SECTION III.

PHYSIOGRAPHY.

§ 1. General Description of Australia.

1. **Geographical Position.**—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.*

Tropical and Temperate Regions. Of the total area of Australia the lesser portion lies within the tropics. Assuming, as is usual, that the latitude of the Tropic of Capricorn is 23° 30′ S.,† the areas within the tropical and temperate zones are approximately as follows :—

AREAS OF TROPICAL AND TEMPERATE REGIONS
OF STATES AND TERRITORY 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 Commonwealth (0.386). See hereafter Meteorology—page 48.

2. **Area of Australia compared with areas of other Countries.**—That the area of Australia is greater than that of the United States of America, that it is four-fifths of that of Canada, that it is nearly one-fourth of the area of the whole of the British Empire, that it is more than three-fourths of the whole area of Europe, that it is more than 25 times as large as any one of the following, viz., the United Kingdom, Hungary, Italy, the Transvaal, and Ecuador, are facts which are not always adequately realised. It is this great size, taken together with the fact of the limited population, that gives to the problems of Australian development their unique character, and its clear comprehension is essential in any attempt to understand those problems.

The relative magnitudes may be appreciated by a reference to the following table, which shows how large Australia is compared with the countries referred to, or *vice versa*. Thus, to take line one, we see that Europe is about $1\frac{3}{10}$ times (1·29711) as large as Australia, or that Australia is about three-quarters (more accurately 0·77) of the area of Europe.

* 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." The limits, according to the 1903–4 edition of "A Statistical Account of Australia and New Zealand," p. 2, and, according to Volume XXV. of the Encyclopædia Britannica, tenth edition, p. 787, are respectively 113° 5′ E., 153° 16′ E., 10° 39′ S., and 39° 11½′ S., but these figures are obviously defective. A similar inaccuracy appears in the XI. edition of the Encyclopædia.

† Its correct value for 1920 is 23° 26′ 58.89″, and it decreases about 0.47″ per annum.

AREA OF AUSTRALIA IN COMPARISON WITH THAT OF OTHER COUNTRIES.

Commonwealth of Australia .. .. 2,974,581 square miles.

Country.	Area.	Australian Commonwealth in comparison with—	In comparison with Australian C'wealth.
	Sq. miles.		
Continents—			
Europe	3,858,361	0.77	1.29711
Asia	16,705,618	0.18	5.61612
Africa	12,154.812	0.24	4.08623
North and Central America and West Indies..	8,548,784	0.35	2.87394
South America	7,366,287	0.40	2.47641
Australasia and Polynesia	3,422,017	0.87	1.15042
Total, exclusive of Arctic and Antarctic Conts.	52,055,879	0.06	17.50023
Europe—			
Russia	1,657,560	1.79	0.55724
France	212,659	13.99	0.07150
Spain	194,783	15.27	0.06548
Germany	183,468	16.21	0.06168
Sweden	173,035	17.19	0.05817
Lithuania	154,491	19.25	0.05194
Finland	149,586	19.89	0.05029
Poland	149,012	19.96	0.05011
Norway	124,964	23.80	0.04201
Rumania	122,282	24.33	0.04111
United Kingdom	121,633	24.46	0.04089
Italy	110,632	26.89	0.03719
Jugo-Slavia	95,628	31.11	0.03215
Czecho-Slovakia	54,264	54.82	0.01824
Greece	41,933	70.94	0.01410
Bulgaria	40,656	73.16	0.01367
Iceland	39,709	74.91	0.01225
Hungary	35,654	83.43	0.01199
Portugal	35,490	83.81	0.01193
Austria	30,766	95.68	0 01034
Latvia	25.000	118.98	0.00840
Esthonia	23,160	128.44	0.00779
Denmark (Exclusive of Iceland)	17,144	173.51	0.00576
Switzerland	15,976	186.19	0.00537
Netherlands	12,582	236.42	0.00423
Belgium	11,744	253.29	0.00395
Albania	11,500	258.66	0.00387
Turkey	10,882	273.35	0.00366
Luxemburg	999	2977.56	0.00034
Danzig	709	4195.46	0.00024
Andorra	191	15573.72	0.00006
Malta	118	25208.31	0.00004
Liechtenstein	65	45762.78	0.00002
San Marino	38	78278.45	0.00001
Monaco	8	371822.63	..
Fiume	8	371822.63	..
Gibraltar	2	1487290.50	..
Total, Europe	3,858,361	0.77	1.29711
Asia—			
Russia	5,913,877	0.50	1.98814
China and Dependencies	3,913,560	0.76	1.31567
British India	1,093,074	2.72	0.36747
Independent Arabia	1,000,000	2.97	0.33618
Feudatory Indian States	709,555	4.19	0.23854
Far Eastern Republic	652,740	4.56	0.21944

AREA OF AUSTRALIA IN COMPARISON WITH OTHER COUNTRIES—*continued.*

Country.	Area.	Australian Commonwealth in comparison with—	In comparison with Australian C'wealth.
ASIA—*continued*—	Sq. miles.		
Persia	628,000	4.74	0.21112
Dutch East Indies	561,661	5.30	0.18882
Turkey	273,202	10.89	0.09185
Japan (and Dependencies). . ..	261,276	11.38	0.08784
Afghanistan	245,000	12.14	0.08236
Siam	198,900	14.95	0.06687
Mesopotamia	143,250	20.76	0.04816
Syria	114,530	25.97	0.03850
Philippine Islands (inclsv. of Sulu Archipelago)	114,400	26.00	0.03846
Laos	96,500	30.82	0.03244
Omán	82,000	36.28	0.02757
Bokhara	79,000	37.65	0.02656
British Borneo and Sarawak	73,106	40.69	0.02458
Kurdistan and Turkish Armenia	71,990	41.32	0.02420
Cambodia	57,900	51.37	0.01946
Nepál	54,000	55.08	0.01815
Tonking	40,530	73.39	0.01363
Annam	39,753	74.82	0.01337
Azerbaijan	33,970	87.57	0.01142
Federated Malay States	27,506	108.14	0.00925
Smyrna	25,801	115.29	0.00867
Georgia	25,760	115.47	0.00866
Ceylon	25,481	116.74	0.00857
Khiva	24,000	123.94	0.00807
Malay Protectorate (including Johore) ..	23,486	126.65	0.00790
Cochin China	22,000	135.20	0,00740
Bhután	20,000	148.73	0.00672
Armenia	15,240	195.18	0,00512
Aden and Dependencies	9,005	330.33	0.00303
Palestine	9 000	330.51	0.00303
Timor, &c. (Portuguese Indian Archipelago)	7,330	405.81	0.00246
Brunei	4,000	743.64	0.00134
Cyprus	3,584	829.96	0.00120
Andaman and Nicobar Islands	2,895	1027.49	0.00097
Kiauchau (including Neutral Zone)	2,700	1101.70	0.00091
Goa, Damaõ, and Diu	1,638	1815.98	0.00055
Straits Settlements	1,600	1859.11	0.00054
Sokotra	1,382	2152.37	0.00046
Hong Kong and Dependencies	391	7607.62	0.00013
Wei-hai-wei	285	10437.13	0.00010
Bahrein Islands	250	11898.32	0.00008
French India (Pondicherry, &c.)	196	15176.43	0.00007
Kwang Chau Wan	190	15655.67	0.00006
Maldive Islands	115	25865.92	0.00004
Macao, &c.	4	743645.25	..
Total, Asia	16,705,618	0.18	5.61612
Africa—			
French Sahara	1,544,000	1.93	0.51906
Sudan	1,014,400	2.93	0.34102
French Equatorial Africa	982,049	3.03	0.33015
Belgian Congo	909,654	3.27	0.30581
Angola	484.800	6.14	0.16298
Union of South Africa	473,096	6.29	0.15905
Rhodesia	440,000	6.76	0.14792
Portuguese East Africa	428,132	6.95	0.14393
Tripolitania and Cyrenaica	406,000	7.33	0.13649
Senegambia and Niger	366,700	8.11	0.12328

AREA OF AUSTRALIA IN COMPARISON WITH OTHER COUNTRIES—*continued.*

Country.	Area.	Australian Commonwealth in comparison with—	In comparison with Australian C'wealth.
AFRICA—*continued*—	Sq. miles.		
Tanganyika Territory	365,000	8.15	0.12271
Abyssinia	350,000	8.50	0.11766
Egypt	350,000	8.50	0.11766
Territory of the Niger	347,400	8.56	0.11679
Mauretania	344,967	8.62	0.11597
Nigeria and Protectorate	332,000	8.96	0.11161
South-west Africa	322,400	9.23	0.10838
Bechuanaland Protectorate	275,000	10.82	0.09245
Kenya Colony and Protectorate	245,060	12.14	0.08238
Madagascar	228,000	13.05	0.07665
Morocco	223,000	13.34	0.07497
Algeria (including Algerian Sahara)	222,180	13.39	0.07469
Kameroon (French)	166,489	17.87	0.05597
Upper Volta	154,400	19.27	0.05191
Italian Somaliland	139,430	21.33	0.04687
Ivory Coast	121,976	24.39	0.04101
Uganda Protectorate	110,300	26.97	0.03708
Rio de Oro and Adrar	109,200	27.24	0.03671
French Guinea	95,218	31.24	0.03201
Gold Coast Protectorate (with Nth. Territories)	80,000	37.18	0.02689
Senegal	74,112	40.14	0.02491
British Somaliland	68,000	43.74	0.02286
Tunis	50,000	59.49	0.01681
Eritrea	45,800	64.95	0.01540
Dahomey	42,460	70.06	0.01427
Liberia	40,000	74.36	0.01345
Nyassaland Protectorate	39,573	75.17	0.01330
Kameroon (British)	31,000	95.95	0.01042
Sierra Leone and Protectorate	31,000	95.95	0.01042
Togoland (French)	21,893	135.87	0.00736
Portuguese Guinea	13,940	213.38	0.00469
Togoland (British)	12,600	236.08	0.00424
Basutoland	11,716	253.89	0.00394
Spanish Guinea (Rio Muni, &c.)	9,470	314.11	0.00318
Spanish Morocco	7,700	386.31	0.00259
Swaziland	6,678	445.43	0.00225
French Somali Coast	5,790	513.74	0.00194
Gambia and Protectorate	4,134	719.54	0.00139
Cape Verde Islands	1,480	2009.85	0.00050
Comoro Islands, Mayotte, &c.	1,440	2065.68	0.00048
Zanzibar	1,020	2916.26	0.00034
Réunion	970	3066.58	0.00033
Ifni	965	3082.47	0.00032
Fernando Po, &c.	814	3654.27	0.00027
Mauritius and Dependencies	809	3676.86	0.00027
St. Thomas and Principe Islands	360	8262.73	0.00012
Seychelles	156	19067.83	0.00005
St. Helena	47	63288.96	0.00002
Ascension	34	87487.68	0.00001
Total, Africa	12,154,812	0.24	4.03623
North and Central America and West Indies—			
Canada	3,729,665	0.80	1.25385
United States (exclusive of Alaska, &c.)	2,973,774	1.00	0.99973
Mexico	767,198	3.88	0.25792
Alaska	590,884	5.03	0.19864
Newfoundland and Labrador	162,734	18.28	0.05471
Nicaragua	49,200	60.46	0.01654

AREA OF AUSTRALIA IN COMPARISON WITH OTHER COUNTRIES—*continued.*

Country.	Area.	Australian Commonwealth in comparison with—	In comparison with Australian C'wealth.
N. & C. AMERICA & W. INDIES—*continued*—	Sq. miles.		
Guatemala	48,290	61.60	0.01623
*Greenland	46,740	63.64	0.01571
Honduras	44,275	67.18	0.01488
Cuba	44,215	67.28	0.01486
Costa Rica	23,000	129.33	0.00773
Santo Domingo	19,332	153.87	0.00650
Salvador	13,183	225.64	0.00443
Haiti	10,204	291.51	0.00343
British Honduras	8,592	346.20	0.00289
Bahamas	4,404	675.43	0.00148
Jamaica	4,207	707.05	0.00141
Porto Rico	3,435	865.97	0.00115
Trinidad and Tobago	1,977	1505.23	0.00066
Guadeloupe and Dependencies	722	4119.92	0.00024
Leeward Islands	715	4160.25	0.00024
Windward Islands	527	5644.37	0.00018
Curaçao and Dependencies	403	7381.09	0.00014
Martinique	385	7726.18	0.00013
Turks and Caicos Islands	224	13279.38	0.00008
Barbados	166	17919.16	0.00006
Virgin Islands of U.S.A., late Danish West Indies	132	22534.70	0.00004
St. Pierre and Miquelon	93	31984.74	0.00003
Cayman Islands	89	33422.25	0.00003
Bermudas	19	156556.89	..
Total, N. and C. America and W. Indies ..	8,548,784	0.35	2.87394
South America—			
Brazil	3,275,510	0.91	1.10117
Argentine Republic	1,153,119	2.58	0.38766
Peru	722,461	4.12	0.24288
Bolivia	514,155	5.79	0.17285
Colombia (exclusive of Panama)	440,846	6.75	0.14820
Venezuela	398,594	7.46	0.13400
Chile	289,829	10.26	0.09744
Paraguay	175,673	16.93	0.05906
Ecuador	116,000	25.64	0.03900
British Guiana	89,480	33.24	0.03008
Uruguay	72,153	41.23	0.02426
Dutch Guiana	46,060	64.58	0.01548
Panama	32,380	91.86	0.01089
French Guiana	32,000	92.96	0.01076
Falkland Islands	6,500	457.63	0.00219
South Georgia	1,000	2974.58	0.00034
Panama Canal Zone	527	5644.37	0.00018
Total, South America	7,366,287	0.40	2.47641
Australasia and Polynesia—			
Commonwealth of Australia	2,974,581	1.00	1.00000
Dutch New Guinea	121,339	24.51	0.04079
New Zealand and Dependencies	103,861	28.64	0.03492
Papua	90,540	32.85	0.03044
Territory of New Guinea	89 390	33.28	0.03005
British Solomon Islands	11,000	270.42	0.00370
Fiji	7,435	400.08	0.00250
New Caledonia and Dependencies	7,237	411.02	0,00243

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

AREA OF AUSTRALIA IN COMPARISON WITH OTHER COUNTRIES—*continued.*

Country.	Area.	Australian Commonwealth in comparison with—	In comparison with Australian C'wealth.
AUSTRALASIA AND POLYNESIA—*continued*—	Sq. miles.		
Hawaii	6,449	461.25	0.00217
New Hebrides	5,500	540.83	0.00185
French Establishments in Oceania	1,520	1956.96	0.00051
Territory of Western Samoa	1,260	2360.78	0.00042
Marianne, Caroline, and Marshall Islands ..	960	3093.52	0.00032
Tonga	385	7726.18	0.00013
Guam	225	13220.36	0.00008
Gilbert and Ellice Islands	208	14300.87	0.00007
Samoa (U.S.A. part)	102	29162.56	0.00003
Norfolk Island	13	228813.92	—
Nauru Island	12	247881.75	—
Total, Australasia and Polynesia ..	3,422,017	0.87	1.15042
British Empire	13,257,584	0.22	4.45696

The above figures are extracted from the Statesman's Year-Book for 1922, but, as several of the boundaries have not yet been finally adjusted since the war, modifications will in some instances be necessary.

3. **Relative Areas of Political Subdivisions.**—As already stated, Australia consists of six States and the Northern and Federal Territories. The areas of these, in relation to one another and to the total of Australia, are shewn in the following table :—

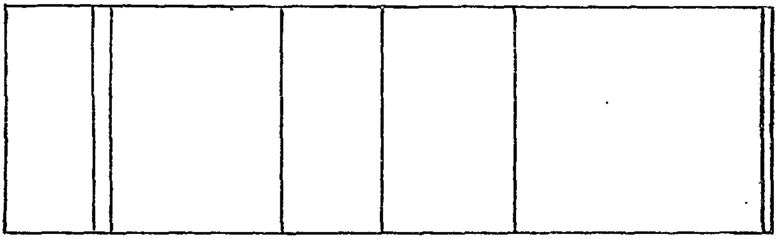
RELATIVE AREAS OF STATES, TERRITORIES, AND COMMONWEALTH.

State or Territory.	Area.	Ratio which the Area of each State and Territory bears to that of other States, Territories, and Commonwealth.							
		N.S.W.	Vic.	Q'land.	S.A.	W.A.	Tas.	N. Ter.	C'wlth.
	Sq. miles.								
New South Wales	309,432	1.000	3.521	0.461	0.814	0.317	11.804	0.591	0.104
Victoria ..	87,884	0.284	1.000	0.131	0.231	0.090	3.352	0.168	0.030
Queensland ..	670,500	2.167	7.629	1.000	1.764	0.687	25.577	1.280	0.225
South Australia	380,070	1.228	4.325	0.567	1.000	0.389	14.498	0.726	0.128
West. Australia	975,920	3.154	11.105	1.456	2.568	1.000	37.228	1.864	0.328
Tasmania ..	26,215	0.085	0.298	0.039	0.069	0.027	1.000	0.050	0.009
North. Territory	523,620	1.692	5.958	0.781	1.378	0.537	19.974	1.000	0.176
Federal Territory	940	0.003	0.011	0.001	0.002	0.001	0.036	0.002	0.000*a*
Commonwealth	2,974,581	9.613	33.847	4.436	7.826	3.048	113.469	5.681	1.000

(*a*) The correct decimal is 0.0003.

Thus, looking at the top line, New South Wales is seen to be over three-and-a-half times as large as Victoria (3.521) and less than one-half the size of Queensland (0.461); or again, looking at the bottom line, the Commonwealth is shewn to be more than nine-and-a-half times as large as New South Wales (9.613), and nearly thirty-four times as large as Victoria (33.847).

These relative magnitudes are shewn in the small diagram below. It may be added that Papua (or British New Guinea), with its area of 90,540 square miles, is 0.030 of the area of the Commonwealth. The comparatively small size of the Federal Territory prevents its being shewn in this diagram.



	N.S.W.	V.	Qld.	S.A.	N.T.	W.A.	Tas.
% on total ..	10	3	22	13	18	33	1

4. **Coastal Configuration.**—There are no striking features in the configuration of the coast; the most remarkable indentations are the Gulf of Carpentaria on the north and the Great Australian Bight on the south. The Cape York Peninsula on the extreme north is the only other remarkable feature in the outline. In Year Book No. 1, an enumeration of the features of the coast-line of Australia was given (see pp. 60 to 68).

(i) *Coast-line.* The lengths of coast-line, exclusive of minor indentations, both of each State and of the whole continent, are shewn in the following table :—

SQUARE MILES OF TERRITORY PER MILE OF COAST LINE.

STATES, TERRITORY, AND CONTINENT.

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

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

For the entire Commonwealth 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.

(ii) *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 Nuyt's Archipelago, in the Northern Territory and in the Gulf of Carpentaria; Captain Cook can be followed along the coasts of New South Wales and Queensland; Flinders' track is easily recognised from Sydney southwards, as far as Cape Catastrophe, by the numerous Lincolnshire names bestowed by him; and the French navigators of the end of the eighteenth and the beginning of the nineteenth century have left their names all along the Western Australian, South Australian, and Tasmanian coasts.

5. **Geographical Features of Australia.**—In each of the earlier issues of this Year Book fairly complete information has been given concerning some special geographical element. Thus No. 1 Year Book, pp. 60–68, contains an enumeration of Coastal features; No. 2, pp. 66–67, deals with Hydrology; No. 3, pp. 59–72, with Orography; No. 4, pp. 59–82, with the Lakes of Australia; No. 5, pp. 51–80, with the Islands of Australia; No. 6, pp. 55–66, with the Mineral Springs of Australia; No. 7, pp. 56–58, with the Salient Features in the Geological History of Australia, with special reference to changes of climate. A special article dealing with the plains and peneplains of Australia appeared in No. 12 Year Book, pp. 82–88. In No. 13 and No. 14 respectively, articles were published on Past Glacial Action in Australia, and on Evidences of Past Volcanic Action in Australia. This practically completes the description of the ordinary physical features.

§ 2. The Fauna of Australia.

An authoritative article describing in some detail the principal features of the Fauna of Australia was given in Year Books No. 1 (see pp. 103 to 109) and No. 2 (see pp. 111 to 117), while a synoptical statement appeared in No. 3 (see pp. 73 to 76). Considerations of space, however, preclude the inclusion in this issue of more than a passing reference to the subject.

§ 3. The Flora of Australia.

In Year Books No. 1 (see pp. 109 to 114) and No. 2 (see pp. 117 to 122) a fairly complete though brief account was given of the Flora of Australia, and in Year Book No. 3 similar information in a greatly condensed form will be found on pp. 76 to 78. Space in this issue will not permit of more than a mere reference to preceding volumes.

A special article dealing with Australian fodder plants, contributed by J. H. Maiden, Esq., F.L.S., Government Botanist of New South Wales, and Director of the Botanic Gardens, Sydney, appeared in Official Year Book No. 6, pp. 1190–6. A special article on the grasses and saltbushes of Australia, contributed by E. Breakwell, B.A., B.Sc., Agrostologist at the Botanic Gardens, Sydney, appeared in Year Book No. 9, pp. 84–90. Year Book No. 10 contained two special articles ; one dealing with Australian eucalyptus timbers, contributed by R. T. Baker, F.L.S., appeared on pp. 85 to 92, and one by H. G. Smith, F.C.S., dealing with the chemical products of Australian eucalypts, appeared on pp. 92–98.

§ 4. Seismology in Australia.

A brief statement regarding the position of seismology and seismological record in Australia appeared in Year Book No. 4, pp. 82 and 83.

§ 5. The Geology of Australia.

1. **General.**—Independent and authoritative sketches of the geology of each State were given in Year Books No. 1 (see pp. 73 to 103) and No. 2 (see pp. 78 to 111). Want of space has precluded the insertion of these sketches in the present issue of the Year Book, and it has not been considered possible to give anything like a sufficient account of the geology of Australia by presenting here a mere condensation of these sketches. Reference must, therefore, be made to either Year Book No. 1 or No. 2, *ut supra.*

2. **Geological Map of Australia.**—The map shewing the geographical distribution of the more important geological systems and formations, which appeared on page 51 of Year Book No. 12 and in preceding issues, has been discontinued pending the preparation of a new map embodying later information.

3. **The Plains and Peneplains of Australia.**—A special article dealing with this subject appears on pp. 82–88 of Year Book No. 12.

4. **The Building Stones of Australia.**—Independent and authoritative descriptions of the building stones of each State (with the exception of Queensland) will be found in Official Year Book No. 9, pp. 446–466.

A special article dealing with " The Building Stones of Queensland " will be found on pp. 89–95 of Year Book No. 12.

5. **Past Glacial Action in Australia.**—A special article on this subject will be found in Year Book No. 13, pp. 1133 *et seq.*

6. **Evidences of Past Volcanic Action in Australia.**—See special article in Year Book No. 14, pp. 46 *et seq.*

§ 6. 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 organisation 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. In the Section of this Year Book dealing with population, a table will be found showing the population and average rainfall of the principal urban incorporated areas in the Commonwealth.

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

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, shewing pressure, temperature, wind, rain, cloud extent, and weather. Similar publications are also issued from the divisional offices in each of the State Capitals.

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

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

3. **General Description of Australia.**—In the general description of Australia, page 40, it is pointed out that a considerable portion (0.530) of three divisions of the Australian Commonwealth 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 the Commonwealth within the temperate zone, however, is 1,825,261 square miles; thus the tropical part is about 0.386, or about five-thirteenths of the whole, or the "temperate" region is half as large again as the "tropical" (more accurately 1.591). By reason of its insular geographical position, and the absence of striking physical features, Australia is, on the whole, less subject to extremes of weather than are regions of similar area in other parts of the globe; and latitude for latitude Australia is, on the whole, more temperate.

The altitudes of the surface of Australia range up to a little over 7,300 feet, hence its climate embraces a great many features, from the characteristically tropical to what is essentially alpine, a fact indicated in some measure by the name Australian Alps given to the southern portion of the great Dividing Range.

While on the coast the rainfall is often abundant and the atmosphere moist, in some portions of the interior the rainfall is very limited, and the atmosphere dry. The distribution of forest, as might be expected, and its climatic influence, is consequently very variable. In the interior there are on the one hand fine belts of trees, on the other there are large areas which are treeless, and where the air is hot and parched in summer. Again, on the coast, even as far south as latitude 35°, the vegetation is tropical in its luxuriance, and also somewhat so in character. Climatologically, therefore, Australia may be said to present a great variety of features. The various climatological characteristics will be referred to in detail.

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

4. Meteorological Divisions.—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., 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., from Wilcannia along the Darling River to its junction with the Murray; (*d*) between divisions II. and V., from the junction of the Darling and Murray Rivers, along the latter to Encounter Bay; (*e*) between divisions III. and IV., 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., 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*) division V. includes Tasmania.

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 :—(i) Perth, (ii) Adelaide, (iii) Brisbane, (iv) Sydney, (v) Melbourne, and (vi) Hobart; and for that reason the climatological and meteorological statistics will be set forth in the indicated order in this publication.

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.

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 ..	133	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.—In respect of Australian temperatures generally it may be pointed out that the isotherm for 70° Fahrenheit extends in South America and South Africa as far south as latitude 33°, while in Australia it reaches only as far south as latitude 30°, thus shewing that, on the whole, Australia has a more temperate climate when compared latitude for latitude with other places in the Southern Hemisphere.

The comparison is even more favourable when the Northern Hemisphere is included therein, for in the United States the 70° isotherm extends in several of the western States as 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 isothermal value 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 the Australian continent the temperatures are very equable. At Darwin, for example, the difference in the means for the hottest and coldest months is only 8.2°, and the extreme readings for the year, that is, the highest maximum in the hottest month and the lowest reading in the coldest month, shew a difference of under 50°.

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

The detailed temperature results for the several capitals of the States of Australia are shewn in the Climatological Tables hereinafter.

(i) *Hottest and Coldest Parts.* A comparison of the temperatures recorded at coast and inland stations shews 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° for days, and even weeks, continuously. The coldest part of the Commonwealth is the extreme south-east of New South Wales and extreme east of Victoria, namely, the region of the Australian Alps. Here the temperature seldom, if ever, reaches 100°, even in the hottest of seasons.

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

(ii) *Monthly Maximum and Minimum Temperatures.* The normal monthly maximum and minimum temperatures can be best shewn by means of graphs, which exhibit the nature of the fluctuation of each for all available years. In the diagram (on page 65) for nine representative places in Australia, the upper heavy curves shew the mean maximum, the lower heavy curves the mean maximum temperatures based upon daily observations. On the same diagram the thin curves shew the relative humidities (see next paragraph).

6. **Relative Humidity.**—Next after temperature the degree of humidity may be regarded as of great importance as an element of climate; and the characteristic differences of relative humidity between the various capitals of Australia call for special remark. For six representative places the variations of humidity are shewn on the graph on page 65, which gives results based upon daily observations of the dry and wet bulb thermometers for all available years. Hitherto difficulties have been experienced in many parts of Australia in obtaining satisfactory observations for a continuous period of any length. For this reason it has been thought expedient to refer to the record of humidity at first order stations only, where the results are thoroughly reliable. Throughout, the degree of humidity given will be what is known as *relative humidity*, that is, the percentage of aqueous vapour actually existing to the total possible if the atmosphere were saturated.

The detailed humidity results for the several State capitals are given in the Climatological Tables hereinafter. From these, it is seen that, in respect of relative humidity, Sydney and Hobart have the first place, while Brisbane, Melbourne, Perth, and Adelaide follow in the order stated, Adelaide being the driest. The graphs on page 65 shew the annual variations in humidity. It will be observed that the *relative* humidity is ordinarily but not invariably great when the temperature is low.

7. **Evaporation.**—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 records on pages 67 and 60 to 64 and 73, which shew that the yearly amount varies from about 33 inches at Hobart to 94 inches at Alice Springs in the centre of the Continent.

(i) *Monthly Evaporation Curves.* The curves shewing the mean monthly evaporation in various parts of the Commonwealth will disclose how characteristically different are the amounts for the several months in different localities. The evaporation for characteristic places is shewn on the diagram shewing also rainfalls (see page 66).

(ii) *Loss by Evaporation.* In the interior of Australia the possible evaporation is greater than the actual rainfall. Since, therefore, the loss by evaporation depends largely on the exposed area, tanks and dams so designed that the surface shall be a minimum are advantageous. Similarly, 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 of more than ordinary concern in the drier districts of Australia.

8. **Rainfall.**—As even a casual reference to climatological maps, indicating the distribution of rainfall and prevailing direction of wind, would clearly shew, 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 zone of the south-east trade and prevailing westerly winds. The southern limit of the south-east trade strikes the eastern shores at about 30° south latitude, and, with very few exceptions, the heaviest rains of the Australian continent are precipitated along the Pacific slopes to the north of that latitude, the varying quantities being more or less regulated by the differences in elevation of the shores and of the chain of mountains, upon which the rain-laden winds blow, from the New South Wales northern border to Thursday Island. The converse effect is exemplified on the north-west coast of Western Australia, where the prevailing winds, blowing from the interior of the continent instead of from the ocean, result in the lightest coastal rain in Australia.

The westerly winds, which skirt the southern shores, are responsible for the very reliable, although generally light to moderate, rains enjoyed by the south-western portion of Western Australia, by the south-eastern agricultural areas of South Australia, by a great part of Victoria, and by the whole of Tasmania.

(i) *Factors determining Distribution and Intensity of Rainfall.*

(ii) *Time of Rainfall.*

In 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.

(iii) *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 148 and 166 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's 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 35 years.

Harvey's Creek in the shorter period of 22 years has three times exceeded 200 inches, the total for 1910 being 201.28 inches, and at the South Johnstone Sugar Experiment Station, where a gauge has recently been established, 202.52 inches were recorded in 1921.

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

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

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

(iv) *Quantities and Distribution of Rainfall generally.* The departure from the normal rainfall increases greatly and progressively from the southern to the northern shores of the continent, and similarly also at all parts of the continent subject to capricious monsoonal rains, as the comparisons hereunder will shew. The general distribution is best seen from the map on page 72, shewing 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 shewn in the following table :—

DISTRIBUTION OF AVERAGE RAINFALL.

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

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

Referring first to the capital cities, the complete records of which are given on the following page, it is seen that Sydney with a normal rainfall of 48.27 inches occupies the chief place, Brisbane, Perth, Melbourne, Hobart and Adelaide following in that order, Adelaide with 21.05 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 shew how the rainfall is distributed throughout the year in various parts of the continent, the figures of representative towns have been selected. (See map on page 71.) Darwin, typical of the Northern Territory, shews that in that region nearly the whole of the rainfall occurs 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 in the former, and in November in 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. In general it may be said that 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 receiving generally from about 10 to 20 inches.

(v) *Curves of Rainfall and Evaporation.* The relative amounts of rainfall and evaporation at different times through the year are best seen by referring to the graphs for a number of characteristic places. (See page 66.) It will be recognised at once how large is the evaporation when water is fully exposed to the direct rays of the sun, and to wind.

(vi) *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.

RAINFALL AT THE AUSTRALIAN CAPITALS, 1860 TO 1921.

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.
1860	..	..	..	19.67	119	..	54.63	144	..	82.76	180	..	25.38	133	..	21.05	142	..
1	..	..	..	24.04	147	..	69.45	155	..	59.36	157	..	29.16	159	..	28.19	167	..
2	..	..	..	21.85	119	..	28.27	98	..	23.99	108	..	22.08	139	..	21.72	148	..
3	..	..	..	23.68	145	..	68.83	146	..	47.08	152	..	36.42	165	..	40.67	163	..
4	..	..	..	19.75	121	..	47.00	114	..	69.12	185	..	27.40	144	..	28.11	142	..
5	..	..	..	15.51	108	..	24.11	52	..	36.15	140	..	15.94	119	..	23.07	146	..
6	..	..	..	20.11	116	..	51.18	142	..	36.91	156	..	22.41	107	..	23.55	127	..
7	..	..	..	19.05	112	..	61.04	112	..	59.56	140	..	25.79	133	..	22.27	139	..
8	..	..	..	19.99	113	19.85	35.98	110	47.55	42.98	161	49.99	18.27	120	24.47	18.08	112	25.00
9	..	..	..	14.74	117	..	54.39	114	..	48.00	150	..	24.58	129	..	23.87	131	..
1870	..	..	..	23.84	119	..	79.06	154	..	64.47	179	..	33.77	129	..	27.53	123	..
1	..	..	..	23.25	137	..	45.45	119	..	52.27	141	..	30.17	125	..	18.25	131	..
2	..	..	..	22.66	146	..	49.22	131	..	37.12	161	..	32.52	136	..	31.76	160	..
3	..	..	..	21.00	139	..	62.02	138	..	73.40	176	..	25.61	134	..	23.43	157	..
4	..	..	..	17.23	127	..	38 71	135	..	63.60	173	..	28.10	134	..	24.09	138	..
5	..	..	..	29.21	157	..	67.03	162	..	46.25	153	..	32.87	158	..	29.25	182	..
6	28.73	100	..	13.43	110	..	53.42	130	..	45.69	156	..	24.04	134	..	23.63	173	..
7	20.48	103	..	24.95	135	..	30.28	119	..	59.66	147	..	24.10	124	..	20.82	165	..
8	39.72	143	29.64	22.08	112	21.24	56.33	134	53.59	49.77	129	54.03	25.36	116	28.11	29.76	183	25.24
9	41.34	106	(3 yr.)	20.69	130	..	67.30	157	..	63.19	167	..	19.28	127	..	21.07	210	..
1880	31.79	116	..	22.48	142	..	49.12	134	..	29.51	142	..	28.48	147	..	..	..	..
1	24.78	101	..	18.02	135	..	29.39	117	..	40.99	163	..	24.08	134	..	..	..	..
2	35.68	109	..	15.70	134	..	42.62	121	..	42.28	112	..	22.40	131	..	30.69	..	..
3	39.65	122	..	26.76	161	..	32.22	114	..	46.92	157	..	23.71	130	..	24.05	161	..
4	31.96	92	..	18.74	138	..	43.49	136	..	44.04	150	..	25.85	128	..	21.55	171	..
5	33.44	110	..	15.89	133	..	26.85	112	..	39.91	145	..	26.94	123	..	28.29	176	..
6	28.90	89	..	14.42	141	..	53.66	152	..	39.43	152	..	24.00	128	..	21.39	189	..
7	37.52	105	..	25.70	164	..	81.54	242	..	60.16	190	..	32.39	153	..	24.21	174	..
8	27.83	117	33.29	14.55	131	19.30	33.08	143	45.93	23.01	132	42.94	19.42	123	24.66	18.45	151	23.71
9	39.96	123	..	30.87	143	..	49.36	155	..	57.16	186	..	27.14	125	..	30.80	180	(8 yr.)
1890	46.73	126	..	25.78	139	...	73.02	162	..	81.42	184	..	24.24	140	..	27.51	173	..
1	30.33	93	..	14.01	113	..	41.68	143	..	55.30	200	..	26.73	126	..	23.25	160	..
2	31.23	122	..	21.53	137	..	64.98	146	..	69.26	189	..	24.96	124	..	18.62	120	..
3	40.12	145	..	21.49	129	..	88.26	147	..	49.90	209	..	26.80	140	..	27.46	146	..
4	23.72	103	..	20.78	134	..	44.02	143	..	38.22	188	..	22.60	138	..	27.39	141	..
5	33.01	123	..	21.28	130	..	59.11	105	..	31.86	170	..	17.04	131	..	25.40	121	..
6	31.50	103	..	15.17	121	..	44.97	121	..	42.40	157	..	25.16	124	..	21.61	135	..
7	27.17	106	..	15.42	119	..	42.53	115	..	42.52	136	..	25.85	117	..	20.45	153	..
8	31.76	118	33.55	20.75	116	20.71	60.06	131	56.80	43.17	143	51.12	15.61	102	23.61	20.40	164	24.29
9	32.40	107	..	18.84	119	..	38.85	141	..	55.90	174	..	28.87	116	..	20.68	170	..
1900	36.61	124	..	21.68	133	..	34.41	110	..	66.54	170	..	28.09	139	..	19.14	135	..
1	36.75	122	..	18.01	124	..	38.48	110	..	40.10	149	..	27.45	113	..	25.11	149	..
2	27.06	93	..	16.02	123	..	16.17	87	..	43.07	180	..	23.08	102	..	21.85	150	..
3	35.69	140	..	25.47	134	..	49.27	136	..	38.62	173	..	28.43	130	..	25.86	139	..
4	34.35	125	..	20.31	117	..	33.23	124	..	45.93	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	30.55	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	..
Aver.	..	..	33.91	..	..	21.05	..	..	45.46	..	..	48.27	..		26.24	..	..	23.59
No. of Yrs.			(46)			(83)			(72)			(82)	..		(78)			(79)

NOTE.—The above average Rainfall figures for Brisbane, Sydney, and Melbourne differ slightly from the mean annual falls given in the Climatological Tables on pp. 62–64, which are for a less number of years.

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 24 hours are not included. Reference, however, to them may be found in preceding Official Year Books:—

HEAVY RAINFALLS, NEW SOUTH WALES, UP TO 1921, INCLUSIVE.

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

HEAVY RAINFALLS, QUEENSLAND, UP TO 1921, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Anglesey ..	26 Dec., 1909	18.20	Flying Fish Point	31 Jan., 1913	16.10
Atherton (Cairns) ..	31 Jan., 1913	16.69	Gladstone ..	4 Feb., 1911	18.83
Babinda (Cairns) ..	1 Feb., ,,	20.51	Glen Boughton ..	5 Apr., 1894	18.50
,, ,, ..	24 Jan., 1916	22.30	Goldsborough		
,, ,, ..	21 Apr., 1920	16.05	(Cairns) ..	31 Jan., 1913	19.92
Babinda	25 Mar., 1921	15.76	Goondi Mill (Innis-		
Bloomsbury ..	14 Feb., 1893	17.40	fail)	6 Apr., 1894	15.69
,, ..	10 Jan., 1901	16.62	.. ,, ..	29 Dec., 1903	17.83
Brisbane ..	21 ,, 1887	18.31	.. ,, ..	10 Feb,. 1911	17.68
Buderim Mountain	11 ,, 1898	26.20	,, ,, ..	6 Apr., 1912	15.55
Bundaberg ..	16 ,, 1913	16.94	Goondi	30 Jan., 1913	24.10
Burnett Head			Goorganga ..	23 ,, 1918	18.17
(Bundaberg) ..	16 ,, 1913	15.22	Halifax	5 Feb., 1899	15.37
Cairns	11 Feb., 1911	15.17	,, ...	6 Jan., 1901	15.68
,, ...	2 Apr., ,,	20.16	Hambledon Mill ..	2 ,, 1911	18.61
Carbrook ..	23 Jan., 1918	22.66	,, ,, ..	1 Apr., ,,	19.62
,, ..	24 ,, ,,	15.77	,, ,, ..	30 Jan., 1913	17.32
Cardwell ..	18 Mar., 1904	18.24	Hampden ..	23 Apr., 1918	17.30
Carmilla	23 Jan., 1918	15.92	,, ..	24 ,, ,,	17.19
Clare	26 ,, 1896	15.30	Harvey Creek ..	8 Mar., 1899	17.72
Collaroy ..	23 ,, 1918	18.06	,, ,, ..	11 Jan., 1905	16.96
Crohamhurst			,, ,, ..	3 ,, 1911	27.75
(Blackall Range)	2 Feb., 1893	35.71	,, ,, ..	2 Apr., ,,	16.46
,, ,,	9 Jan., 1898	19.55	,, ,, ..	31 Jan., 1913	24.72
,, ..	6 Mar., ,,	16.01	Harvey Creek ..	25 Mar., 1921	15.80
Croydon	29 Jan., 1908	15.00	Haughton Valley..	26 Jan., 1896	18.10
Dungeness ..	16 Mar., 1893	22.17	Holmwood (Wood-		
Dunira	9 Jan., 1898	18.45	ford) ..	2 Feb., 1893	16.19
,, ...	6 Mar., ,,	15.95	Howard.. ..	15 Jan., 1905	19.55
Fairymead Planta-			Huntley ..	27 Dec., 1916	18.94
tion (Bundaberg)	16 Jan., 1913	15.32	Innisfail (formerly		
Flying Fish Point	7 Apr., 1912	16.06	Geraldton) ..	11 Feb., 1889	17.13

HEAVY RAINFALLS, QUEENSLAND—*continued.*

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Innisfail (formerly			Mourilyan	7 Apr., 1912	18.97
Geraldton)	6 Apr. 1894	16.02	,,	31 Jan., 1913	15.05
,, ,,	24 Jan., 1900	15.22	Mundoolun	21 ,, 1887	17.95
,, ,,	29 Dec., 1903	21.22	Nambour	9 ,, 1898	21.00
,, ,,	2 Apr., 1911	15.00	,,	27 Dec., 1909	16.80
,, ,,	7 ,, 1912	20.50	Netherdale	22 Jan., 1918	19.50
,, ,,	31 Jan., 1913	20.91	Oxenford	14 Mar., 1908	15.65
Kamerunga (Cairns)	2 Apr., 1911	21.00	Palmwoods	10 Jan., 1898	15.85
,, ,,	31 Jan., 1913	16.00	,,	25 Dec., 1909	17.75
Koumala	23 ,, 1918	22.31	Pialba (Marybor'gh)	16 Jan., 1913	17.22
,,	24 ,, ,,	20.65	Plane Creek		
Kuranda (Cairns)	11 Feb., 1911	16.30	(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*	St. Lawrence	30 ,, 1896	15.00
Mackay	21 Jan., 1918	24.70†	The Hollow (Mac-		
,,	22 ,, ,,	17.25‡	kay)	23 Feb., 1888	15.12
Sugar Experimental			Thornborough	20 Apr., 1903	18.07
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	Victoria Mill	6 Jan., 1901	16.67
,,	6 Jan., 1901	23.33	Woodlands (Yepp'n)	31 ,, 1893	23.07
,,	4 Mar., 1915	22.00	Wootha	10 Feb., 1915	15.93
Mapleton	26 Dec., 1909	15.72	Yandina	1 ,, 1893	20.08
Mirani	12 Jan., 1901	16.59	,,	9 Jan., 1898	19.25
Miriam Vale (B'berg)	17 ,, 1913	15.80	,,	28 Dec., 1909	15.80
Mooloolah	13 Mar., 1892	21.53	Yarrabah	2 Apr., 1911	30.65
,,	2 Feb., 1893	19.11	,,	24 Jan., 1916	27.20
Mount Cuthbert	8 Jan., 1911	18.00	,,	25 ,, ,,	18.60
Mount Molloy	31 Mar., ,,	20.00	Yeppoon	31 ,, 1893	20.05
,,	1 Apr., ,,	20.00	,,	8 ,, 1898	18.05
,,	2 ,, ,,	20.00	,,	8 Oct., 1914	21.70
Mourilyan	11 Feb., ,,	17.40			

HEAVY RAINFALLS, WESTERN AUSTRALIA, UP TO 1921, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Balla Balla	21 Mar., 1899	14.40	Exmouth Gulf	2 Feb., 1918	12.50
Bamboo Creek	22 ,, ,,	10.10	Fortescue	3 May, 1890	23.36
Boodarie	21 ,, ,,	14.53	Frazier Downs	3 Mar., 1916	12.25
Broome	6 Jan., 1917	14.00	Kerdiadary	7 Feb., 1901	12.00
Carlton	11 ,, 1906	10.64	Meda	2 Mar., 1916	10.55
Cossack	3 Apr., 1898	12.82	Millstream	5 ,, 1900	10.00
,,	16 ,, 1900	13.23	Obagama	28 Feb., 1910	12.00
Croydon	3 Mar., 1903	12.00	,,	24 Dec., 1920	13.02
Derby	29 Dec., 1898	13.09	Pilbara	2 Apr., 1898	14.04
,,	7 Jan., 1917	16.47	Point Cloates	20 Jan., 1909	10.87

* Mr. Jas. Laidlaw, of Lyndon, states that this fell in 4 hours. † 37½ hours. ‡ 22¼ hours.

HEAVY RAINFALLS, WESTERN AUSTRALIA—*continued.*

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Point Torment ..	17 Dec., 1906	11.86	Whim Creek ..	6 Mar., 1900	10.03
Port George IV. ..	17 Jan., 1915	11.24	„ „ ..	3 „ 1903	10.44
Roebourne ..	3 Apr., 1898	11.44	Woodstock ..	21 „ 1912	13.00
Roebuck Plains ..	5 Jan., 1917	14.01	Wyndham ..	27 Jan., 1890	11.60
„ „ ..	6 „ „	22.36	„ ..	4 Mar., 1919	12.50
Tambray ..	6 Mar., 1900	10.00	Yardil Creek ..	3 Feb., 1918	10.00
„ ..	3 „ 1903	10.47	Yeeda	2 Mar., 1916	10.70
Thangoo ..	17-19 Feb. '96	24.18	„	6 Jan., 1917	10.20
„ ..	28 Dec., 1898	11.55	„	7 „ „	11.75
Whim Creek ..	3 Apr., „	29.41			

HEAVY RAINFALLS, NORTHERN TERRITORY, UP TO 1921, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Bonrook	24 Dec., 1915	10.60	Cosmopolitan Gold Mine ..	24 Dec., 1915	10.60
Borroloola ..	14 Mar., 1899	14.00	Darwin	7 „ „	11.67
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			

HEAVY RAINFALLS, SOUTH AUSTRALIA, UP TO 1921, 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 1921, 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 1921, INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Gould's Country ..	8-10 Mar., '11	15.33	Mathinna ..	8-10 Mar.,'11	15.79
Lottah	8-10 „ „	18.10	The Springs ..	30-31 Jan.,'16	10.75

10. **Snowfall.**—Light snow has been known to fall even as far north, occasionally, 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 as far north as Toowoomba in Queensland. During the winter, snow covers the ground to a great extent on the Australian Alps for several months, where also the temperature falls below zero Fahrenheit during the night, and in the ravines around Kosciusko and similar localities the snow never entirely disappears.

The antarctic "V"-shaped disturbances are always associated with our most pronounced and extensive snowfalls. The depressions on such occasions are very steep in the vertical area, and the apexes are unusually sharp-pointed and protrude into very low latitudes, sometimes even to the tropics.

11. **Hail.**—Hail falls throughout Australia 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. Rarely does a summer pass without some station experiencing a fall of stones exceeding in size an ordinary hen-egg, and many riddled sheets of light-gauge galvanised iron bear evidence of the weight and penetrating power of he stones.

Hail storms occur most frequently in Australia 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 shewn on page 67.

13. **Wind.**—Notes on the distinctive wind currents in Australia were given a preceding Year Books (see No. 6, page 83) and are here omitted to save space.

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

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

Occasionally the north-east coast of Queensland is visited by hurricanes from the north-east tropics. During the first four months of the year these hurricanes appear to have their origin in th neighbourhood of the South Pacific Islands, their path being a parabolic curve of south-westerly direction. Only a small percentage, however, reach Australia, the majority recurving in their path to the east of New Caledonia.

Very severe cyclones, locally known as "Willy Willies," are peculiar to the north-west coast of Western Australia from the months of November to April inclusive. They apparently originate in the ocean, in the vicinity of Cambridge Gulf, and travel in a south-westerly direction with continually increasing force, displaying their greatest energy near Cossack and Onslow, between latitudes 20° and 22° South. The winds in these storms, like those from the north-east tropics, are very violent and destructive, causing 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 coast-line, 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 Year Book (see No. 6, pp. 84, 85, 86).

15. **Influences affecting Australian Climate.**—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 therein, however, have 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 shews a rise of two-tenths of a degree during the last twenty years, a change probably brought about by the great growth of residential and manufacturing buildings within the city and in the surrounding suburbs during that period. Again, low-lying lands on the north coast of New South Wales, that 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.

(i) *Influences 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 equalising 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. 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. Thus, 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 inland rivers. Thus, the River Murray, which has never been known to run dry, derives its steadiness of flow mainly through the causes above indicated.

(ii) *Direct Influences 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 contend the opposite.

Sufficient evidence exists, however, to establish that, even if the rainfall has not increased, the beneficial effect of forest lands in tempering the effects of the climate is more than sufficient to disclose the importance of their protection and extension.

It is the rapid rate of evaporation, induced by both hot and cold winds, which injures crops and makes life uncomfortable on the plains. Whether the forest aids in increasing precipitation there may be doubt, but it must be admitted that it does check the 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 our treeless interior. 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 Year Book No. 6, pp. 86 and 95).

16. **Comparison of Rainfalls and Temperatures.**—For the purpose of comparison, the following lists of rainfalls and temperatures are given for various important cities throughout the world, for the site of the Federal capital, and for the capitals of the Australian States.

COMPARISONS OF RAINFALLS AND TEMPERATURES
OF CITIES OF THE WORLD WITH THOSE OF AUSTRALIA.

Place.	Height above M.S.L.	Annual Rainfall. Average.	Annual Rainfall. Highest.	Annual Rainfall. Lowest.	Temperature. (a) Mean Summer.	Temperature. (b) Mean Winter.	Temperature. Highest on Record.	Temperature. Lowest on Record.	Temperature. Average Hottest Month.	Temperature. 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	43.31	63.72	26.32	66.1	52.5	91.0	31.9	67.2	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	25.45	35.30	13.54	61.1	43.4	95.7	21.3	61.6	42.4
Christiania ..	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	37.06	53.90	22.15	57.3	43.1	94.0	23.0	57.9	42.0
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	44.0
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.) ..	110	49.70	67.68	30.02	61.7	48.4	88.0	30.0	62.4	47.5
Zürich	1,542	45.15	78.27	29.02	63.3	31.3	94.1	−0.8	65.1	29.5
FEDERAL CAPITAL SITE.					(a)	(b)				
Canberra (Dist.) Queanbeyan	2,000 to 2,900	22.49	41.29	10.45	68.4	44.2	102.6	18.0	68.8	43.4
THE STATE CAPITALS.					(a)	(b)				
Perth	197	33.91	46.73	20.21	73.1	56.0	108.4	34.2	74.2	55.2
Adelaide ..	140	21.05	30.87	11.39	73.1	53.1	116.3	32.0	74.1	51.7
Brisbane ..	137	45.65	88.26	16.17	76.6	59.7	108.9	36.1	77.0	58.4
Sydney	133	48.04	82.76	21.49	71.0	54.0	108.5	35.9	71.7	52.6
Melbourne ..	115	25.66	44.25	15.61	66.6	50.0	111.2	27.0	67.5	48.6
Hobart	177	23.59	43.39	13.43	61.7	46.8	105.2	27.0	62.4	45.5

(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 1921. These are given in the following tables :—

CLIMATOLOGICAL DATA FOR PERTH, W.A.

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.	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	37	24		24	24	24	23	24	25	25
January	29.906	797	27/95	0.69	11,266	S S E	10.44	1.8	2.7	14.1
February	29.924	650	6/08	0.63	9,853	S S E	8.60	1.5	2.8	11.5
March	29.988	651	6/13	0.54	10,004	S S E	7.64	1.4	3.2	11.9
April	30.076	955	25/00	0.41	8,443	S E	4.74	1.3	4.1	8.0
May	30.076	768	5/12	0.35	8,035	E N E	2.72	2.3	5.3	5.1
June	30.058	861	27/10	0.37	7,972	N	1.73	2.3	5.9	3.1
July	30.091	949	11/99	0.39	8,444	N	1.71	2.3	5.4	4.9
August	30.084	966	15/03	0.42	8,854	W	2.36	1.7	5.3	4.8
September ..	30.060	864	11/05	0.47	9,033	S W	3.30	1.4	4.9	5.6
October	30.031	809	6/16	0.53	9,891	S S W	5.22	1.1	4.9	5.8
November ..	29.988	777	18/97	0.61	10,253	S	7,65	1.3	3.8	7.9
December ..	29.928	672	31/98	0.65	10,936	S	9.84	1.6	3.0	12.2
Year Totals ..	—	—		—	112,984	—	65.95	20.0	—	94.9
Year Averages ..	30.018	..		0.50	—	S	—	—	4.3	—
Year Extremes ..	—	966	15/8/03	—	—	—	—	—	—	—

TEMPERATURE.

Month.	Mean Temperature (Fahr.). Mean Max.	Mean Temperature (Fahr.). Mean Min.	Mean Temperature (Fahr.). Mean.	Extreme Shade Temperature (Fahr.). Highest.		Extreme Shade Temperature (Fahr.). Lowest.		Greatest Range.	Extreme Temperature (Fahr.). Highest in Sun.		Extreme Temperature (Fahr.). Lowest on Grass.		Mean Hours of Sunshine.
No. of yrs. over which observation extends	25	25	25	25		25		25	24		23		24
January	84.6	63.4	74.0	108.4	28/21	50.6	25/01	57.8	177.3	22/11	40.4	1/21	321.0
February	84.9	63.5	74.2	107.3	12/15	47.7	1/02	59.6	169.0	4/99	39.8	1/13	273.0
March	81.3	60.9	71.1	106.1	6/14	45.8	8/03	60.3	167.0	19/18	36.7	8/03	269.4
April	75.9	57.1	66.5	99.7	9/10	39.3	20/14	60.4	157.0	8/16	31.0	20/14	219.2
May	68.6	52.5	60.6	90.4	2/07	34.3	11/14	56.1	141.0	2/21	25.3	11/14	177.2
June	63.9	49.6	56.8	81.7	2/14	36.3	29/14	45.4	135.5	9/14	29.0	20/16	143.4
July	62.7	47.7	55.2	76.4	21/21	34.2	7/16	42.2	133.2	13/15	25.1	30/20	168.0
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	186.5
September ..	66.1	50.2	58.2	90.9	30/18	38.9	17/13	52.0	153.6	29/16	29.2	21/16	203.4
October	69.3	52.7	61.0	93.4	17/06	40.9	4/17	52.5	154.0	29/14	30.5	4/17	236.7
November ..	75.4	56.6	66.0	104.6	24/13	42.0	1/04	62.6	166.6	23/15	35.5	6/10 14/12	289.4
December ..	80.8	60.6	70.7	107.9	20/04	48.0	2/10	59.9	168.7	25/15	39.1	2/10	325.2
Year Averages ..	73.1	55.2	64.2	—		—		—	—		—		2812.4*a*
Year Extremes ..	—	—	—	108.4	28/1/21	34.2	7/7/16	74.2	177.3	22/1/14	25.1	30/7/20	—

(*a*) Total for year.

HUMIDITY, RAINFALL, AND DEW.

Month.	Rel. Hum. (%). Mean 9 a.m.	Rel. Hum. (%). Highest Mean.	Rel. Hum. (%). Lowest Mean.	Rainfall (inches). Mean Monthly.	Rainfall (inches). Mean No. of Days Rain.	Rainfall (inches). Greatest Monthly.		Rainfall (inches). Least Monthly.		Rainfall (inches). Greatest in One Day.		Dew (inches). Mean Amount of Dew.	Dew (inches). Mean No. Days Dew.
No. of yrs. over which observation extends	25	25	25	46	46	46		46		46		—	46
January	52	61	42	0.33	3	2.17	1879	nil	(*a*)	1.74	28/79	—	2.5
February	54	65	46	0.48	2	2.30	1883	nil	(*a*)	1.63	26/15	—	2.9
March	57	66	46	0.75	4	4.50	1896	nil	(*a*)	1.53	17/76	—	5.7
April	64	72	51	1.58	7	4.97	1882	nil	1920	2.62	30/04	—	9.0
May	72	81	61	4.88	14	12.13	1879	0.98	1903	2.80	20/79	—	12.2
June	78	83	72	6.86	17	12.11	1890	2.16	1877	3,90	10/20	—	11.7
July	78	84	72	6.52	17	10.90	1902	2.42	1876	3.00	4/91	—	13.1
August	74	79	67	5.69	18	10.33	1882	0.46	1902	2.79	7/03	—	11.2
September ..	68	75	58	3.35	14	7.72	1903	0.62	1914	1.73	23/07	—	9.2
October	62	75	54	2.12	12	7.87	1890	0.49	1892	1.38	15/10	—	5.4
November ..	55	63	56	0.77	6	2.12	1880	nil	1891	1.11	30/03	—	3.9
December ..	52	62	44	0.58	4	3.05	1888	nil	1886	1.72	1/88	—	3.0
Year Totals ..	—	—	—	33.91	118	—		—		—		—	89.8
Year Averages ..	64	—	—	—	—	—		—		—		—	—
Year Extremes ..	—	84	42	—	—	12.13	5/79	nil	(*b*)	3.90	10/6/20	—	—

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

CLIMATOLOGICAL DATA FOR ADELAIDE, S.A.

LAT. 34° 56′ S., LONG. 138° 35′ E. HEIGHT ABOVE M.S.L. 140 FT.

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

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. readings.	Wind. Greatest Number of Miles in One Day.	Wind. Mean Hourly Pressure. (lbs.)	Wind. Total Miles.	Wind. Prevailing Direction.	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	65	44	44	44	44	52	50	54	50
January	29.918	758 19/99	0.34	7,893	S	9.00	2.3	3.4	8.3
February	29.953	691 22/96	0.30	6,783	S	7.34	2.0	3.4	7.1
March	30.038	628 9/12	0.25	6,735	S	5.81	2.2	3.9	6.9
April	30.121	773 10/96	0.22	6,137	S x W	3.41	1.6	5.0	4.0
May	30.124	760 9/80	0.21	6,210	N x E	2.03	1.7	5.7	1.9
June	30.095	750 12/78	0.25	6,623	N	1.24	2.1	6.1	1.6
July	30.129	674 25/82	0.25	6,777	N	1.30	1.6	5.8	1.7
August	30.098	773 31/97	0.28	7,182	N N W	1.88	2.2	5.6	2.5
September ..	30.040	720 2/87	0.31	7,348	W	2.85	2.4	5.2	3.2
October	30.000	768 28/98	0.34	7,896	S W x W	4.76	3.4	4.9	4.0
November ..	29.974	677 2/04	0.33	7,556	S S W	6.51	3.6	4.6	5.1
December ..	29.920	675 12/91	0.34	7,928	S S W	8.43	2.7	3.8	7.4
Year Totals ..	—	—	—	—	—	54.56	27.8	—	53.7
Year Averages ..	30.034	—	0.28	7,089	S W x S	—	—	4.8	—
Year Extremes ..	—	773(a)	—	—	—	—	—	—	—

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

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.). Mean Max.	Mean Temperature (Fahr.). Mean Min.	Mean Temperature (Fahr.). Mean	Extreme Shade Temperature (Fahr.). Highest.	Extreme Shade Temperature (Fahr.). Lowest.	Extreme Range.	Extreme Temperature (Fahr.). Highest in Sun.	Extreme Temperature (Fahr.). Lowest on Grass.	Mean Hours of Sunshine.
No. of yrs. over which observation extends	65	65	65	65	65	65	44	61	40
January	86.5	61.7	74.1	116.3 26/58	45.1 21/84	71.2	180.0 18/82	36.5 14/79	311.2
February	86.2	62.1	74.1	113.6 12/99	45.5 23/18	68.1	170.5 10/00	36.7 (c)	263.9
March	80.8	58.9	69.8	108.0 12/61	44.8 –/57	63.2	174.0 17/83	33.8 27/80	238.9
April	73.2	54.5	63.9	98.0 10/66	39.6 15/59	58.4	155.0 1/83	30.2 16/17	178.2
May	65.6	50.2	57.9	89.5 4/21	36.9 (a)	52.6	148.2 12/79	25.9 10/91	148.5
June	60.3	46.7	53.5	76.0 23/65	32.5 27/76	43.5	138.8 18/79	22.9 12/13	121.4
July	58.8	44.5	51.7	74.0 11/06	32.0 24/08	42.0	134.5 26/90	23.3 25/11	138.4
August	62.0	45.9	54.0	85.0 31/11	32.3 17/59	52.7	140.0 31/92	23.5 7/88	163.3
September ..	66.3	47.9	57.1	90.7 23/82	32.7 4/58	58.0	160.5 23/82	26.2 15/08	184.3
October	72.5	51.4	62.0	102.8 30/19	36.0 –/57	66.8	162.0 30/21	27.8 2/18	228.0
November ..	78.6	55.4	67.0	113.5 21/65	40.8 2/09	72.7	166.9 29/78	31.5 2/09	261.2
December ..	83.4	59.0	71.2	114.2 14/76	43.0 (b)	71.2	175.7 7/99	32.5 4/84	304.6
Year Averages ..	72.8	53.2	63.0	—	—	—	—	—	2,541.0(d)
Year Extremes ..	—	—	—	116.3 26/1/58	32.0 24/7/08	84.3	180.0 18/1/82	22.9 12/6/13	—

(a) 26/1895 and 24/1904. (b) 16/1861 and 4/1905. (c) 24/78 and 23/18. (d) Total for year.

HUMIDITY, RAINFALL, AND DEW.

Month.	Rel. Hum. (%) Mean 9 a.m.	Rel. Hum. (%) Highest Mean.	Rel. Hum. (%) Lowest Mean.	Rainfall (inches). Mean Monthly.	Rainfall (inches). Mean No. of Days Rain.	Rainfall (inches). Greatest Monthly.	Rainfall (inches). Least Monthly.	Rainfall (inches). Greatest in One Day	Dew (inches). Mean Amount of Dew.	Dew (inches). Mean No. Days Dew.
No. of yrs. over which observation extends	54	54	54	83	83	83	83	83	—	50
January	38	59	30	0.72	4	4.00 1850	nil (a)	2.30 2/89	—	4.2
February	41	56	31	0.65	4	2.89 1919	nil (b)	2.24 14/13	—	5.7
March	47	58	36	1.06	6	4.60 1878	nil (c)	3.50 5/78	—	11.1
April	56	72	44	1.78	9	6.78 1853	0.06 1910	3.15 5/60	—	14.1
May	68	76	49	2.74	13	7.75 1875	0.20 1891	2.75 1/53	—	15.9
June	77	84	69	3.11	16	8.58 1916	0.42 1886	2.11 1/20	—	15.7
July	76	87	68	2.63	16	5.38 1865	0.37 1899	1.75 10/65	—	17.2
August	69	77	54	2.51	16	6.24 1852	0.35 1914	2.23 19/51	—	16.4
September ..	61	72	44	1.99	14	4.64 1840	0.45 1896	1.42 (d)	—	15.6
October	51	67	29	1.73	11	3.83 1870	0.17 1914	2.24 16/08	—	12.6
November ..	43	57	34	1.17	8	3.55 1851	0.04 1885	1.88 28/58	—	7.2
December ..	39	50	33	0.96	6	3.98 1861	nil 1904	2.42 23/13	—	4.8
Year Totals ..	—	—	—	21.05	123	—	—	—	—	140.5
Year Averages ..	55	—	—	—	—	—	—	—	—	—
Year Extremes ..	—	87	29	—	—	8.58 6/16	nil (e)	3.50 5/3/78	—	—

(a) 1848, 1849, 1878, and 1906. (b) 1848, 1860, &c. (c) 1859, &c. (d) 25/93 and 12/17.
(e) January, February, March, and December, various years.

CLIMATOLOGICAL DATA FOR 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.	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	35	11	11	11	35	13	35	30	13
January	29.876	315 24/14	0.10	4,222	E	6.516	5.3	5.8	2.8
February	29.904	340 10/15	0.13	4,419	S E	5.291	5.1	5.7	2.1
March	29.958	305 29/16	0.09	4,086	S E & S	4.726	4.4	5.3	4.5
April	30.050	335 6/21	0.08	3,606	S	3.644	3.2	4.5	8.1
May	30.090	245 29/19	0.07	3,474	S	2.748	3.2	4.4	8.2
June	30.066	307 23/16	0.07	3,364	S		2.1	4.2	8.2
July	30.072	291 31/21	0.07	3,470	S W & S	—	2.5	3.7	11.8
August	30.097	284 6/20	0.08	3,823	S	—	3.5	3.6	11.5
September ..	30.040	269 19/21	0.07	3,532	S	3.689	5.7	3.6	11.8
October	30.006	325 25/18	0.09	4,048	N E	5.166	6.9	4.1	7.8
November ..	29.958	272 22/21	0.10	4,185	N E & N	5.922	8.1	4.8	6.1
December ..	29.890	295 21/13	0.11	4,561	N E	6,579	8.4	5.2	3.4
Year { Totals ..	—	—	—	—	S to E	44.281	58.4	—	86.3
Year { Averages ..	30.001	—	0.09	3.899	and N E	—	—	4.6	—
Year { Extremes ..	—	340 10/2/15	—	—	—	—	—	—	—

TEMPERATURE AND SUNSHINE.

Month.	Mean Temperature (Fahr.). Mean Max.	Mean Temperature (Fahr.). Mean Min.	Mean Temperature (Fahr.). Mean.	Extreme Shade Temperature (Fahr.). Highest.	Extreme Shade Temperature (Fahr.). Lowest.	Extreme Range.	Extreme Temperature (Fahr.). Highest in Sun.	Extreme Temperature (Fahr.). Lowest on Grass.	Mean Hours of Sunshine.
No. of yrs. over which observation extends	35	35	35	35	35	35	35	35	13
January	85.3	68.8	77.0	108.9 14/02	58.8 4/93	50.1	166.4 10/17	49.9 4/93	215.6
February	84.5	68.2	76.4	101.9 11/04	58.7 (a)	43.2	165.2 6/10	49.3 9/89	203.1
March	82.3	66.3	74.3	99.4 5/19	52.4 29/13	47.0	160.0 1/87	45.4 29/13	198.9
April	79.0	61.6	70.3	95.2 (b)	48.6 17/00	46.6	153.8 11/16	37.0 17/00	202.8
May	73.5	55.3	64.4	88.8 18/97	41.3 24/99	47.5	147.0 1/10	29.8 8/97	188.5
June	69.4	50.9	60.2	88.9 19/18	36.3 29/08	52.6	136.0 3/18	25.4 23/88	160.1
July	68.4	48.4	58.4	83.4 28/98	36.1 (c)	47.3	146.1 20/15	23.9 11/90	191.0
August	71.1	49.2	60.4	87.5 28/07	37.4 6/87	50.1	141.9 20/17	27.1 9/99	218.1
September ..	75.8	54.8	65.3	95.2 16/12	40.7 1/96	54.5	155.5 26/03	30.4 1/89	227.9
October	79.8	59.8	69.8	101.4 18/93	43.3 3/99	58.1	157.4 31/18	34.9 8/89	246.9
November ..	83.0	64.1	73.6	106.1 18/13	48.5 2/05	57.6	162.3 7/89	38.8 1/05	237.4
December ..	85.3	67.5	76.4	105.9 26/93	56.4 13/12	49.5	160.4 7/14	49.1 3/94	242.5
Year { Averages ..	78.1	59.6	68.9	—	—	—	—	—	2,532.8*d*
Year { Extremes ..	—	—	—	108.9 14/1/02	36.1 (c)	72.8	166.4 10/1/17	23.9 11/7/90	—

(*a*) 10 and 11/04. (*b*) 9/96 and 5/03. (*c*) 12/94 and 2/96. (*d*) Total for year.

HUMIDITY, RAINFALL, AND DEW.

Month.	Rel. Hum. (%). Mean 9 a.m.	Rel. Hum. (%). Highest Mean.	Rel. Hum. (%). Lowest Mean.	Rainfall (inches). Mean Monthly.	Rainfall (inches). Mean No. of Days Rain.	Rainfall (inches). Greatest Monthly.	Rainfall (inches). Least Monthly.	Rainfall (inches). Greatest in One Day.	Dew (inches). Mean Amount of Dew.	Dew (inches). Mean No. Days Dew.
No. of yrs. over which observation extends	35	35	35	70	62	70	70	—	—	35
January	67	79	53	6.46	14	27.72 1895	0.32 1919	18.31 21/87		4.9
February	70	82	55	6.33	14	40.39 1893	0.58 1849	8.36 16/93		5.4
March	73	85	56	5.89	15	34.04 1870	nil 1849	11.18 14/08		8.4
April	73	80	60	3.64	12	15.28 1867	0.04 1897	4.47 13/16		11.3
May	74	85	64	2.89	10	13.85 1876	nil 1846	5.62 9/79		12.3
June	74	84	67	2.65	8	14.03 1873	nil 1847	6.01 9/93		10.2
July	75	81	61	2.28	8	8.46 1889	nil 1841	3.54 (b)		11.7
August	70	80	61	2.17	8	14.67 1879	nil (a)	4.89 12/87		9.5
September ..	65	76	47	2.08	8	5.43 1886	0.10 1907	2.46 2/94		9.2
October	61	72	49	2.62	9	9.99 1882	0.14 1900	1.95 20/89		7.5
November ..	60	72	46	3.67	10	12.40 1917	nil 1842	4.46 16/86		4.4
December ..	63	68	52	4.97	12	13.99 1910	0.35 1865	6.60 28/71		3.7
Year { Totals ..	—	—	—	45.65	128	—	—	—	—	98.5
Year { Averages ..	69	—	—	—	—	—	—	—	—	—
Year { Extremes ..	—	85	46	—	—	40.39 2/1893	nil (c)	18.31 21/1/87	—	—

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

CLIMATOLOGICAL DATA FOR SYDNEY, N.S.W.

LAT. 33° 52′ S., LONG. 151° 12′ E. HEIGHT ABOVE M.S.L. 133 FT.

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

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from 24 hourly readings.	Wind. Greatest Number of Miles in one day.	Wind. Mean Hourly Pressure. (lbs.)	Wind. Total Miles.	Wind. Prevailing Direction.	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	63	55	55	55	55	42	62	63	58
January	29.903	721 1/71	0.36	8,130	N E	5.238	4.7	5.8	2.1
February	29.946	871 12/69	0.30	6,965	N E	4.099	4.3	6.0	1.4
March	30.012	943 20/70	0.24	6,750	N E	3.519	4.1	5.6	2.1
April	30.074	803 6/82	0.19	6,099	N E	2.505	3.9	5.1	3.0
May	30.082	758 6/98	0.24	6,324	W	1.729	3.3	4.8	3.7
June	30.058	712 7/00	0.24	7,909	W	1.406	2.2	4.8	3.9
July	30.075	930 17/79	0.30	7,090	W	1.502	2.4	4.4	4.7
August	30.070	756 22/72	0.24	6,839	W	1.858	3.2	4.0	5.2
September ..	30.009	964 6/74	0.30	7,096	W	2.640	4.0	4.3	4.4
October	29.972	926 4/72	0.30	7,731	N E	3.780	4.9	5.0	2.7
November ..	29.940	720 13/68	0.36	7,582	N E	4.516	5.5	5.6	1.8
December ..	29.882	938 3/84	0.36	8,016	N E	5.294	5.7	5.7	2.1
Year Totals ..	—	—	—	—	—	38.086	48.2	—	37.1
Year Averages ..	30.002	—	0.29	7,236	N E	—	—	5.1	—
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	63	63	63	63	63	63	63	63	11
January	78.4	64.9	71.7	108.5 13/96	51.2 14/65	57.3	164.3 26/15	44.2 18/97	199.1
February	77.5	64.9	71.2	101.0 19/66	49.3 28/63	51.7	162.1 16/98	43.4 25/91	177.9
March .. .	75.6	62.9	69.2	102.6 3/69	48.8 14/36	53.8	153.9 1/16	39.9 17/13	176.6
April	71.1	58.1	64.6	89.0 4/09	44.6 27/64	44.4	144.1 10/77	33.3 24/09	145.6
May	65.2	52.1	58.7	86.0 1/19	40.2 22/50	45.8	129.7 1/96	29.3 25/17	131.0
June	60.8	48.2	54.5	75.5 23/19	38.0 5/20	37.5	123.0 14/78	28.1 24/11	118.1
July	59.3	45.9	52.6	74.9 17/71	35.9 12/90	39.0	124.7 19/77	24.0 4/93	128.5
August	62.5	47.6	55.0	82.0 31/84	36.8 3/72	45.2	149.0 30/78	26.1 4/09	179.4
September ..	66.8	51.5	59.2	92.3 27/19	40.8 18/64	51.5	142.2 12/78	30.1 17/05	184.2
October	71.1	55.8	63.4	99.7 19/98	42.3 3/18	57.4	151.9 (a)	32.7 9/05	198.4
November ..	74.5	59.7	67.1	102.7 21/78	45.8 1/05	56.9	158.5 28/99	36.0 6/06	194.8
December ..	77.3	62.9	70.1	107.5 21/04	49.3 2/59	58.2	164.5 27/89	41.5 6/09	193.6
Year Averages ..	70.0	56.2	63.1	—	—	—	—	—	2,027.2*b*
Year Extremes ..	—	—	—	108.5 13/1/96	35.9 12/7/90	72.6	164.5 27/12/89	24.0 4/7/93	

(*a*) 30 and 31/14. (*b*) Total for year.

HUMIDITY, RAINFALL, AND DEW.

Month.	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 (inches). Mean Amount of Dew.	Mean No. Days Dew.
No. of yrs. over which observation extends	63	63	63	63	63	63	63	63	62	62
January	69	78	58	3.61	13.9	15.26 1911	0.42 1888	7.08 13/11	0.002	1.2
February	72	81	59	4.45	14.0	18.56 1873	0.34 1902	8.90 25/73	0.004	2.0
March	74	85	62	5.03	15.0	18.70 1870	0.42 1876	6.52 9/13	0.008	3.3
April	77	87	63	5.39	13.4	24.49 1861	0.06 1868	7.52 29/60	0.016	5.5
May	76	90	66	5.16	15.1	23.03 1919	0.18 1860	8.36 28/89	0.022	6.2
June	78	89	68	4.90	12.6	16.30 1885	0.19 1904	5.17 16/84	0.018	5.3
July	77	88	65	4.88	12.5	13.21 1900	0.12 1862	5.72 28/08	0.016	5.3
August	73	84	56	3.03	11.3	14.89 1899	0.04 1885	5.33 2/60	0.014	4.9
September ..	69	79	49	2.89	12.0	14.05 1879	0.08 1882	5.69 10/79	0.008	3.4
October	67	77	46	2.95	12.6	11.14 1916	0.21 1867	6.37 13/02	0.007	3.0
November ..	66	79	42	2.88	12.5	9.88 1865	0.07 1915	4.23 19/00	0.004	2.1
December ..	67	77	52	2.87	13.0	15.82 1920	0.23 1913	4.75 13/10	0.003	1.4
Year Totals ..	—	—	—	48.04	157.9	—	—	—	0.122	43.6
Year Averages ..	72	—	—	—	—	—	—	—	—	—
Year Extremes ..	—	90	42	—	—	24.49 April/61	0.04 Aug./85	8.90 25/2/73	—	—

CLIMATOLOGICAL DATA FOR 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., 3 & 9 p.m. readings.	Wind. Greatest Number of Miles in One Day.		Wind. Mean Hourly Pressure. (lbs.)	Wind. Total Miles.	Wind. Prevailing Direction.	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	64	49		49	49	49	49	14	64	14
January	29.915	583	10/97	0.29	7,345	S W, S E	6.42	1.8	5.0	7.8
February	29.963	566	8/68	0.28	6.441	S W, S E	5.06	2.4	5.0	7.2
March	30.033	677	9/81	0.22	6,398	S W, S E	3.95	1.6	5.5	5.6
April	30.104	597	7/68	0.19	5,719	S W, N W	2.36	0.9	5.9	4.4
May	30.105	693	12/65	0.19	5,958	N W, N E	1.46	0.6	6.5	3.4
June	30.074	761	13/76	0.24	6.461	N W, N E	1.10	0.9	6.7	2.2
July	30.094	755	8/74	0.23	6,482	N W, N E	1.06	0.6	6.3	3.4
August	30.065	637	14/75	0.26	6,882	N W, N E	1.48	1.0	6.3	2.9
September ..	29 999	617	11/72	0.29	7.108	N W, S W	2.31	1.8	6.1	3.6
October	29.969	899	5/66	0.29	7,377	S W, N W	3.34	1.9	5.9	4.4
November ..	29.950	734	13/66	0.29	7,083	S W, S E	4.54	2.3	5.9	3.5
December ..	29.898	655	1/75	0.30	7,503	S W, S E	5.75	2.1	5.5	4.4
Year Totals ..	—	—		—	—	—	38.83	17.9	—	52.8
Year Averages ..	30.014	—		0.26	6,730	S W, N W	—	—	5.9	—
Year Extremes ..	—	899	5/10/66	—	—	—	—	—	—	—

TEMPERATURE AND SUNSHINE.

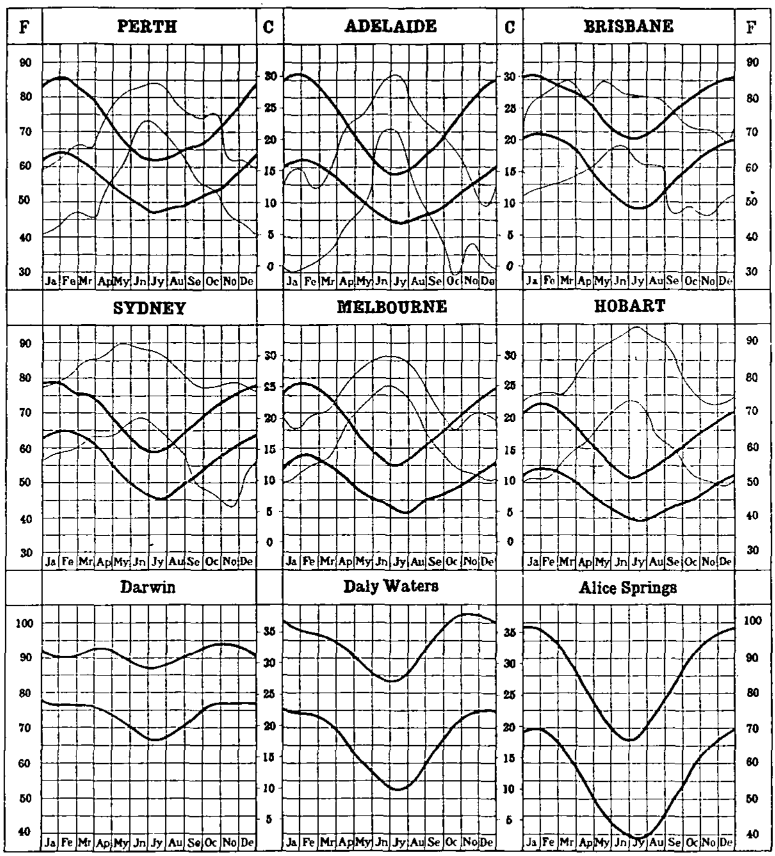
Month.	Mean Temperature (Fahr.) Mean Max.	Mean Temperature (Fahr.) Mean Min.	Mean Temperature (Fahr.) Mean.	Extreme Shade Temperature (Fahr.). Highest.		Extreme Shade Temperature (Fahr.). Lowest.		Extreme Range.	Extreme Temperature (Fahr.). Highest in Sun.		Extreme Temperature (Fahr.). Lowest on Grass.		Mean Hours of Sunshine.
No. of yrs. over which observation extends	66	66	66	66		66		66	62		62		40
January	78.2	56.8	67.5	111.2	14/62	42.0	28/85	69.2	178.5	14/62	30.2	28/85	269.5
February	78.0	57.1	67.5	109.5	7/01	40.3	9/65	69.2	167.5	15/70	30.9	6/91	246.9
March	74.4	54.6	64.5	105.5	2/93	37.1	17/84	68.4	164.5	1/68	28.9	(a)	207.9
April	68.3	50.7	59.5	94.0	6/65	34.8	24/88	59.2	152.0	8/61	25.0	23/97	164.3
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	142.7
June	56.8	44.1	50.4	72.2	1/07	28.0	11/66	44.2	129.0	11/61	20.4	17/95	112.8
July	55.5	41.7	48.6	68.4	24/78	27.0	21/69	41.4	125.8	27/80	20.5	12/03	106.4
August	58.7	43.4	51.1	77.0	20/85	28.3	11/63	48.7	137.4	29/69	21.3	14/02	156.2
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	174.6
October	67.0	48.2	57.6	98.4	24/14	32.1	3/71	66.3	154.3	28/68	24.8	22/18	209.5
November ..	71.4	51.2	61.3	105.7	27/94	36.5	2/96	69.2	159.6	29/65	24.6	2/96	246.5
December ..	78.4	54.2	64.8	110.7	15/76	40.0	4/70	70.7	170.3	20/69	33.2	1/04	259.6
Year Averages ..	67.6	49.5	58.4	—		—		—	—		—		2296.9b
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*) 17/1884 and 20/1897. (*b*) Total for year.

HUMIDITY, RAINFALL, AND DEW.

Month.	Rel. Hum. (%) Mean 9 a.m.	Rel. Hum. (%) Highest Mean.	Rel. Hum. (%) Lowest Mean.	Rainfall (inches.) Mean Monthly.	Rainfall (inches.) Mean No. of Days Rain.	Rainfall (inches.) Greatest Monthly.		Rainfall (inches.) Least Monthly.		Rainfall (inches.) Greatest in One Day.		Dew (inches). Mean Amount of Dew.	Dew (inches). Mean No. Days Dew.
No. of yrs. over which observation extends	14	14	14	66	66	66		66		66		—	14
January	55	65	50	1.88	7	5.68	1904	0.04	1878	2.97	9/97	—	2.5
February	61	69	53	1.70	7	6.24	1904	0.03	1870	3.37	18/19	—	3.2
March	64	71	57	2.23	9	7.50	1911	0.18	1859	3.55	5/19	—	7.5
April	71	78	66	2.23	11	6.71	1901	0.33	1908	2.28	22/01	—	8.3
May	79	84	73	2.19	13	4.31	1862	0.45	1901	1.85	7/91	—	8.1
June	82	87	77	2.10	14	4.51	1859	0.73	1877	1.74	21/04	—	7.8
July	82	86	76	1.83	14	7.02	1891	0.57	1902	2.71	12/91	—	10.1
August	76	82	70	1.85	14	3.59	1909	0.48	1903	1.87	17/81	—	7.6
September ..	68	76	60	2.47	14	7.93	1916	0.52	1907	2.62	12/80	—	6.4
October	62	67	56	2.62	13	7.61	1869	0.29	1914	3.00	17/69	—	6.6
November ..	59	69	52	2.24	11	6.71	1916	0.25	1895	2.57	16/76	—	1.8
December ..	57	69	51	2.32	9	7.18	1863	0.11	1904	2.62	28/07	—	1.6
Year Totals ..	—	—	—	25.66	136	—		—		—		—	71.5
Year Averages ..	68	—	—	—	—	—		—		—		—	—
Year Extremes ..	—	87	50	—	—	7.93	9/16	0.03	2/70	3.55	5/3/19		

GRAPHS SHEWING ANNUAL FLUCTUATIONS OF NORMAL MAXIMUM AND MINIMUM TEMPERATURE AND HUMIDITY IN SEVERAL PARTS OF THE COMMONWEALTH OF AUSTRALIA.



EXPLANATION OF THE GRAPHS OF TEMPERATURE AND HUMIDITY.—In the above graphs in which the heavy lines denote "temperature" and the thin lines "humidity," the fluctuations of mean temperature and mean humidity are shewn throughout the year. These curves are plotted from the data given in the Climatological Tables hereinafter. The temperatures are shewn in degrees Fahrenheit, the inner columns giving the corresponding values in Centigrade degrees. Humidities have not been obtained for Darwin, Daly Waters, and Alice Springs.

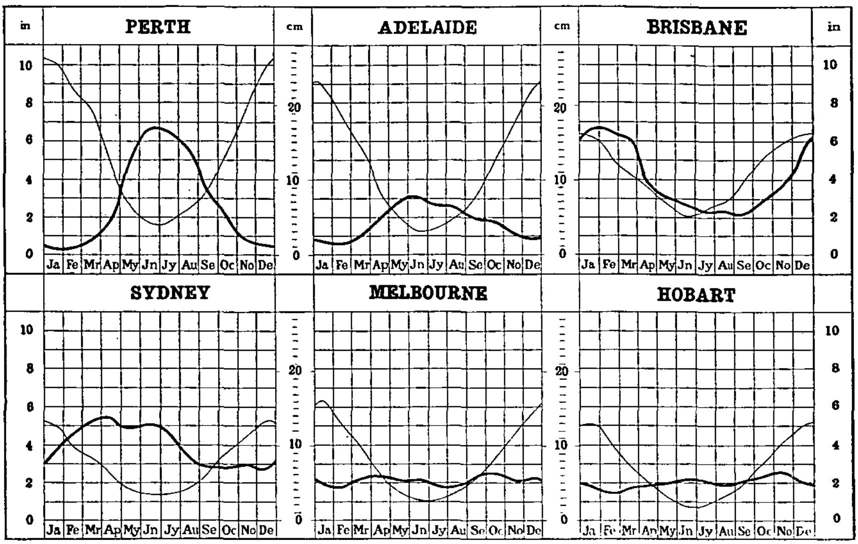
For the thin lines the degree numbers represent relative humidities, or the percentages of actual saturation (absolute saturation = 100).

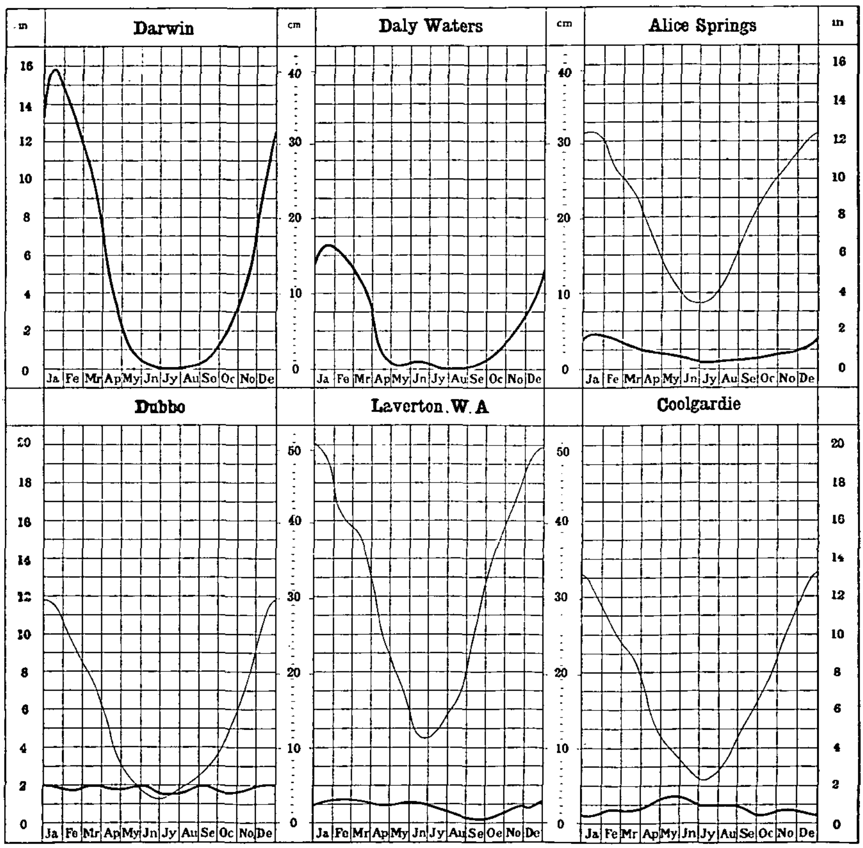
The upper temperature line represents the mean of the maximum, and the lower line the mean of the minimum results; thus the curves also shew the progression of the range between maximum and minimum temperatures throughout the year. The humidity curves shew the highest and lowest values of the mean monthly humidity at 9 a.m. recorded during a series of years.

INTERPRETATION OF THE GRAPHS.—The curves denote mean monthly values. Thus, taking for example, the temperature graphs for Perth, the mean readings of the maximum and minimum temperatures for a number of years on 1st January would give respectively about 83° Fahr. and 62° Fahr. Thus the mean range of temperature on that date is the difference, viz., 21°. Similarly, observations about 1st June would give respectively about 66° Fahr. and 51° Fahr., or a range of 15°.

In a similar manner it will be seen that the greatest mean humidity, say for March, is about 66° and the least mean humidity for the month 46°: in other words, at Perth the degree of saturation of the atmosphere by aqueous vapour for the month of March ranges between 66% and 46%.

GRAPHS SHEWING ANNUAL FLUCTUATIONS OF MEAN RAINFALL AND MEAN EVAPORATION IN SEVERAL PARTS OF THE COMMONWEALTH OF AUSTRALIA.





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

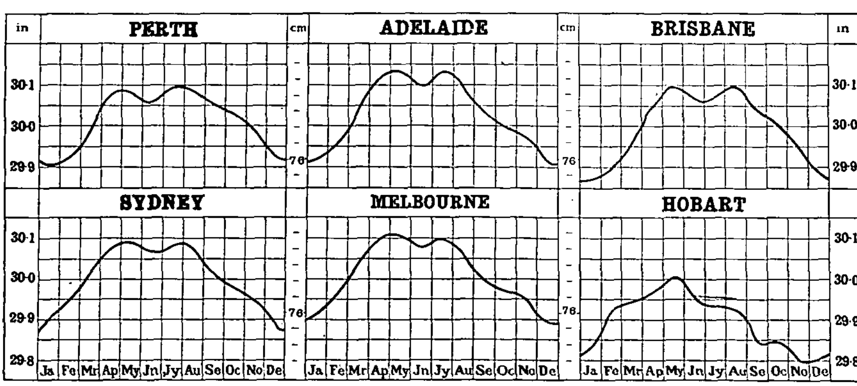
At Perth, Adelaide, Brisbane, Melbourne, Hobart, Alice Springs, and Coolgardie the results have been obtained from jacketed tanks sunk in the ground. At Sydney and Dubbo sunken tanks without water jackets are used, whilst at Laverton (W.A.) the records are taken from a small portable jacketed evaporation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

INTERPRETATION OF THE GRAPHS.—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, on the 1st January the rain falls on the average at the rate of about four-fifths of an inch per month, or, say, at the rate of about 9½ inches per year. In the middle of June it falls at the rate of nearly 3 inches per month, or, say, at the rate of about 36 inches per year. At Dubbo the evaporation is at the rate of nearly 11¼ inches per month about the middle of January, and only about 1¼ inches at the middle of June.

TABLE SHEWING MEAN ANNUAL RAINFALL AND EVAPORATION IN INCHES AT THE PLACES SHEWN ON PRECEDING PAGE, AND REPRESENTED BY THE GRAPHS.

—	Rainfall.	Evaporation.	—	Rainfall.	Evaporation.
Perth ..	33.91	65.95	Darwin ..	61.73	—
Adelaide ..	21.05	54.56	Daly Waters ..	26.39	—
Brisbane ..	45.65	44.28	Alice Springs ..	11.21	94.24
Sydney ..	48.04	38.09	Dubbo ..	22.13	66.37
Melbourne ..	25.66	38.83	Laverton, W.A.	9.98	141.33
Hobart ..	23.59	32.67	Coolgardie ..	10.13	87.72

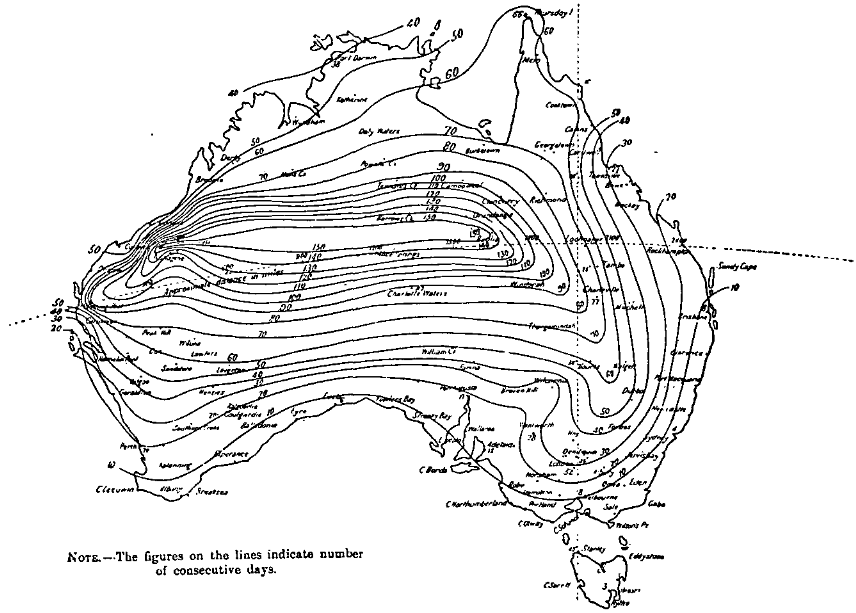
GRAPHS SHEWING ANNUAL FLUCTUATIONS OF MEAN BAROMETRIC PRESSURE FOR THE CAPITALS OF THE SEVERAL STATES OF THE COMMONWEALTH OF AUSTRALIA.



EXPLANATION OF THE GRAPHS OF BAROMETRIC PRESSURE.—On the above graphs the lines representing the yearly fluctuation of barometric pressure at the State capital cities are means for long periods, and are plotted from the Climatological Tables given hereinafter. The pressures are shewn in inches on about 2½ times the natural scale, and the corresponding pressures in centimetres are also shewn in the two inner columns, in which each division represents one millimetre.

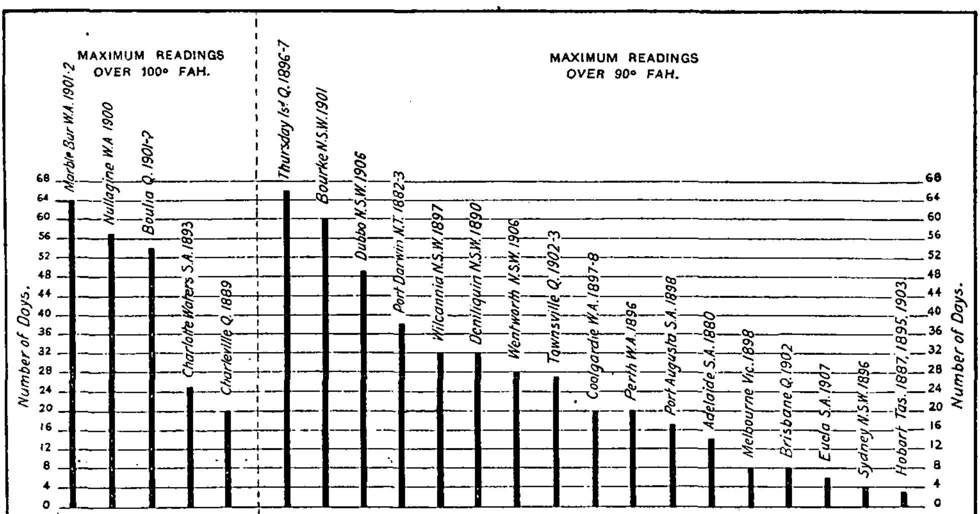
INTERPRETATION OF THE BAROMETRIC GRAPHS.—Taking the Brisbane graph for purposes of illustration, it will be seen that the mean pressure on 1st January is about 29·87 inches, and there are maxima in the middle of May and August of about 30·09 inches.

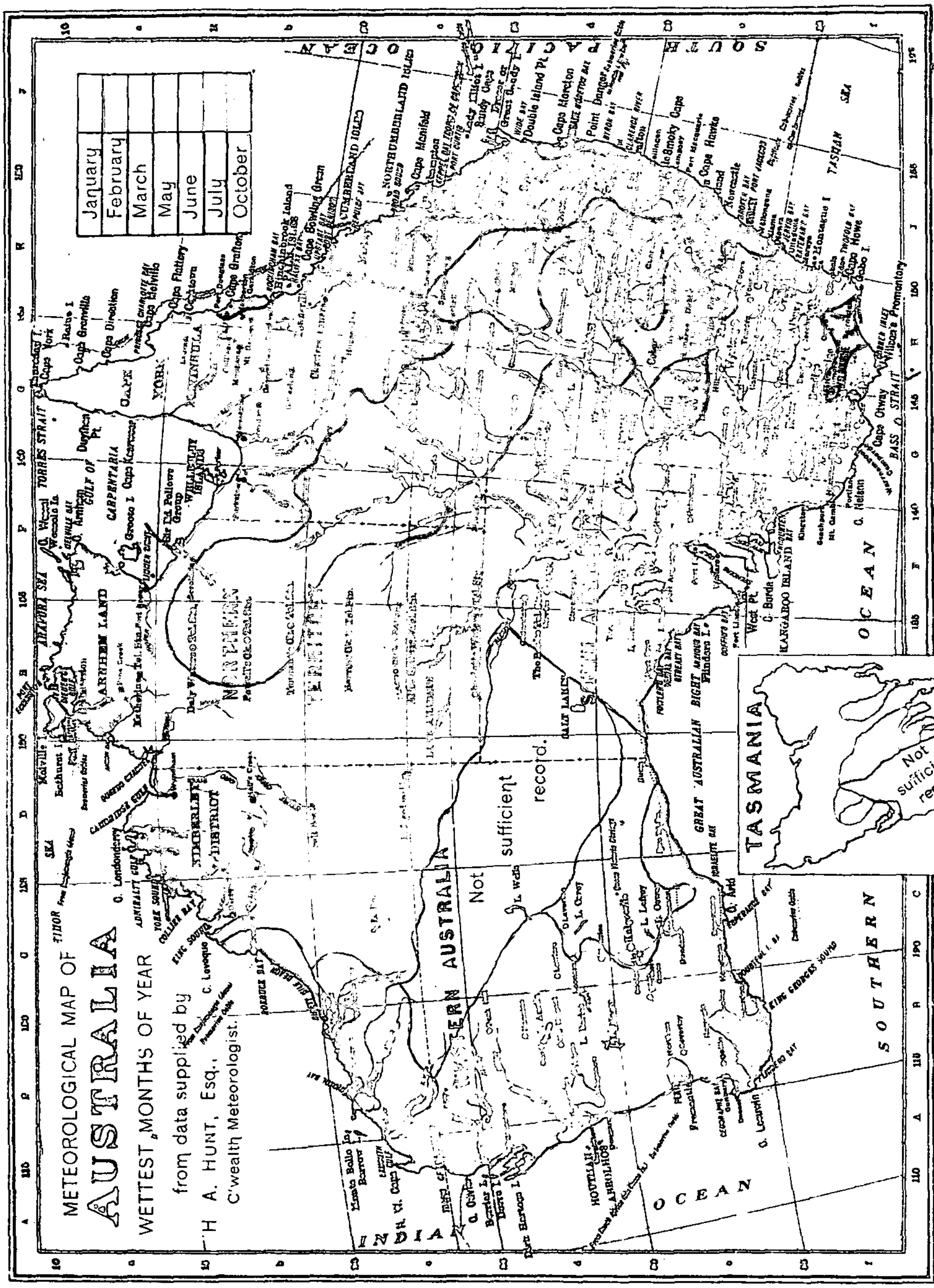
Chart indicating the area affected and period of duration of the Longest Heat Waves when the Maximum Temperature for consecutive 24 hours reached or exceeded 90° Fah.



NOTE.—The figures on the lines indicate number of consecutive days.

Diagram showing the greatest number of consecutive days on which the Temperature in the shade was over 100° and also over 90° at the places indicated.





METEOROLOGICAL SUB-DIVISIONS.

West Australia.

No.
1. East Kimberley.
2. West Kimberley.
3. North-West.
4. Gascoyne.
5. South-West.
6. Eucla.
7. Eastern.

South Australia.

8. Northern Territory.
9. Far North and N.W.
10. West.
11. Upper North.
12. North-East.
13. Lower North.
14. Central.
15. Murray Valley.
16. South-East.

Queensland.

17. Peninsular.
18. Gulf.
19. Far West.
20. Central.
21. Nth-East Coast.
22. Central Coast.
23. South-East Coast.
24. Darling Downs.
25. Maranoa.
26. South-West.

New South Wales.

27. Western.
28. North-West Plain.
29. North-West Slope.
30. Northern Tableland.
31. North Coast.
32. Hunter & Manning.
33. Central Tableland.
33a. Metropolitan.
34. Cent. Westn. Slope.
35. Cent. Westn. Plain.
36. Riverina.
37. South-West Slope.
38. Southern Tableland.
39. South Coast.

Victoria.

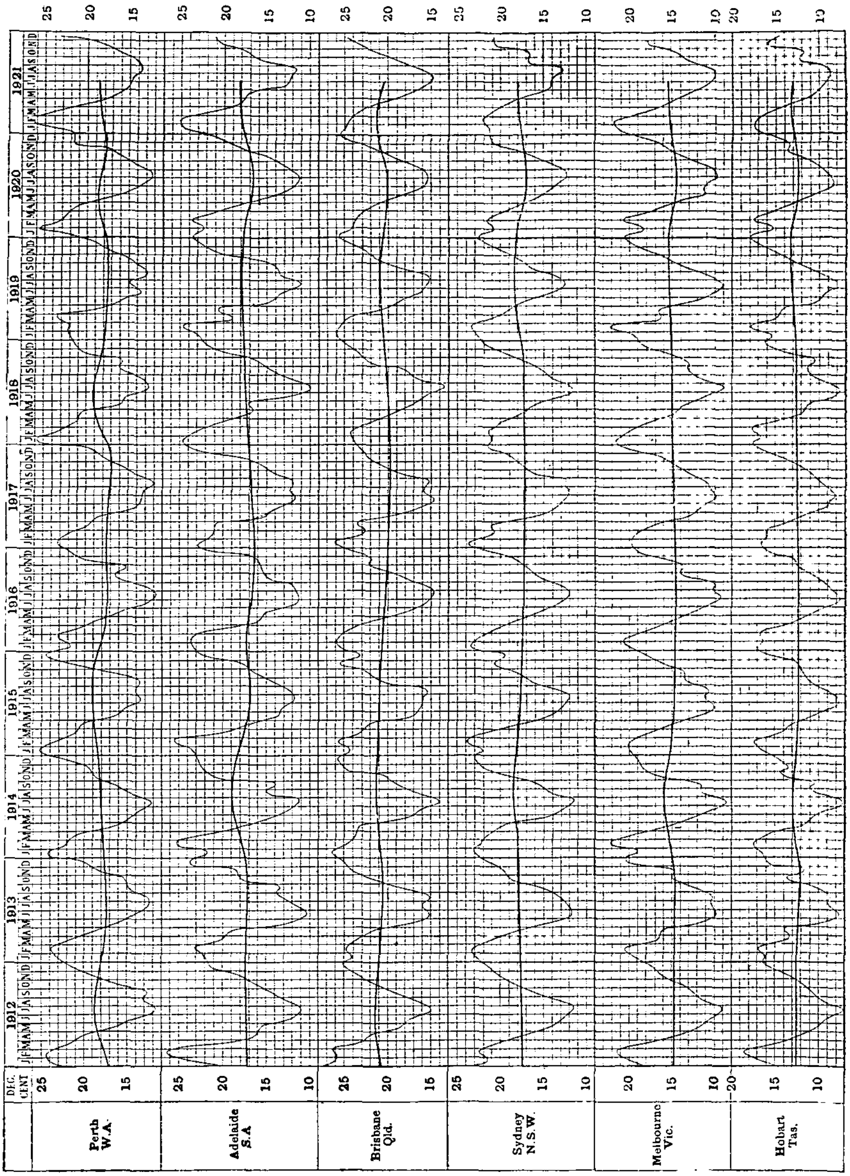
40. Gippsland.
41. North-East.
42. Central.
43. North Central.
44. Northern Country.
45. Mallee.
46. Wimmera.
47. Western.

Tasmania.

48. Northern.
49. W. Coast Mt. Region
50. Central Plateau.
51. Midland.
52. East Coast.
53. Derwent.
54. South-Eastern.

The above are the meteorological sub-divisions adopted by H. A. Hunt, Esq., C'wealth. Meteorologist.

GRAPHS SHEWING THE NORMAL MONTHLY, AND NORMAL ANNUAL TEMPERATURES OF THE PRINCIPAL AUSTRALIAN CITIES FROM 1912 TO 1921.

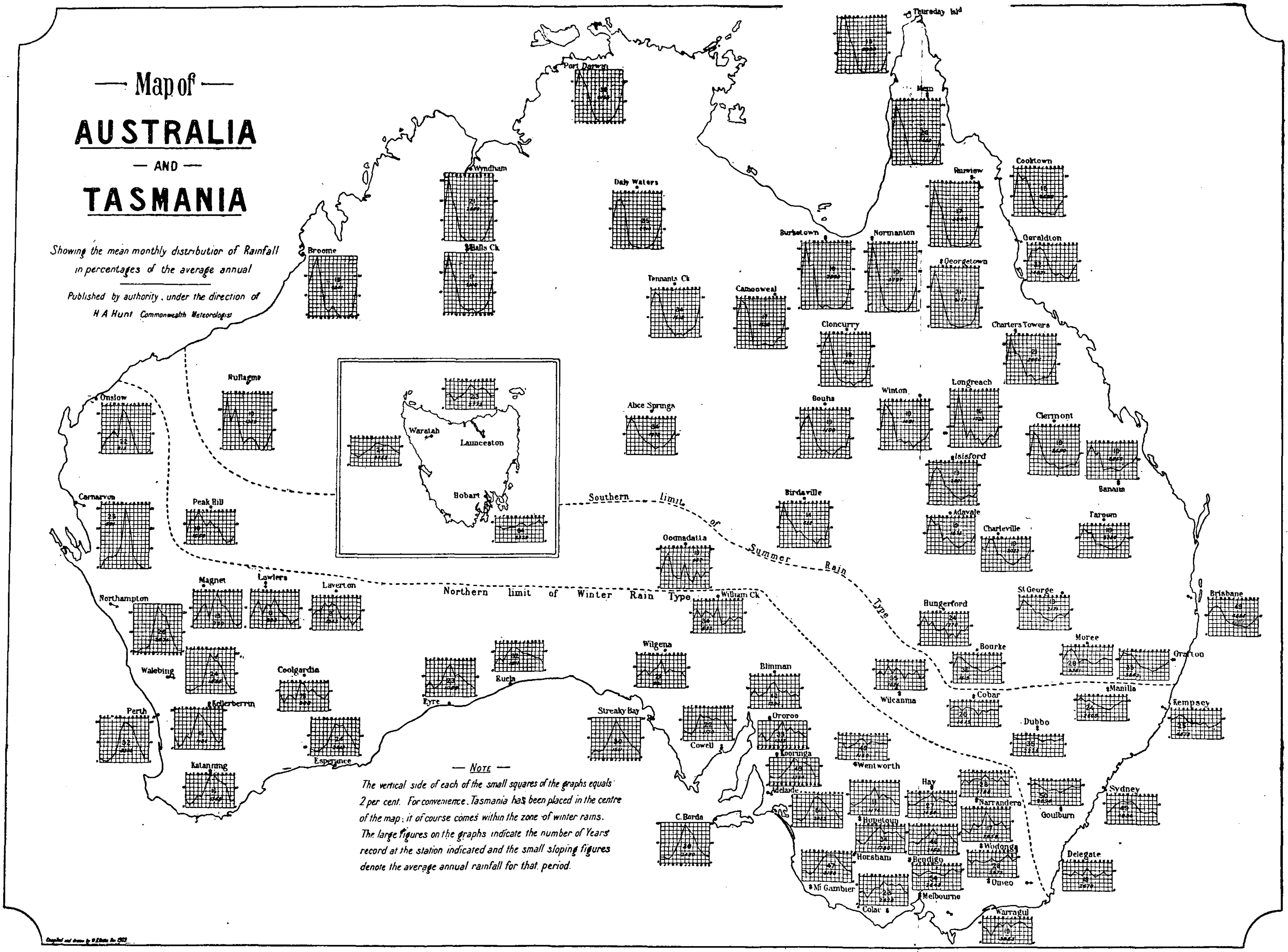


EXPLANATION OF GRAPHS.

The six light continuous curves shew the fluctuations of mean monthly temperatures of the Australian capitals from 1912 to 1921.

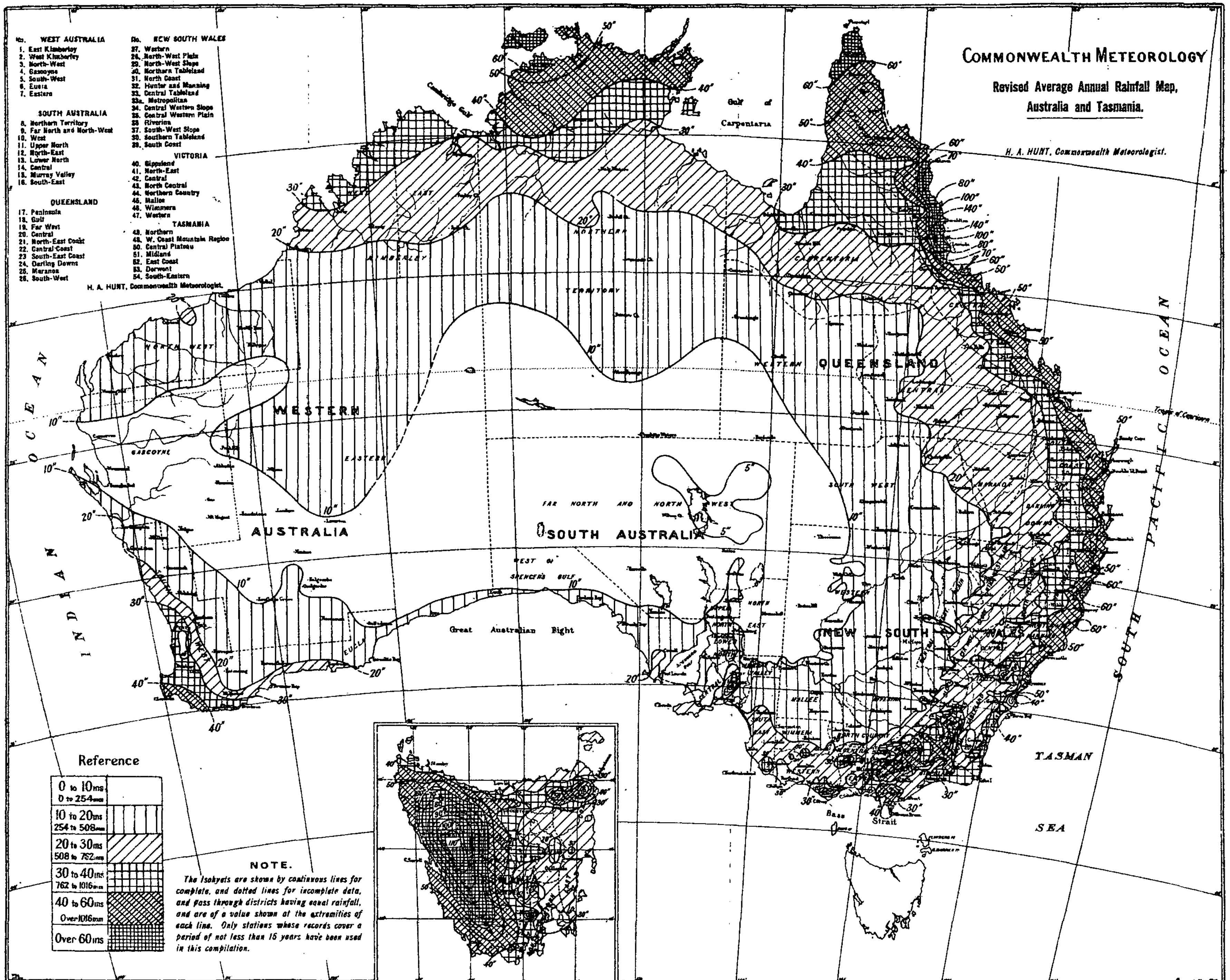
The six heavy curves similarly shew the fluctuations of the mean annual temperatures of the Australian capitals from 1912 to 1921.

The base of each small square denotes one month, and the vertical side 1° Centigrade or 1·8° Fahrenheit.



— 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.


COMMONWEALTH METEOROLOGY
Revised Average Annual Rainfall Map, Australia and Tasmania.
H. A. HUNT, Commonwealth Meteorologist.
No. WEST AUSTRALIA
1. East Kimberley
2. West Kimberley
3. North-West
4. Gascoyne
5. South-West
6. Eucla
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
INDIAN OCEAN
SOUTH PACIFIC OCEAN
TASMAN SEA
Great Australian Bight
Bass Strait
WESTERN AUSTRALIA
QUEENSLAND
SOUTH AUSTRALIA
NEW SOUTH WALES
NORTHERN TERRITORY
FAR NORTH AND NORTH WEST
Reference
0 to 10ins 0 to 254mm
10 to 20ins 254 to 508mm
20 to 30ins 508 to 762mm
30 to 40ins 762 to 1016mm
40 to 60ins Over 1016mm
Over 60ins
NOTE.
The Isohyets are shown by continuous lines for complete, and dotted lines for incomplete data, and 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.

CLIMATOLOGICAL DATA FOR 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.	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	37	11	11	11	17	11	14	59	15
January	29.837	500 30/16	0.19	5,924	N W & S E	5.317	0.6	5.9	2.9
February	29.927	393 19/13	0.13	4,474	S E & N	3.885	1.3	5.0	2.7
March	29.940	407 16/21	0.13	4,861	N & S E	3.023	1.3	5.9	2.0
April	29.959	432 7/17	0.13	4,841	N W & S E	2.036	0.9	6.0	1.6
May	29.991	411 3/16	0.12	4,677	N & N W	1.375	0.6	6.0	2.1
June	29.939	569 27/20	0.13	4,790	N & N W	0.885	0.6	6.1	1.5
July	29.929	425 16/21	0.12	4,790	N & N W	0.918	0.6	5.7	2.7
August	29.927	459 30/11	0.13	4,951	N & N W	1.209	0.6	5.9	2.1
September	29.847	516 26/15	0.19	5,662	N & N W	2.042	1.0	6.1	1.9
October	29.843	461 8/12	0.18	5,728	N W & S E	3.207	0.8	6.3	1.7
November	29.801	508 18/15	0.19	5,788	N W & S E	4.074	0.9	6.3	1.7
December	29.811	486 30/20	0.18	5,732	N W & S E	4.695	1.3	6.2	1.2
Year — Totals	—	—	—	62,218	—	32.666	10.5	—	24.1
Year — Averages	29.896	—	0.15	—	N	—	—	6.0	—
Year — Extremes	—	569 27/6/20	—	—	—	—	—	—	—

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	51	51	51	75	75	75	34	54	27
January	71.4	53.0	62.2	105.0 1/00	40.3 (a)	64.7	160.0 (b)	30.6 19/97	210.0
February	71.5	53.3	62.4	104.4 12/99	39.0 20/87	65.4	165.0 24/98	28.3 –/87	176.6
March	68.0	50.8	59.4	98.8 5/46	36.0 31/05	62.8	150.0 3/05	27.5 35/02	169.7
April	62.7	47.6	55.2	90.0 2/56	30.0 25/56	60.0	142.0 18/93	25.0 –/86	137.4
May	57.3	43.6	50.4	77.5 1/41	29.2 20/02	48.3	128.0 (d)	20.0 19/02	130.4
June	52.8	41.0	46.9	75.0 7/74	28.0 22/79	47.0	122.0 12/94	21.0 6/87	101.0
July	51.9	39.2	45.5	72.0 22/77	27.0 18/66	45.0	118.7 19/96	18.7 16/86	123.1
August	55.0	41.0	48.0	77.0 3/76	30.0 10/73	47.0	129.0 –/87	20.1 7/09	139.5
September	58.8	43.1	51.0	80.0 9/72	30.0 12/41	50.0	138.0 23/93	22.7 –/86	143.0
October	62.7	45.4	54.1	92.0 24/14	32.0 12/89	60.0	156.0 9/93	23.8 (e)	167.7
November	66.2	48.3	57.3	98.0 20/88	35.2 5/13	62.8	158.0 18/21	26.0 1/08	194.9
December	69.5	51.2	60.4	105.2 30/97	38.0 13/06	67.2	161.0 24/20	27.2 –/86	191.7
Year — Averages	62.3	46.5	54.4	—	—	—	—	—	1,885.0c
Year — Extremes	—	—	—	105.2 30/12/97	27.0 18/7/66	78.2	165.0 24/2/98	18.7 16/7/86	—

(a) 3/72 and 2/06. (b) 5/86 and 13/05. (c) Total for year. (d) –/88 and –/92. (e) 1/86 and –/99.

HUMIDITY, RAINFALL, AND DEW.

Month.	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 (inches) Mean Amount of Dew.	Mean No. days Dew.
No. of yrs. over which observation extends	38	38	38	79	78	79	79	55	—	12
January	63	77	51	1.78	9	5.91 1893	0.03 1841	2.96 30/16	—	0.9
February	65	80	51	1.43	8	9.15 1854	0.07 1847	4.50 25/54a	—	2.2
March	69	78	58	1.69	10	7.60 1854	0.02 1843	2.79 5/19	—	4.1
April	74	84	61	1.88	11	6.50 1909	0.07 1904	5.02 20/09	—	10.0
May	78	88	68	1.86	13	6.37 1905	0.10 1843	3.22 14/58	—	12.9
June	82	92	68	2.19	14	8.15 1889	0.22 1852	4.11 14/89	—	7.1
July	80	88	72	2.15	14	5.93 1849	0.30 1850	2.00 27/78	—	7.5
August	77	85	64	1.84	14	10.16 1858	0.23 1854	4.35 12/58	—	7.6
September	72	82	60	2.12	14	7.14 1844	0.39 1847	3.50 29/44	—	4.2
October	67	80	51	2.21	15	6.67 1906	0.26 1850	2.58 4/06	—	3.1
November	64	78	50	2.48	14	8.92 1849	0.16 1868	3.97 6/49	—	1.5
December	61	79	49	1.96	11	9.00 1875	0.11 1842	2.48 13/16	—	0.9
Year — Totals	—	—	—	23.59	147	—	—	—	—	62.0
Year — Averages	71	—	—	—	—	—	—	—	—	—
Year — Extremes	—	92	49	—	—	10.16 8/1858	0.02 3/1843	5.02 20/4/09	—	—

(a) 4.18 on 26/54 also.