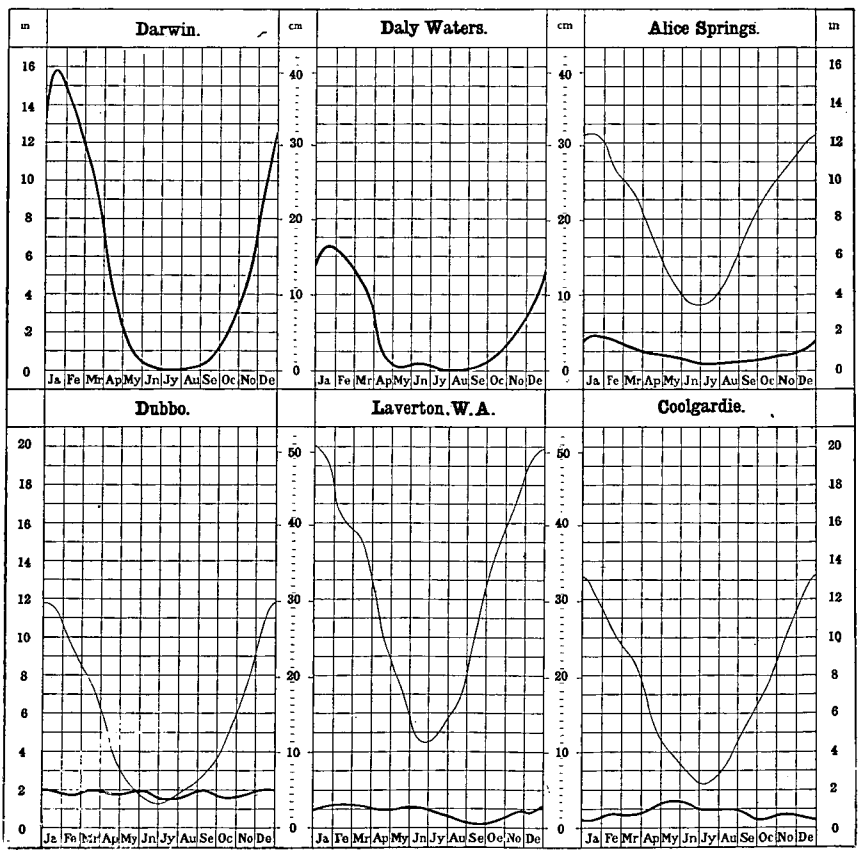
The curves for temperature and vapour pressure joining the mean monthly values serve to show the annual fluctuation of these elements, but the relative humidity graphs joining the extreme values for each month do not indicate any normal annual variation.

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.





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.

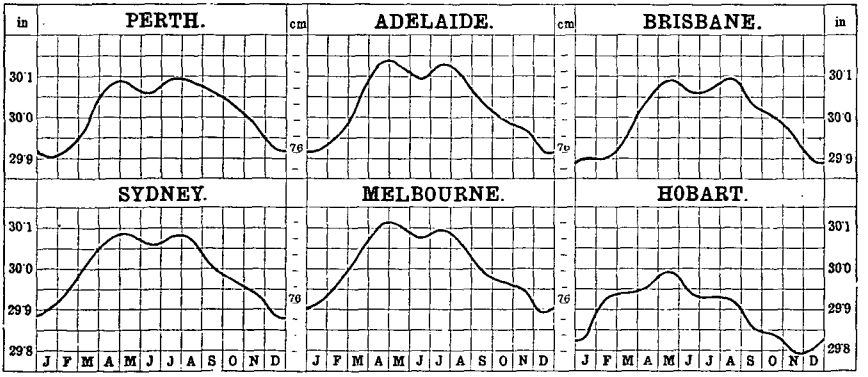
The distance for any date from the zero line to the curve represents the average number of inches, reckoned as per month, of rainfall at that date. Thus, taking the curves for Adelaide in the middle of January the rain falls on the average at the rate of about three-fourths of an inch per month, or, 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 11¾ inches per month about the middle of January, and only about 1½ inches at the middle of June.

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

MEAN ANNUAL RAINFALL AND EVAPORATION.

Place.	Rainfall.	Evaporation.	Place.	Rainfall.	Evaporation.
	In.	In.		In.	In.
Perth ..	34.37	65.87	Darwin ..	61.67	—
Adelaide ..	21.18	54.59	Daly Waters ..	26.63	—
Brisbane ..	45.29	54.76	Alice Springs ..	11.10	94.24
Sydney ..	47.46	38.70	Dubbo ..	22.11	66.37
Melbourne ..	25.47	39.04	Laverton, W.A.	9.67	142.17
Hobart ..	23.79	32.12	Coolgardie .	10.06	84.41

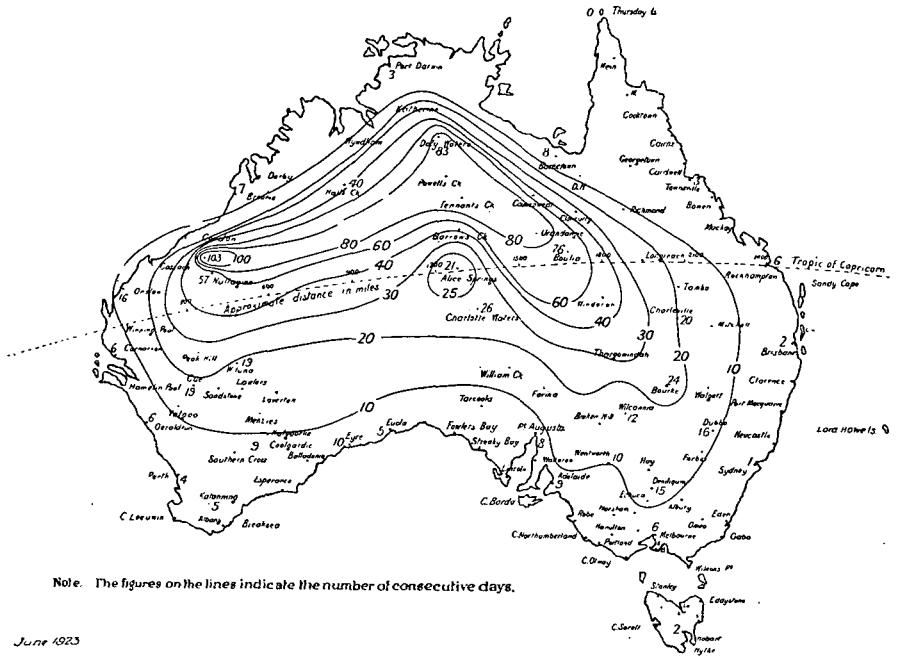
MEAN BAROMETRIC PRESSURE.—CAPITAL CITIES.

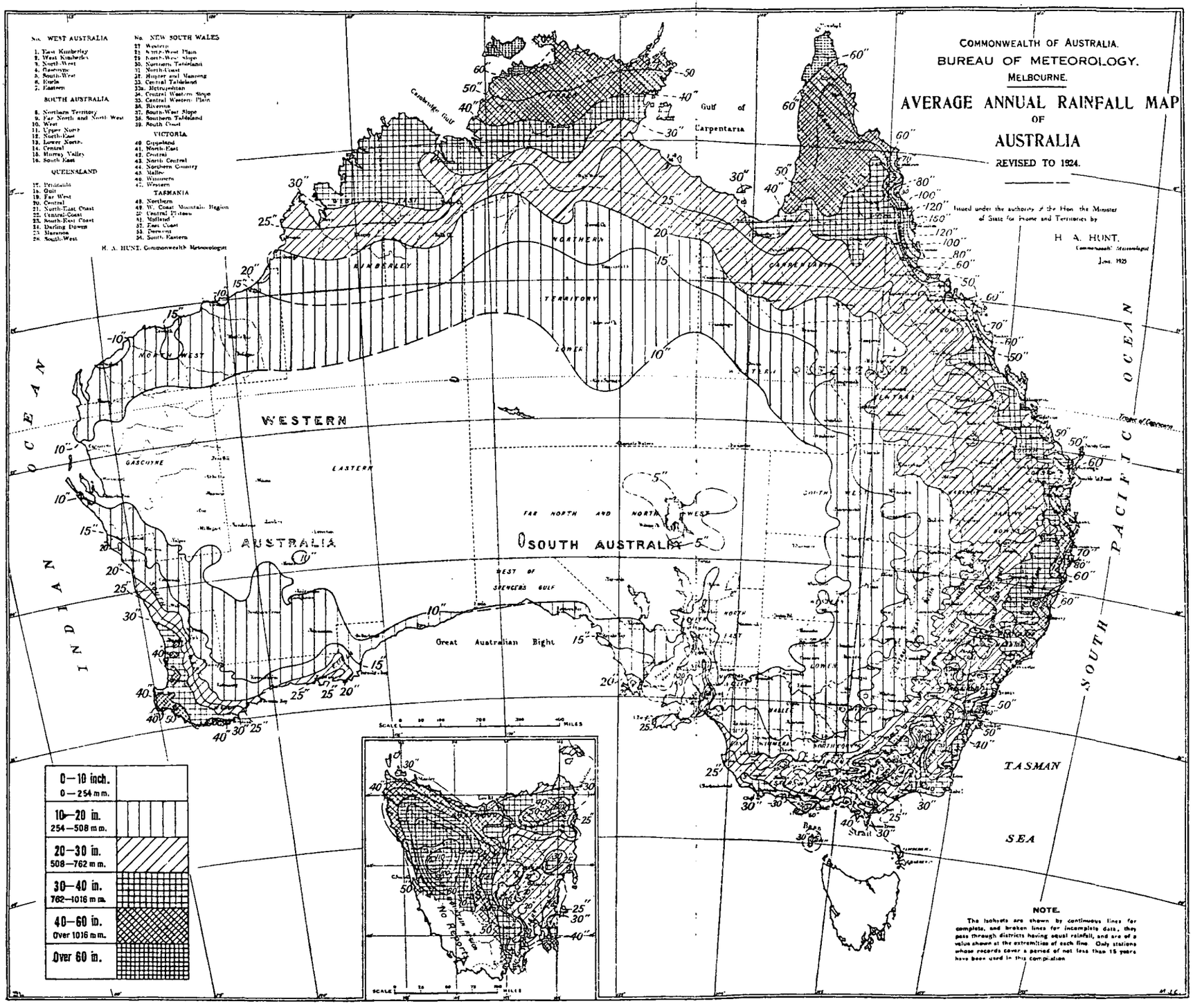


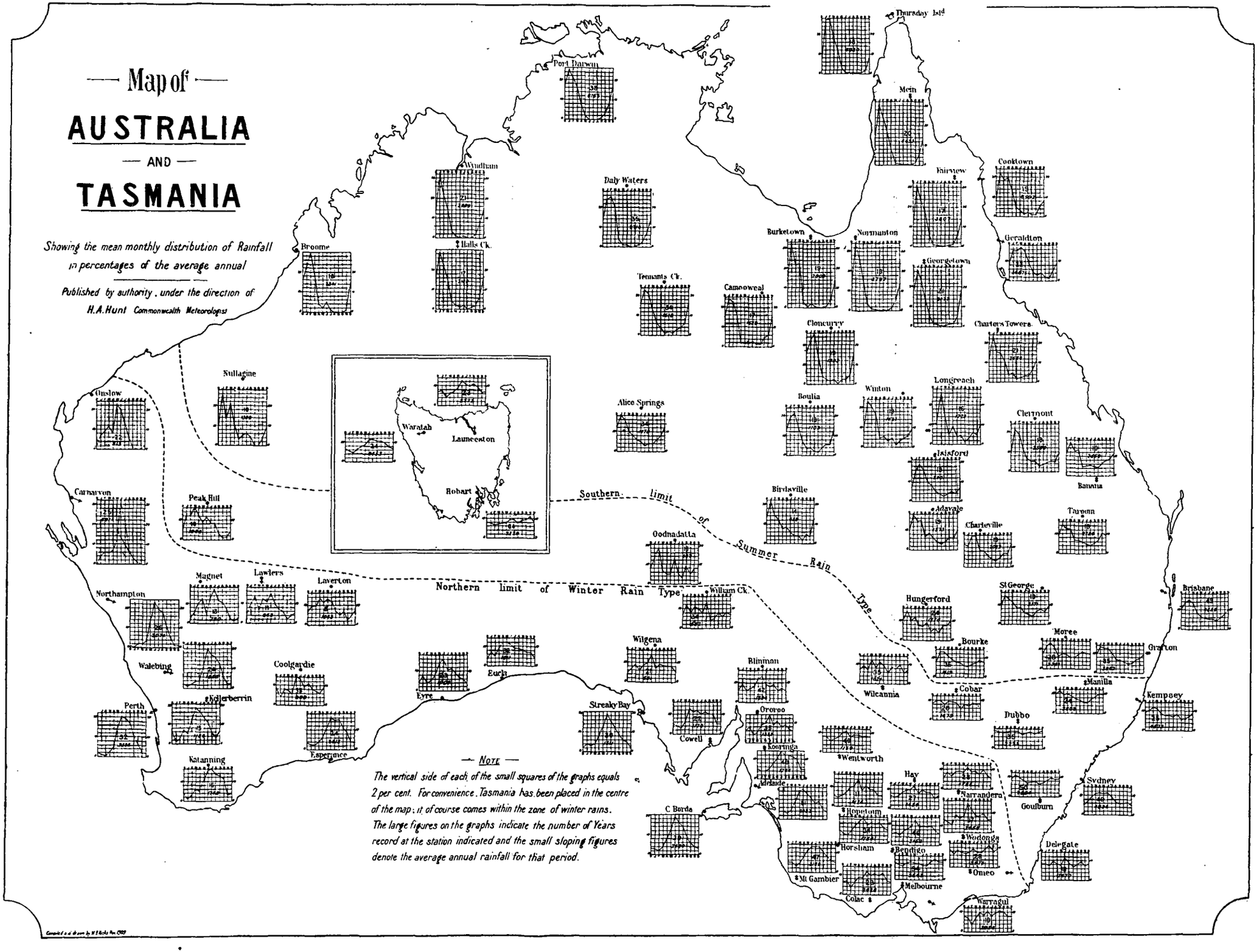
EXPLANATION.—The lines representing the yearly fluctuations of barometric pressure at the State capital cities are means for long periods, and are plotted from the Climatological Tables herein. The pressures are shown in inches on a about 2½ times the natural scale, and the corresponding pressures in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

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

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


Approximate distance in miles
Tropic of Capricorn
Lord Howe Is.
Port Darwin
Cooktown
Cairns
Townsville
Bowen
Mackay
Rockhampton
Sandy Cape
Brisbane
Clermont
Longreach
Tambo
Charleville
Roma
Dalby
Toowoomba
Warwick
Goondiwindi
Moree
Narrabri
Walgett
Bourke
Wilcannia
Wentworth
Broken Hill
Dubbo
Newcastle
Sydney
Wagga
Albury
Echuca
Deniliquin
Hay
Forbes
Orange
Parkes
Mudgee
Gulgong
Dunedoo
Coonamble
Walgett
Lightning Ridge
Goondiwindi
Roma
Charleville
Cunnamulla
Thargomindah
Windorah
Birdsville
Boulia
Alice Springs
Tennants Ck.
Barrows Ck.
Powells Ck.
Daly Waters
Katherine
Port Darwin
Normanton
Burketown
Camooweal
Mt. Isa
Cloncurry
Winton
Longreach
Barcaldine
Blackall
Tambo
Augustus Downs
Wyndham
Halls Ck.
Nullagine
57 Nullagine
Marble Bar
Onslow
Roebourne
Cossack
Carnarvon
Geraldton
Perth
Fremantle
Albany
Esperance
Kalgoorlie
Coolgardie
Southern Cross
Merredin
Meekatharra
Wiluna
Leonora
Laverton
Menzies
Leonora
Sandstone
Lawlers
Laverton
Wiluna
Meekatharra
Yalgoo
Morawa
Mullewa
Dongara
Geraldton
Northampton
Port Gregory
Hamelin Pool
Carnarvon
Onslow
Roebourne
Cossack
Port Hedland
Marble Bar
Nullagine
Halls Creek
Wyndham
Kununurra
Ord R.
Lake Argyle
Turkey Creek
Oodnadatta
Alice Springs
Tennants Ck.
Barrows Ck.
Powells Ck.
Daly Waters
Port Darwin
Katherine
Roper R.
Borroloola
Anthony Lagoon
Camooweal
Mt. Isa
Cloncurry
Winton
Longreach
Barcaldine
Blackall
Tambo
Augustus Downs
Wyndham
Halls Creek


COMMONWEALTH OF AUSTRALIA.
BUREAU OF METEOROLOGY.
MELBOURNE.
AVERAGE ANNUAL RAINFALL MAP
OF
AUSTRALIA
REVISED TO 1924.
Issued under the authority of the Hon. the Minister of State for Home and Territories by
H. A. HUNT.
Commonwealth Meteorologist
June, 1925
No. WEST AUSTRALIA
1. East Kimberley
2. West Kimberley
3. North-West
4. Gascoyne
5. South-West
6. Yilgarn
7. Eastern
SOUTH AUSTRALIA
8. Northern Territory
9. Far North and North-West
10. West
11. Upper North
12. North-East
13. Lower North
14. Central
15. Murray Valley
16. South East
QUEENSLAND
17. Peninsula
18. Gulf
19. Far West
20. Central
21. North-East Coast
22. Central-Coast
23. South-East Coast
24. Darling Downs
25. Maranoa
26. South-West
No. NEW SOUTH WALES
27. Western
28. North-West Plain
29. North-West Slope
30. Northern Tableland
31. North-Coast
32. Hunter and Manning
33. Central Tableland
33a. Metropolitan
34. Central Western Slope
35. Central Western Plain
36. Riverina
37. South-West Slope
38. Southern Tableland
39. South Coast
VICTORIA
40. Gippsland
41. North-East
42. Central
43. North Central
44. Northern Country
45. Mallee
46. Wimmera
47. Western
TASMANIA
48. Northern
49. W. Coast Mountain Region
50. Central Plateau
51. Midland
52. East Coast
53. Derwent
54. South Eastern
H. A. HUNT, Commonwealth Meteorologist
Gulf of Carpentaria
Cambridge Gulf
NORTHERN TERRITORY
KIMBERLEY
NORTH WEST
LOWER
CENTRAL
GASCOYNE
EASTERN
WESTERN AUSTRALIA
SOUTH AUSTRALIA
FAR NORTH AND NORTH WEST
WEST OF SPENCERS GULF
Great Australian Bight
INDIAN OCEAN
SOUTH PACIFIC OCEAN
TASMAN SEA
Tropic of Capricorn
Strait
0—10 inch.
0—254 m.m.
10—20 in.
254—508 m.m.
20—30 in.
508—762 m.m.
30—40 in.
762—1016 m.m.
40—60 in.
Over 1016 m.m.
Over 60 in.
NOTE.
The isohyets are shown by continuous lines for complete, and broken lines for incomplete data, they pass through districts having equal rainfall, and are of a value shown at the extremities of each line. Only stations whose records cover a period of not less than 15 years have been used in this compilation.


— Map of —
AUSTRALIA
— AND —
TASMANIA
Showing the mean monthly distribution of Rainfall in percentages of the average annual
Published by authority, under the direction of H.A. Hunt Commonwealth Meteorologist
Port Darwin
Thursday Isld
Mein
Cooktown
Fairview
Geraldton
Burketown
Normanton
Georgetown
Daly Waters
Wyndham
Halls Ck.
Broome
Tennants Cr.
Camooweal
Cloncurry
Charters Towers
Nullagine
Onslow
Alice Springs
Boulia
Winton
Longreach
Clermont
Isisford
Banana
Waratah
Launceston
Hobart
Carnarvon
Peak Hill
Birdsville
Adavale
Charleville
Tarcoon
Southern limit of Summer Rain Type
Oodnadatta
Northern limit of Winter Rain Type
William Ck.
Hungerford
St George
Brisbane
Northampton
Magnet
Lawlers
Laverton
Moree
Bourke
Grafton
Wilgena
Eucla
Eyre
Blinman
Wilcannia
Manilla
Cobar
Walebing
Coolgardie
Kalgoorlie
Perth
Esperance
Streaky Bay
Cowell
Ororoo
Kooringa
Wentworth
Dubbo
Kempsey
Katanning
Hay
Narrandera
Sydney
Goulburn
Hometown
Wodonga
Delegate
C. Borda
Horsham
Bendigo
Omeo
Mt Gambier
Melbourne
Colac
Warragul
— Note —
The vertical side of each of the small squares of the graphs equals 2 per cent. For convenience, Tasmania has been placed in the centre of the map; it of course comes within the zone of winter rains. The large figures on the graphs indicate the number of Years record at the station indicated and the small sloping figures denote the average annual rainfall for that period.

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 site of the Federal capital, and for the capitals of the Australian States.

RAINFALL AND TEMPERATURE—VARIOUS CITIES.

Place.	Height above M.S.L.	Annual Rainfall.			Temperature.					
		Average.	Highest.	Lowest.	(a)Mean Summer.	(b)Mean Winter.	Highest on Record.	Lowest on Record.	Average Hottest Month.	Average Coldest Month.
	Ft.	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	19.6	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	..	..	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	166	32.57	57.89	12.72	74.3	46.0	104.2	17.2	76.1	44.6
San Francisco ..	155	22.27	38.82	9.00	58.8	50.5	101.0	29.0	59.3	49.5
Shanghai ..	21	45.00	62.52	27.92	78.0	41.1	102.9	10.2	80.4	37.8
Singapore ..	8	91.99	158.68	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	76.3	39.9
Vienna	663	24.50	33.90	16.50	65.7	30.4	97.7	− 8.0	67.1	28.0
Vladivostock ..	55	19.54	33.60	9.39	63.9	11.0	95.7	−21.8	69.4	6.1
Washington ..	112	43.50	61.33	30.85	74.7	34.5	106.0	−15.0	76.8	32.9
Wellington (N.Z.)	10	48.65	67.68	27.83	61.8	48.6	88.0	28.6	62.5	47.7
Zürich	1,542	45.15	78.27	29.02	63.3	31.3	94.1	− 0.8	65.1	29.5
FEDERAL CAPITAL SITE.										
Canberra (Dist.) Queanbeyan	2,000 to 2,900	22.59	41.29	10.45	(a) 67.7	(b) 44.0	102.6	14.0	68.5	42.7
STATE CAPITALS.										
Perth	197	34.37	49.22	20.21	(a) 72.9	(b) 56.0	108.4	34.2	74.1	55.2
Adelaide ..	140	21.18	30.87	11.39	73.0	53.1	116.3	32.0	74.0	51.8
Brisbane ..	137	45.30	88.26	16.17	76.7	59.7	108.9	36.1	77.2	58.5
Sydney	138	47.82	82.76	21.49	71.0	54.1	108.5	35.9	71.6	52.7
Melbourne ..	115	26.04	44.25	15.61	66.6	50.0	111.2	27.0	67.6	48.7
Hobart	177	23.79	43.39	13.43	61.5	46.9	105.2	27.0	62.3	45.7

(*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 1927. 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. Mn. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. Greatest Number of Miles in One Day.	Wind. Mean Hourly Pressure. (lbs.)	Wind. Total Miles.	Wind. Prevailing Direction. 9 a.m.	Wind. Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m. & 9 p.m.	No. of Clear Days.
No. of yrs. over which observation extends	43	30	29	30	30		29	30	30	30
January	29.966	797 27/98	0.68	11,198	E S E	S S W	10.39	1.5	2.8	14
February	29.924	650 6/08	0.63	9,742	E S E	S S W	8.54	1.5	3.0	12
March	29.986	651 6/13	0.52	9,934	E	W S W	7.56	1.4	3.3	12
April	30.074	955 25/00	0.40	8,325	E N E	S S W	4.74	1.5	4.3	8
May	30.072	768 5/12	0.36	8,104	N E	W S W	2.74	2.2	5.3	5
June	30.058	914 19/27	0.36	7,909	N N E	W	1.75	2.2	5.9	3
July	30.091	1015 20/26	0.40	8,617	N N E	W	1.75	2.2	5.5	5
August	30.087	966 15/03	0.41	8,751	N N E	W S W	2.37	1.5	5.3	5
September	30.062	864 11/05	0.46	8,916	N E	W S W	3.33	1.4	4.9	6
October	30.029	809 6/16	0.53	9,886	S S E	S W	5.23	1.1	5.0	6
November	29.990	777 18/97	0.58	10,037	S E	S W	7.63	1.4	3.8	8
December	29.927	776 6/22	0.64	10,901	S E	S S W	9.84	1.8	3.0	12
Year Totals	—	—	—	—	—		65.87	19.7	—	96
Year Averages	30.017	—	0.49	9,360	E	S W	—	—	4.3	—
Year Extremes	—	1015 20/7/26	—	—	—		—	—	—	—

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.). Mean Max.	Mean Min.	Mean	Extreme Shade Temperature (Fahr.). Highest.	Lowest.	Extreme Range.	Extreme Temperature (Fahr.). Highest in Sun.	Lowest on Grass.	Mean Hours of Sunshine.
No. of yrs. over which observation extends	31	31	31	31	31	—	29	29	30
January	84.4	63.1	73.8	108.4 28/21	48.6 20/25	59.8	177.3 22/14	38.5 20/25	319.9
February	84.7	63.5	74.1	107.4 7/23	47.7 1/02	59.7	169.0 4/99	39.8 1/13	273.8
March	81.3	61.0	71.2	106.4 14/22	45.8 8/03	60.6	167.0 19/18	36.7 8/03	262.8
April	76.3	57.3	66.8	99.7 9/10	39.3 20/14	60.4	157.0 8/16	31.0 20/14	217.2
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	176.3
June	64.1	49.5	56.8	81.7 2/14	35.0 30/20	46.7	135.5 9/14	26.5 30/20	142.9
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	164.8
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	185.9
September	66.3	50.2	58.2	90.9 30/18	38.0 17/13	52.0	153.6 29/16	29.2 21/16	204.6
October	68.9	52.6	60.8	95.3 30/22	40.5 5/24	54.8	154.0 29/14	30.5 4/17	234.4
November	75.4	56.8	66.1	104.6 24/13	42.0 1/04	62.6	167.0 30/25	35.4 6/10	285.9
December	81.0	60.7	70.8	107.9 20/04	48.0 2/10	59.9	168.8 11/27	39.0 (c)	322.5
Year Averages	73.1	55.3	64.2	—	—	—	—	—	2791.0
Year Extremes	—	—	—	108.4 28/1/21	34.2 7/7/16	74.2	177.3 22/1/14	25.1 30/7/20	—

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches). Mean 9 a.m.	Rel. Hum. (%) Mean 9 a.m.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Dew. Mean No. Days Dew.
No. of yrs. over which observation extends	31	31	31	31	52	52	52	52	52	31
January	0.440	51	61	42	0.34	3	2.17 1879	0.00 (a)	1.74 28/79	2.3
February	0.451	53	65	46	0.45	3	2.98 1915	0.00 (a)	1.63 26/15	3.3
March	0.430	57	66	46	0.81	5	4.50 1896	0.00 (a)	2.06 26/23	5.5
April	0.399	62	72	51	1.65	7	5.85 1926	0.00 1920	2.62 30/04	9.2
May	0.368	72	81	61	4.97	14	12.13 1879	0.98 1903	2.80 20/79	12.5
June	0.341	78	83	68	6.94	17	12.80 1923	2.16 1877	3.90 10/20	12.3
July	0.319	77	84	69	6.56	17	12.28 1926	2.42 1876	3.00 4/91	13.1
August	0.319	73	79	63	5.65	18	10.33 1882	0.46 1902	2.79 7/03	11.6
September	0.344	68	76	58	3.42	15	7.84 1923	0.34 1916	1.73 23/09	10.0
October	0.353	61	75	54	2.22	12	7.87 1890	0.49 1892	1.38 15/10	5.4
November	0.385	54	63	46	0.80	6	2.78 1916	0.00 1891	1.11 30/03	3.7
December	0.413	51	62	44	0.56	4	3.05 1888	0.00 1896	1.72 1/88	2.8
Year Totals	—	—	—	—	34.37	121	—	—	—	91.7
Year Averages	0.377	62	—	—	—	—	—	—	—	—
Year Extremes	—	—	84	42	—	—	12.80 1923	Nil (b)	3.90 10/6/20	—

(a) Various years. (b) Jan., Feb., March, April, Nov., Dec., various years. (c) 3/1910 and 12/1920.

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. Min. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. Greatest Number of Miles in One Day.	Wind. Mean Hourly Pressure. (lbs.)	Wind. Total Miles.	Wind. Prevailing Direction. 9 a.m.	Wind. Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (Inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m. & 9 p.m.	No. of Clear Days.
No. of yrs. over which observation extends	71	50	50	50	50		58	56	60	46
January	29.916	758 19/99	0.34	7,880	S W	S W	8.97	2.3	3.5	8.4
February	29.951	691 22/96	0.29	6,682	N E	S W	7.31	2.0	3.5	7.1
March	30.038	628 9/12	0.24	6,646	S E	S W	5.83	2.1	3.9	7.1
April	30.121	773 10/96	0.22	6,087	N E	S W	3.46	1.5	5.0	4.3
May	30.120	760 9/80	0.21	6,276	N E	W S W	2.02	1.7	5.8	2.1
June	30.097	750 12/78	0.25	6,521	N E	N W	1.23	2.0	6.1	1.7
July	30.126	674 25/82	0.24	6,713	N E	N W	1.28	1.6	5.8	1.8
August	30.098	773 31/97	0.28	7,145	N E	W S W	1.87	2.2	5.6	2.6
September	30.041	720 2/87	0.31	7,258	N N E	S W	2.85	2.4	5.2	3.3
October	30.995	768 28/98	0.34	7,861	N N E	S W	4.77	3.4	5.0	4.1
November	30.977	677 2/04	0.33	7,512	S W	S W	6.58	3.5	4.6	5.4
December	30.919	675 12/91	0.34	7,914	S W	S W	8.42	2.7	3.8	7.4
Year Totals	—	—	—	—	—	—	54.59	27.4	—	55.3
Year Averages	30.033	—	0.28	7,041	N E	S W	—	—	4.8	—
Year Extremes	—	773 (a)	—	—	—	—	—	—	—	—

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

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.). Mean Max.	Mean Min.	Mean	Extreme Shade Temperature (Fahr.). Highest.	Lowest.	Extreme Range.	Extreme Temperature (Fahr.). Highest in Sun.	Lowest on Grass.	Mean Hours of Sunshine.
No. of yrs. over which observation extends	71	71	71	71	71	71	50	67	46
January	86.2	61.5	73.9	116.3 26/58	45.1 21/84	71.2	180.0 18/82	30.5 14/79	310.6
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	262.2
March	80.7	58.8	69.8	108.0 12/61	44.3 –/57	63.2	174.0 17/83	33.8 27/80	240.4
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	179.4
May	65.6	50.2	57.9	89.5 4/21	36.9 (a)	52.6	148.2 12/79	25.9 10/91	147.9
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	122.2
July	58.9	44.6	51.8	74.0 11/06	32.0 24/08	42.0	134.5 26/90	23.3 25/11	137.9
August	62.0	45.9	53.9	85.0 31/11	32.3 17/59	52.7	140.0 31/92	23.5 7/88	164.0
September	66.3	47.9	57.1	90.7 23/82	32.7 4/58	58.0	160.5 23/82	25.0 25/27	183.9
October	72.5	51.4	62.0	102.9 21/22	36.0 –/57	66.9	162.0 30/21	27.8 2/18	228.1
November	78.7	55.4	67.0	113.5 21/65	40.8 2/09	72.7	166.9 20/78	31.5 2/09	264.0
December	83.3	58.9	71.1	114.2 14/76	43.0 (b)	71.2	175.7 7/99	32.5 4/84	302.6
Year Averages	72.8	53.2	63.0	—	—	—	—	—	2543.2
Year Extremes	—	—	—	116.3 26/1/58	32.0 24/7/08	84.3	180.0 18/1/82	22.9 12/6/1913	—

(a) 26/1895 and 24/1904. (b) 16/1861 and 4/1906.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches). Mean 9 a.m.	Rel. Hum. (%) Mean 9 a.m.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Dew. Mean No. Days Dew.
No. of yrs. over which observation extends	60	60	60	60	89	89	89	89	89	56
January	0.342	39	59	30	0.72	4	4.00 1850	Nil (a)	2.30 2/89	4.0
February	0.357	41	56	30	0.72	4	6.09 1925	Nil (b)	5.57 7/25	5.7
March	0.345	46	58	36	1.03	6	4.60 1878	Nil (c)	3.50 5/78	10.9
April	0.336	56	72	37	1.73	9	6.78 1853	0.03 1923	3.15 5/60	13.9
May	0.317	67	76	49	2.78	14	7.75 1875	0.20 1891	2.75 1/53	15.7
June	0.298	76	84	67	3.10	16	8.58 1916	0.42 1886	2.11 1/20	15.8
July	0.276	76	87	68	2.64	16	5.38 1865	0.37 1899	1.75 10/65	17.1
August	0.287	70	77	54	2.53	16	6.24 1852	0.35 1914	2.23 19/51	16.5
September	0.297	61	72	44	2.05	14	5.83 1923	0.45 1896	1.59 20/23	15.5
October	0.300	51	67	29	1.73	11	3.83 1870	0.17 1914	2.24 16/08	12.7
November	0.310	43	57	31	1.15	7	3.55 1851	0.04 1885	1.88 28/58	6.9
December	0.323	39	50	33	1.00	6	3.98 1861	Nil 1904	2.42 23/13	4.7
Year Totals	—	—	—	—	21.18	123	—	—	—	139.4
Year Averages	0.311	53	—	—	—	—	—	—	—	—
Year Extremes	—	—	87	29	—	—	8.58 6/16	Nil (d)	5.57 7/2/25	—

(a) 1848, etc. (b) 1848, etc. (c) 1859, etc. (d) January, February, March, December, various years.

CLIMATOLOGICAL DATA—BRISBANE, QUEENSLAND.

LAT. 27° 28′ S., LONG. 153° 2′ E. HEIGHT ABOVE M.S.L. 137 FT.

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

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. Greatest Number of Miles in One Day.	Wind. Mean Hourly Pressure. (lbs.)	Wind. Total Miles.	Wind. Prevailing Direction. 9 a.m.	Wind. Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m. & 9 p.m.	No. of Clear Days.
No. of yrs. over which observation extends	41	14	17	17	41		19	41	36	9
January	29.869	361 1/22	0.12	4,775	E		6.694	6.4	5.7	3.3
February	29.903	347 5/22	0.14	4.621	S E		5.524	5.4	5.7	2.2
March	29 958	348 10/25	0.11	4,467	S E		4.970	4.5	5.3	5.4
April	30.048	400 3/25	0.10	4,089	S & S E		3.897	3.3	4.5	8 0
May	30.080	363 7/25	0.08	3.854	S		3.020	3.3	4.3	9.2
June	30.069	400 12/24	0.09	3,922	S W		2.321	2.3	4.2	8.9
July	30.071	359 2/23	0.08	3.946	S W		2.586	2.6	3.7	11.2
August	30.095	331 6/23	0.09	4,166	S W		3.281	3.8	3.5	12.5
September	30.042	322 14/23	0.09	3 978	N E & S		4.123	5.9	3.5	12.6
October	30.004	325 25/18	0.10	4.319	N E		5.493	6.8	4.0	8.9
November	29.959	331 31/27	0.12	4,636	N E		6.148	8.7	4.7	6.4
December	29.889	467 15/26	0.13	4,987	N E		6.703	9.1	5.3	3.4
Year Totals	—	—	—	—	—		54.760	62.1	—	92.0
Year Averages	29.999	—	0.10	4.313	S & E		—	—	4.5	—
Year Extremes	—	467 15/12/26	—	—	—		—	—	—	—

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.). Mean Max.	Mean Min.	Mean.	Extreme Shade Temperature (Fahr.). Highest.	Lowest.	Extreme Range.	Extreme Temperature (Fahr.). Highest in Sun.	Lowest on Grass.	Mean Hours of Sunshine.
No. of yrs. over which observation extends	41	41	41	41	41	41	41	41	19
January	85.4	68.9	77.2	108.9 14/02	58.8 4/93	50.1	166.4 10/17	49.9 4/93	220.0
February	84.6	68.4	76.5	105.7 21/25	58.7 (a)	47.0	165.2 6/10	49.3 9/89	208.1
March	82.3	66.3	74.3	99.4 5/19	52.4 29/13	47.0	161.7 4/25	45.4 29/13	205.4
April	79.0	61.6	70.3	95.2 (b)	44.4 25/25	50.8	153.8 11/16	36.7 24/25	208.7
May	73.7	55.4	64.6	90.3 21/23	41.3 24/99	49.0	147.0 1/10	29.8 8/97	201.1
June	69.4	51.1	60.2	88.9 19/18	36.3 29/08	52.6	136.0 3/18	25.4 23/88	175.5
July	68.5	48.5	58.5	83.4 28/98	36.1 (c)	47.3	146.1 20/15	23.9 11/90	205.8
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	232.2
September	75.7	54.8	65.2	95.2 16/12	40.7 1/96	54.5	155.5 26/03	30.4 1/89	235.5
October	79.7	59.9	69.8	101.4 18/93	43.3 3/99	58.1	157.4 31/18	34.9 8/89	255.7
November	82.8	64.2	73.5	106.1 18/13	48.5 2/05	57.6	162.3 7/89	38.8 1/05	244.5
December	85.2	67.5	76.4	105.9 26/93	56.4 13/12	49.5	161.7 27/26	49.1 3/94	238.1
Year Averages	78.1	59.7	68.9	—	—	—	—	—	2630.6
Year Extremes	—	—	—	108.9 14/1/02	36.1 (d)	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) 12/7/94 and 2/7/96.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches). Mean 9 a.m.	Rel. Hum. (%) Mean 9 a.m.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Dew. Mean No. Days Dew.
No. of yrs. over which observation extends	41	41	41	41	76	68	76	76	76	41
January	0.638	66	79	53	6.50	14	27.72 1895	0.32 1919	18.31 21/87	7.3
February	0.646	69	82	55	6.18	13	40.39 1893	0.58 1849	8.36 16/93	7.5
March	0.615	72	85	56	5.78	15	34.04 1870	nil 1849	11.18 14/08	10.5
April	0.525	72	80	60	3.54	12	15.28 1867	0.04 1897	4.47 13/16	13.2
May	0.426	73	85	61	2.81	10	13.85 1876	nil 1846	5.62 9/79	14.2
June	0.360	74	84	67	2.77	8	14.03 1873	nil 1847	6.01 9/93	12.3
July	0.330	73	81	61	2.28	8	8.46 1889	nil 1841	3.54 16/89	13.7
August	0.350	64	80	56	2.08	7	14.67 1879	nil (a)	4.89 12/87	12.1
September	0.413	65	76	47	2.05	8	5.43 1886	0.10 1907	2.46 2/94	11.6
October	0.476	60	72	48	2.58	9	9.99 1882	0.14 1900	3.75 3/27	10.5
November	0.553	60	72	45	3.75	10	12.41 1917	nil 1842	4.46 16/86	6.9
December	0.602	62	69	52	4.97	12	13.99 1910	0.35 1865	6.60 28/71	6.4
Year Totals	—	—	—	—	45.29	126	—	—	—	126.2
Year Averages	0.495	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.

CLIMATOLOGICAL DATA—SYDNEY, NEW SOUTH WALES.

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

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

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. Greatest Number of Miles in One Day.	Wind. Mean Hourly Pressure. (lbs.)	Wind. Total Miles.	Wind. Prevailing Direction. 9 a.m., 3 p.m.	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.
No. of yrs. over which observation extends	69	61	61	61	61	48	68	66	64
January	29.898	721 1/71	0.35	7,995	N E	5.289	4.8	5.8	2.5
February	29.943	871 12/69	0.31	6,859	N E	4.190	4.2	5.9	1.9
March	30.012	943 20/70	0.24	6,670	N E	3.591	4.1	5.5	2.5
April	30.073	803 6/82	0.21	6,043	N E	2.555	3 8	5.0	3.4
May	30.077	758 6/98	0.21	6,262	W	1.801	3.2	4.8	3.9
June	30.061	712 7/00	0.27	6,736	W	1.420	2.1	4.8	4.4
July	30.071	930 17/79	0.27	6,969	W	1.526	2.3	4.4	5.4
August	30.069	756 22/72	0.24	6,736	W	1.909	3.1	4.0	5.7
September	30.008	964 6/74	0.28	6,980	W	2.661	4.0	4.3	4.7
October	29.968	926 4/72	0.32	7,618	N E	3.857	4.9	4.9	3.3
November	29.940	720 13/68	0.32	7,456	N E	4.569	5.4	5.5	2.4
December	29.883	938 3/84	0.34	7,872	N E	5.331	5.6	5.6	2.5
Year Totals	—	—	—	—	—	38.699	47.5	—	42.6
Year Averages	30.000	—	0.28	7,016	N E	—	—	5.0	—
Year Extremes	—	964 6/9/74	—	—	—	—	—	—	—

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.). Mean Max.	Mean Min.	Mean	Extreme Shade Temperature (Fahr.). Highest.	Lowest.	Extreme Range.	Extreme Temperature (Fahr.). Highest in Sun.	Lowest on Grass.	Mean Hours of Sunshine.
No. of yrs. over which observation extends	69	69	69	69	69	69	66	69	17
January	78.4	64.8	71.6	108.5 13/96	51.2 14/65	57.3	164.3	43.7	208.6
February	77.7	64.9	71.3	107.8 8/26	49.3 28/63	58.5	161.2	43.4	188.1
March	75.7	62.9	69.3	102.6 3/69	48.8 14/86	53.8	158.3	39.9	189.9
April	71.3	58.1	64.7	91.0 20/22	44.6 27/64	46.4	144.1	33.3	155.2
May	65.4	52.2	58.8	86.0 1/19	40.2 22/59	45.8	129.7	29.3	144.6
June	61.0	48.3	54.7	79.8 2/23	38.0 5/20	41.8	125.5	28.1	130.7
July	59.6	45.9	52.7	78.3 22/26	35.9 12/90	42.4	124.7	24.0	151.7
August	62.6	47.5	55.0	82.0 31/84	36.8 3/72	45.2	149.0	26.1	191.7
September	66.9	51.4	59.2	92.3 27/19	40.8 18/64	51.5	142.2	30.1	194.0
October	71.3	55.8	63.6	99.7 19/98	42.2 6/27	57.5	151.9	32.7	214.5
November	74.5	59.6	67.0	102.7 21/78	45.8 1/05	56.9	158.5	36.0	205.5
December	77.2	62.9	70.1	107.5 31/04	48.4 3/24	59.1	164.5	41.4	204.2
Year Averages	70.1	56.2	63.1	—	—	—	—	—	2128.7
Year Extremes	—	—	—	108.5 13/1/96	35.9 12/7/90	72.6	164.5	24.0	—

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches.) Mean 9 a.m.	Rel. Hum. (%) Mean 9 a.m.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Dew. Mean No. Days Dew.
No. of yrs. over which observation extends	69	69	69	69	69	69	69	69	69	69
January	0.546	67	78	58	3.65	14	15.26 1911	0.42 1888	7.08 13/11	1.2
February	0.560	71	81	59	4.20	14	18.56 1873	0.34 1902	8.90 25/73	2.3
March	0.527	73	85	62	4.98	15	18.70 1870	0.42 1876	6.52 9/13	3.8
April	0.444	76	87	63	5.52	14	24.49 1861	0.06 1868	7.52 29/60	6.1
May	0.357	71	90	63	5.18	15	23.03 1919	0.18 1860	8.36 23/89	6.7
June	0.299	77	89	68	4.74	13	16.30 1885	0.19 1904	5.17 16/84	5.9
July	0.275	76	88	65	4.80	12	13.21 1900	0.12 1862	5.72 28/08	6.1
August	0.290	72	84	56	2.97	11	14.89 1899	0.04 1885	5.33 2/60	5.6
September	0.331	66	79	49	2.86	12	14.05 1879	0.08 1882	5.69 10/79	4.0
October	0.383	63	77	46	2.85	12	11.14 1916	0.21 1867	6.37 13/02	3.0
November	0.444	63	79	42	2.85	12	9.89 1865	0.07 1915	4.23 19/00	2.5
December	0.503	64	77	52	2.86	13	15.82 1920	0.23 1913	4.75 13/10	1.6
Year Totals	—	—	—	—	47.46	157	—	—	—	48.8
Year Averages	0.401	70	—	—	—	—	—	—	—	—
Year Extremes	—	—	90	42	—	—	24.49 4/1861	0.04 8/1885	8.90 25/2/1873	—

CLIMATOLOGICAL DATA—MELBOURNE, VICTORIA.

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

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

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. Greatest Number of Miles in One Day.	Mean Hourly Pressure. (lbs.)	Total Miles.	Prevailing Direction. 9 a.m.	3 p.m.	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.
No. of yrs. over which observation extends.	70	54	54	54	54		55	20	70	20
January	29.911	563 10/97	0.27	7,159	S W	S E	6.425	1.9	5.0	7.4
February	29.959	566 8/68	0.25	6,209	S W	S E	5.074	2.5	5.0	7.0
March	30.033	677 9/81	0.20	6,179	S W	S E	3.998	1.5	5.5	5.1
April	30.105	597 7/68	0.19	5,595	S W	N W	2.392	0.8	5.8	4.7
May	30.101	693 12/65	0.19	5,756	N W	N E	1.475	0.6	6.5	3.1
June	30.076	761 13/76	0.22	6,163	N W	N E	1.090	0.6	6.7	2.3
July	30.090	755 8/74	0.21	6,227	N W	N E	1.059	0.5	6.4	3.0
August	30.064	637 14/75	0.24	6,699	N W	N E	1.475	1.1	6.3	2.9
September	29.997	617 11/72	0.26	6,799	N W	S W	2.301	1.5	6.1	3.6
October	29.965	899 5/66	0.27	7,121	S W	N W	3.364	2.2	5.9	3.7
November	29.951	734 13/66	0.27	6,853	S W	S E	4.580	2.4	5.9	3.6
December	29.898	655 1/75	0.27	7,299	S W	S E	5.808	1.7	5.5	4.3
Year Totals	—	—	—	—	—		39.041	17.3	—	50.7
Year Averages	30.012	—	0.24	6,505	S W	N W	—	—	5.9	—
Year Extremes	—	899 5/10/66	—	—	—		—	—	—	—

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.). Mean Max.	Mean Min.	Mean	Extreme Shade Temperature (Fahr.). Highest.	Lowest.	Extreme Range.	Extreme Temperature (Fahr.). Highest in Sun.	Lowest on Grass.	Mean Hours of Sunshine.
No. of yrs. over which observation extends	72	72	72	72	72	72	68	68	46
January	78.1	56.8	67.4	111.2 14/62	42.0 28/85	69.2	178.5 14/62	30.2 28/65	265.4
February	78.0	57.1	67.6	109.5 7/01	40.2 24/24	69.3	167.5 15/70	30.9 6/91	242.8
March	74.3	54.6	64.5	105.5 2/93	37.1 17/84	68.4	164.5 1/68	28.9 (*b*)	206.8
April	68.2	50.7	59.5	94.0 (*a*)	34.8 24/88	59.2	152.0 8/61	25.0 23/97	162 5
May	61.4	46.7	54.1	83.7 7/05	29.9 29/16	53.8	142.6 2/59	21.1 26/16	130.3
June	56.8	44 0	50.4	72.2 1/07	28.0 11/66	44.2	129.0 11/61	20.4 17/95	111.4
July	55.6	41.8	48.7	69.3 22/26	27.0 21/69	42.3	125.8 27/80	20.5 12/03	107.1
August	58.7	43.4	51.0	77.0 20/85	28.3 11/63	48.7	137.4 29/69	21.3 14/02	155.2
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	171.7
October	67.1	48.3	57.7	98.4 24/14	32.1 3/71	66.2	154.3 28/68	24.8 22/18	205.9
November	71.4	51.3	61.3	105.7 27/94	36.5 2/96	69.2	159.6 29/65	24.6 2/96	242.0
December	75.4	54.3	64.8	110.7 15/76	40.0 4/70	70.7	170.3 20/69	33.3 1/04	254.4
Year Averages	67.3	49.7	58.4	—	—	—	—	—	2255.5
Year 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.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches) Mean 9 a.m.	Rel. Hum. (%) Mean 9 a.m.	Highest Mean.	Lowest Mean.	Rainfall (inches). Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Dew. Mean No. Days Dew.
No. of yrs. over which observation extends	20	20	20	20	72	72	72	72	69	20
January	0.382	58	65	50	1.89	8	5.68 1904	0.04 1878	2.97 9/97	2.6
February	0.413	62	69	48	1.71	7	6.24 1904	0.03 1870	3.37 18/19	2.9
March	0.373	64	71	57	2.18	10	7.50 1911	0.18 1859	3.55 9/19	6.9
April	0.333	71	78	66	2.17	11	6.71 1901	Nil 1923	2.28 22/01	8.4
May	0.312	78	86	71	2.16	13	4.31 1862	0.45 1901	1.85 7/91	8.8
June	0.277	83	89	77	2.06	14	4.51 1859	0.73 1877	1.74 21/04	8.7
July	0.263	82	86	76	1.86	14	7.02 1891	0.57 1902	2.71 12/91	9.3
August	0.269	76	80	70	1.87	14	4.04 1924	0.48 1903	1.94 26/24	8.3
September	0.291	69	76	60	2.44	14	7.93 1916	0.52 1907	2.62 12/80	6.0
October	0.312	62	67	56	2.63	13	7.61 1869	0.29 1914	3.00 17/69	6.0
November	0.329	59	69	52	2.23	11	6.71 1916	0.25 1895	2.57 16/76	1.9
December	0.365	57	69	51	2.27	9	7.18 1863	0.11 1904	2.62 28/07	1.8
Year Totals	—	—	—	—	25.47	138	—	—	—	71.6
Year Averages	0.326	68	—	—	—	—	—	—	—	—
Year Extremes	—	—	89	48	—	—	7.93 9/1916	Nil 4/1923	3.55 5/3/19	—

CLIMATOLOGICAL DATA—HOBART, TASMANIA.

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

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

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. Greatest Number of Miles in One Day.		Wind. Mean Hourly Pressure. (lbs.)	Wind. Total Miles.	Wind. Prevailing Direction. 9 a.m.	Wind. Prevailing Direction. 3 p.m.	Mean Amount of Evaporation (inches).	No. of Days Lightning.	Mean Amount of Clouds, 9 a.m., 3 p.m. & 9 p.m.	No. of Clear Days.
No. of yrs. over which observation extends	43	17		17	17	22		17	20	65	21
January	29.831	500	30/16	0.19	5,968	N N W & N	S E	4.906	0.9	6.0	2.6
February	29.916	605	4/27	0.15	4,753	N	S E	3.741	1.3	6.0	2.4
March	29.942	443	19/27	0.13	4,960	N & N N W	S E	3.030	1.3	5.9	2.3
April	29.966	533	27/26	0.14	4,890	N W to N	N W & S E	2.032	0.8	6.1	1.6
May	29.982	423	15/27	0.13	4,798	N W to N	N & N W	1.406	0.5	6.1	2.2
June	29.951	569	27/20	0.13	4,667	NW & NNW	N to NW	0.909	0.6	6.1	2.1
July	29.928	425	16/21	0.13	4,805	NNW & NW	N to NW	0.916	0.5	5.8	2.5
August	29.924	612	19/26	0.14	5,006	N & N N W	N & N W	1.287	0 5	6.0	2.0
September	29.852	516	26/15	0.18	5,508	N N W & N	N W & S E	2.009	0.8	6.1	1.6
October	29.828	461	8/12	0.19	5,988	N	S E	3.185	0.8	6.3	1.4
November	29.805	508	18/15	0.20	5,851	N	S E	4.102	0.9	6.3	1.6
December	29.808	486	30/20	0.18	5,741	N	S E	4.599	1.1	6.3	1.2
Year Totals	—	—		—	—	—		32.122	10.0	—	23.5
Year Averages	29.894	—		0.16	5.245	N to N W	S E & N W	—	—	6.0	—
Year Extremes	—	612	19/8/26	—	—	—		—	—	—	—

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.). Mean Max.	Mean Min.	Mean	Extreme Shade Temperature (Fahr.). Highest.	Lowest.	Extreme Range.	Extreme Temperature (Fahr.). Highest in Sun.	Lowest on Grass.	Mean Hours of Sunshine.
No. of yrs. over which observation extends	57	57	57	81	81	81	40	60	33
January	71.2	52.9	62.0	105.0 (a)	40.3 (b)	64.7	160.0 (c)	30.6 19/97	212.9
February	71.3	53.3	62.3	104.4 12/99	39.0 20/87	65.4	165.0 24/98	28.3 –/87	179.6
March	67.9	50.7	59.3	99.0 –/61	35.2 31/26	63.6	150.0 3/05	27.5 30/02	175.4
April	62.7	47.6	55.2	90.0 1/56	30.0 25/56	60.0	142.0 18/93	25.0 –/86	141.3
May	57.3	43.7	50.5	77.8 5/21	29.2 20/02	48.6	128.0 (d)	20.0 19/02	132.0
June	52.8	41.1	47.0	75.0 7/74	28.0 22/79	47.0	122.0 12/94	21.0 6/87	104.0
July	52.0	39.4	45.7	72.0 22/77	27.0 18/66	45.0	121.0 12/93	18.7 16/86	123.7
August	55.0	41.0	48.0	81.0 21/72	30.0 10/73	51.0	129.0 –/87	20.1 7/09	145.0
September	58.8	43.2	51.0	81.7 23/26	30.0 12/41	51.7	138.0 23/93	18.3 16/26	147.0
October	62.7	45.5	54.1	92.0 24/14	32.0 12/89	60.0	156.0 9/93	23.8 (e)	171.6
November	66.1	48.2	57.2	98.0 20/88	35.2 5/13	62.8	154.0 19/92	26.0 1/08	202.6
December	69.3	51.2	60.2	105.2 30/97	38.0 13/06	67.2	157.0 30/18	27.2 –/86	199.6
Year Averages	62.3	46.5	54.4	—	—		—	—	1934.7
Year Extremes	—	—	—	105.2 30/12/97	27.0 18/7/66	78.2	165.0 24/2/98	18.3 16/9/26	—

(a) 27/49 and 1/00. (b) 3/72, 2/06, and 27/13. (c) 5/86 and 13/05. (d) –/89 and –/93. (e) 1/86 and –/99.

HUMIDITY, RAINFALL, AND DEW.

Month.	Vapour Pressure (inches) Mean 9 a.m.	Rel. Hum. (%) Mean 9 a.m.	Highest Mean.	Lowest Mean.	Rainfall (Inches). Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Dew. Mean No. Days Dew.
No. of yrs. over which observation extends	41	41	41	41	85	84	85	85	61	18
January	0.336	59	72	47	1.83	10	5.91 1893	0.03 1841	2.96 30/16	0.7
February	0.356	63	77	53	1.48	9	9.15 1854	0.07 1847	4.50 25/54a	1.7
March	0.329	66	77	58	1.70	10	7.60 1854	0.02 1843	2.79 5/19	4.8
April	0.299	72	84	58	1.85	11	6.50 1909	0.07 1904	5.02 20/09	9.8
May	0.268	77	89	65	1.90	13	6.37 1905	0.10 1843	3.22 14/58	12.5
June	0.243	81	91	68	2.23	14	8.15 1889	0.22 1852	4.11 14/89	8.5
July	0.231	81	94	72	2.18	14	6.02 1922	0.30 1850	2.51 18/22	8.2
August	0.239	76	92	64	1.83	14	10.16 1858	0.23 1854	4.35 12/58	8.6
September	0.257	68	85	60	2.07	15	7.14 1844	0.39 1847	3.50 29/44	4.7
October	0.271	63	73	51	2.26	15	6.67 1906	0.26 1850	2.58 4/06	2.8
November	0.296	60	72	50	2.47	14	8.92 1849	0.16 1868	3.97 6/49	1.1
December	0.316	57	67	45	1.99	11	9.00 1875	0.11 1842	2.48 13/16	0.8
Year Totals	—	—	—	—	23.79	150	—	—	—	64.2
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 26/54 also.