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.[1]

(i.) *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.[2], the areas within the tropical and temperate zones are approximately as follows :—

AREAS OF TROPICAL AND TEMPERATE REGIONS

OF STATES 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 3.

2. **Area of Australia compared with that 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 more than one-fourth of the area of the whole of the British Empire, that it is nearly 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.

1. 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.

2. Its correct value for 1914 is 23° 27′ 1″.70, and it decreases about 0″.47 per annum.

The relative magnitudes may be appreciated by a reference to the following table, which shews how large Australia is compared with the countries referred to, or *vice versa*. Thus, to take line 1, we see that Europe is about $1\frac{3}{10}$ times (1.29778) as large as Australia, or that Australia is about three-quarters (more accurately 0.77) of the area of Europe.

SIZE OF AUSTRALIA IN COMPARISON WITH THAT OF OTHER COUNTRIES.

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

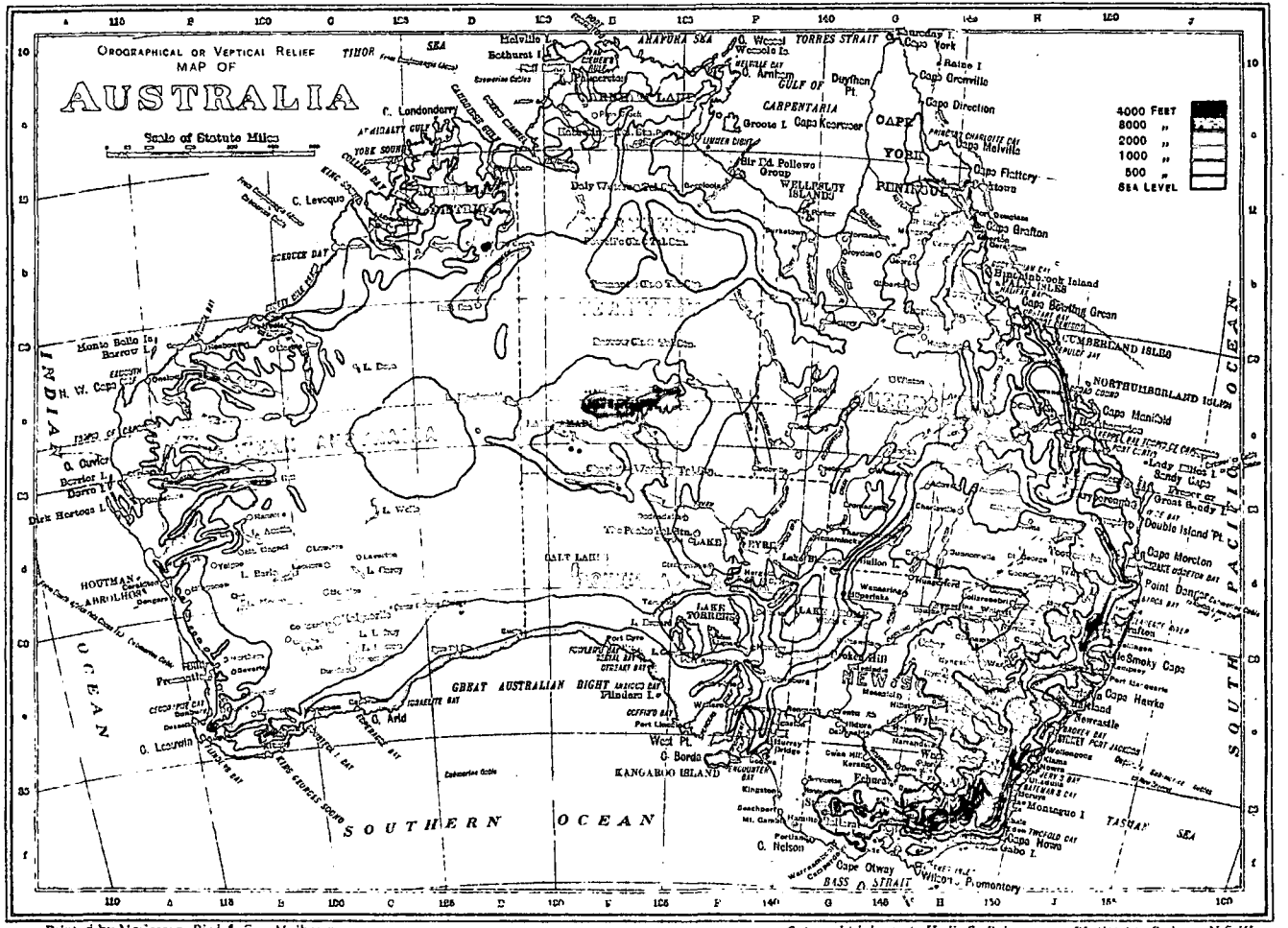
Country.	Area.	Australian Commonw'lth in comparison with—	In comparison with Australian C'wealth.
Continents—	Sq. miles.		
Europe	3,860,368	0.77	1.29778
Asia	16,978,885	0.17	5.70799
Africa	11,201,439	0.25	3.76571
North and Central America and West Indies ...	8,543,253	0.34	2.87208
South America	7,423,882	0.40	2.49577
Australasia and Polynesia	3,462,418	0.85	1.16400
Total, exclusive of Arctic and Antarctic Conts.	51,470,245	0.05	17.30335
Europe—			
Russia (inclusive of Poland, Ciscaucasia & Finland)	2,122,557	1.40	0.71356
Austria-Hungary (incl. of Bosnia & Herzegovina)	261,101	11.39	0.08777
Germany	208,780	14.25	0.07011
France	207,054	14.37	0.06969
Spain	194,783	15.27	0.06548
Sweden	172,876	17.21	0.05812
Norway	124,130	23.96	0.04173
United Kingdom	121,391	24.50	0.04081
Italy	110,659	26.88	0.03720
Turkey (inclusive of Crete)	68,715	43.29	0.02310
Denmark (inclusive of Iceland)	55,338	53.73	0.01861
Rumania	50,720	58.65	0.01705
Bulgaria	38,080	78.11	0.01280
Portugal	35,490	83.82	0.01193
Greece	25,014	118.91	0.00841
Servia	18,650	159.49	0.00627
Switzerland	15,976	186.22	0.00537
Netherlands	12,648	235.29	0.00425
Belgium	11,373	261.78	0.00382
Montenegro	3,630	819.67	0.00122
Luxemburg	998	2941.18	0.00034
Andorra	175	16997.61	0.00006
Malta	117	25423.76	0.00004
Liechtenstein	65	45793.55	0.00002
San Marino	38	78278.45	0.00001
Monaco	8	371822.63	...
Gibraltar	2	1487290.50	...
Total, Europe	3,860,368	0.77	1.29778
Asia—			
Russia (inclus. of Transcaucasia, Siberia, Steppes, Transcaspia, Turkestan and inland waters) ...	6,525,130	0.45	2.19364
China and Dependencies...	4,277,170	0.70	1.43791
British India...	1,097,901	2.70	0.36912
Independent Arabia	966,700	3.08	0.32499
Turkey (including Samos)	693,790	4.29	0.23324
Feudatory Indian States...	691,253	4.30	0.23238
Persia	628,000	4.74	0.21112

Country.	Area.	Australian Commonwe'lth in comparison with—	In comparison with Australian C'wealth.
ASIA (continued)—	Sq. Miles.		
Dutch East Indies	584,611	5.09	0.19654
Japan (and Dependencies)	260,919	11.04	0.08771
Afghanistan	250,000	11.90	0.08405
Siam	195,000	15.25	0.06555
Philippine Islands (inclusive of Sulu Archipelago)	127,853	23.27	0.04298
Laos	98,000	30.35	0.03295
Bokhara	83,000	35.83	0.02790
Omán	82,000	36.27	0.02757
British Borneo and Sarawak	73,106	40.68	0.02457
Nepál	54,000	55.10	0.01815
Annam	52,100	57.08	0.01752
Tonking	46,400	64.10	0.01560
Cambodia	45,000	66.10	0.01513
Federated Malay States	27,700	107.38	0.00931
Ceylon	25,332	117.37	0.00852
Khiva	24,000	123.94	0.00807
Cochin China...	20,000	148.73	0.00672
Bhután	20,000	148.73	0.00672
Aden and Dependencies	9,005	330.32	0.00303
Timor, etc. (Portuguese Indian Archipelago) ...	7,330	406.50	0.00246
Brunei	4,000	743.64	0.00134
Cyprus	3,584	833.33	0.00120
Goa, Damaõ, and Diu	1,638	1818.18	0.00055
Straits Settlements	1,600	1851.85	0.00054
Sokotra and Kuria Muria Islands	1,382	2152.22	0.00046
Hong Kong and Dependencies	405	7344.64	0.00013
Wei-hai-wei	285	10623.50	0.00009
Bahrein Islands	250	11898.32	0.00008
French India (Pondicherry, etc.)	196	15176.43	0.00007
Kiauchau	193	15412.33	0.00006
Labuan	30	99152.70	0.00001
Italian Concession, Tientsin	18	165254.50	0.00001
Macao, etc.	4	743643.25	...
Total, Asia	16,978,885	0.17	5.70799
Africa—			
French Sahara	1,544,000	1.93	0.51907
Turkey (inclusive of Egypt and Soudan) ...	1,384,520	2.14	0.46545
Belgian Congo	909,654	3.27	0.30582
French Congo	669,000	4.46	0.22491
Angola	484,800	6.14	0.16298
Union of South Africa	473,184	6.28	0.15907
Rhodesia	439,575	6.77	0.14778
Abyssinia	432,432	6.88	0.14538
Tripoli and Benghezi	398,900	7.45	0.13410
German East Africa	384,000	7.74	0.12909
Mauretania	344,967	8.62	0.11597
Algeria (including Algerian Sahara)	343,500	8.66	0.11548
German South-west Africa	322,450	9.23	0.10840
Portuguese East Africa	293,400	10.14	0.09864
Bechuanaland Protectorate	275,000	10.82	0.09245
Northern Nigeria Protectorate	256,400	11.60	0.08620
Madagascar	228,000	13.05	0.07665
Uganda Protectorate	223,500	13.31	0.07514
Morocco	219,000	13.58	0.07362
British East Africa Protectorate	202,000	14.72	0.06790
Kamerun	191,130	15.56	0.06425
Italian Somaliland	139,430	21.34	0.04687
Ivory Coast	130,000	22.87	0.04370

Country.	Area.	Australian Commonw'lth in comparison with—	In comparison with Australian C'wealth.
AFRICA (continued)—	Sq. miles.		
French Guinea	95,000	31.31	0.03194
Gold Coast Protectorate (with North. Territories)	80,000	37.18	0.02689
Southern Nigeria and Protectorate	79,880	37.23	0.02685
Senegal	74,000	40.20	0.02488
Rio de Oro, etc.	73,000	40.75	0.02454
Senegambia and Niger	72,000	41.31	0.02420
British Somaliland	68,000	43.74	0.02286
Dahomey	65,000	45.77	0.02185
Tunis	50,000	59.49	0.01681
Eritrea	45,800	64.95	0.01540
Nyasaland Protectorate	43,608	68.21	0.01466
Liberia	40,000	74.36	0.01345
Togoland	33,700	88.26	0.01133
Sierra Leone and Protectorate	31,624	94.06	0.01063
Portuguese Guinea	13,940	213.22	0.00469
Spanish Guinea (Rio Muni, etc.)	12,000	247.88	0.00403
Basutoland	11,716	253.89	0.00393
Swaziland	6,536	455.10	0.00219
French Somali Coast	5,790	513.74	0.00194
Gambia and Protectorate	4,500	661.02	0.00151
Cape Verde Islands	1,480	2000.00	0.00050
Zanzibar	1,020	2941.18	0.00034
Réunion	965	3082.46	0.00032
Mauritius and Dependencies	850	3499.50	0.00028
Fernando Po, etc.	814	3654.28	0.00027
Comoro Islands	620	4761.91	0.00021
St. Thomas and Prince Islands	360	8262.73	0.00012
Seychelles	160	19830.54	0.00005
Mayotte, etc....	140	21247.01	0.00005
St. Helena	47	63288.95	0.00002
Ascension	34	87487.65	0.00001
Spanish North and West Africa	13	228813.92	...
Total, Africa	11,201,439	0.25	3.76571
North and Central America and West Indies—			
Canada	3,729,665	0.80	1.25385
United States (exclusive of Alaska, &c.)	2,973,890	1.00	0.99976
Mexico	767,005	3.88	0.25785
Alaska	590,884	5.03	0.19864
Newfoundland and Labrador	162,734	18.28	0.05471
Nicaragua	49,200	60.46	0.01654
Guatemala	48,290	61.61	0.01623
*Greenland	46,740	63.65	0.01571
Honduras	46,250	64.31	0.01555
Cuba	44,164	67.35	0.01484
Costa Rica	23,000	129.32	0.00773
San Domingo	18,045	164.74	0.00607
Haiti	10,204	291.55	0.00343
British Honduras	8,598	345.96	0.00289
Salvador	7,225	411.52	0.00243
Bahamas	4,403	675.58	0.00148
Jamaica	4,200	708.23	0.00141
Porto Rico	3,606	824.90	0.00121
Trinidad and Tobago	1,868	1592.39	0.00063
Leeward Islands	701	4243.33	0.00024
Guadeloupe and Dependencies	688	4323.52	0.00023
Windward Islands	527	5644.36	0.00017

* Danish colony only.

Country.	Area.	Australian Commonwe'lth in comparison with—	In comparison Australian C'wealth.
N. & C. AMERICA & W. INDIES (continued)—	Sq. miles.		
Curaçao and Dependencies	403	7381.09	0.00014
Martinique	381	7807.30	0.00013
Turks and Caicos Islands	166	17925.18	0.00005
Barbados	166	17925.18	0.00005
Danish West Indies	138	21554.94	0.00005
St. Pierre and Miquelon	93	31984.74	0.00003
Bermudas	19	156556.89	...
Total, N. and C. America and W. Indies ...	8,543,253	0.34	2.87208
South America—			
Brazil (inclusive of Acré)...	3,292,991	0.90	1.10704
Argentine Republic	1,135,840	2.62	0.38185
Peru	695,733	4.28	0.23389
Bolivia	608,195	4.89	0.20446
Colombia	438,436	6.78	0.14739
Venezuela	393,976	7.55	0.13244
Chile	292,580	10.17	0.09836
Paraguay	171,204	17.37	0.05755
Ecuador	116,000	25.64	0.03900
British Guiana	90,277	32.95	0.03035
Uruguay	72,210	41.19	0.02428
Dutch Guiana	46,060	64.60	0.01548
Panamá	32,380	91.86	0.01088
French Guiana	30,500	97.56	0.01025
Falkland Islands	6,500	456.62	0.00219
South Georgia	1,000	2974.58	0.00034
Total, South America	7,423,882	0.40	2.49577
Australasia and Polynesia—			
Commonwealth of Australia	2,974,581	1.00	1.00000
Dutch New Guinea	151,789	19.60	0.05103
New Zealand and Dependencies	104,751	28.39	0.03522
Papua	90,540	32.85	0.03044
Kaiser Wilhelm Land	70,000	42.50	0.02353
Bismarck Archipelago	20,000	148.73	0.00672
British Solomon Islands	14,800	204.36	0.00497
New Caledonia and Dependencies	8,548	347.99	0.00287
Fiji	7,435	400.08	0.00250
Hawaii	6,449	460.83	0.00217
German Solomon Islands, etc.	5,160	576.46	0.00173
New Hebrides	5,000	594.92	0.00168
French Establishments in Oceania	1,520	1960.78	0.00051
German Samoa	1,000	2974.58	0.00034
Tonga	390	7627.13	0.00013
Guam	200	14872.91	0.00007
Gilbert Islands	166	17919.16	0.00006
Samoa (U.S.A. part)	79	37652.92	0.00003
Norfolk Island	10	297458.10	...
Total, Australasia and Polynesia ...	3,462,418	0.85	1.16400
British Empire...	11,447,954	0.26	3.84859



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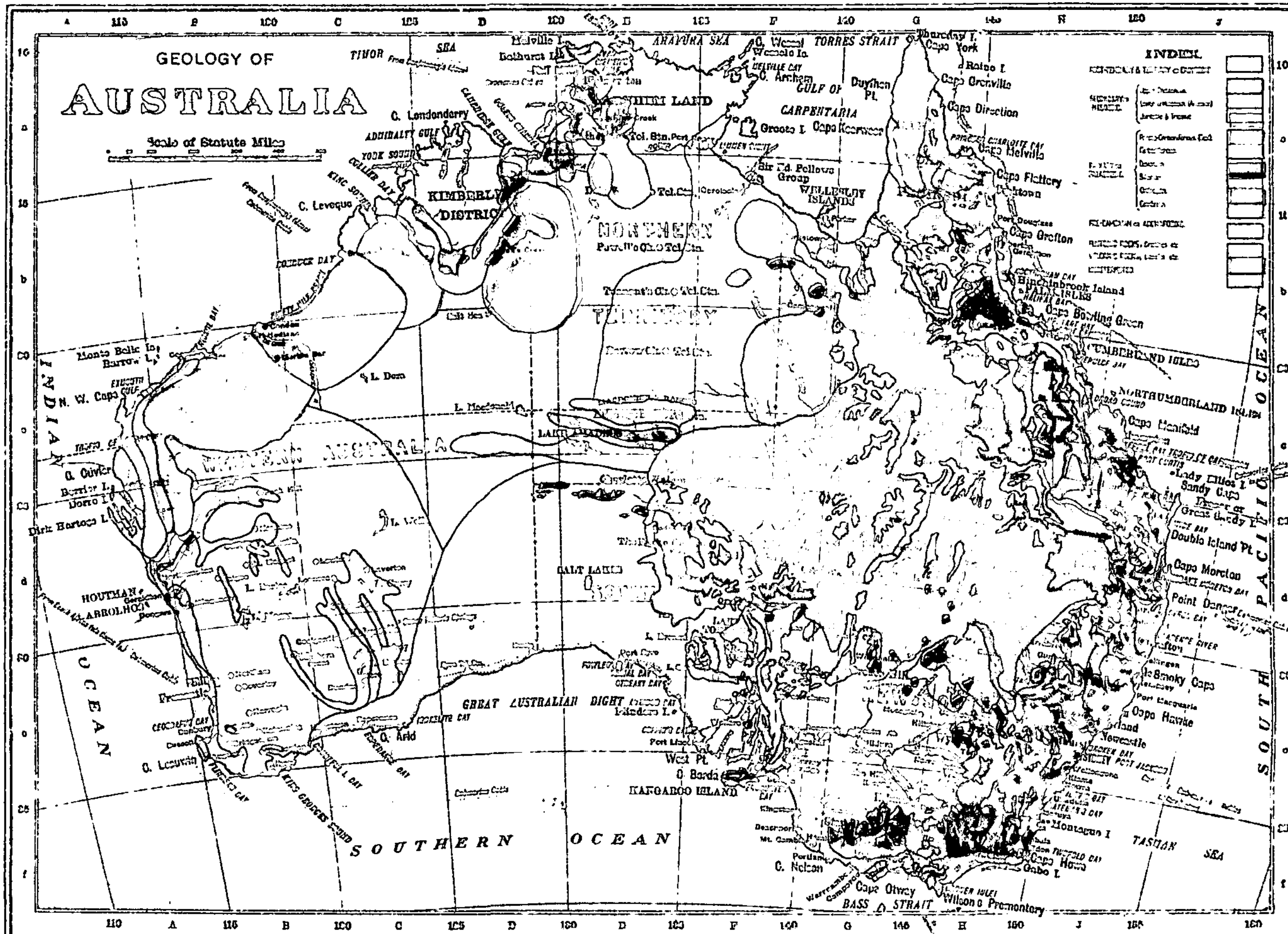

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3. **Relative Size of Political Subdivisions.**—As already stated, Australia consists of six States and the Northern and Federal Capital Territories. The areas of these, in relation to one another and to the total of Australia, are shewn in the following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

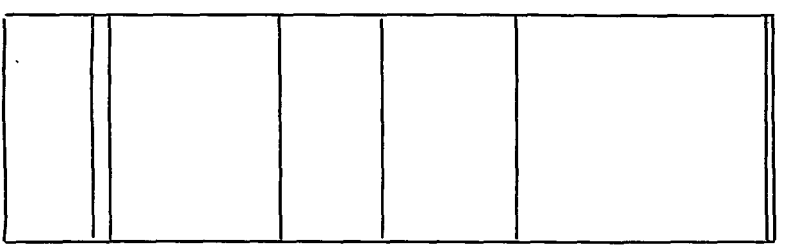
RELATIVE SIZES OF STATES AND COMMONWEALTH.

State.	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	309,460	1.000	3.522	0.462	0.814	0.317	11.806	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	2.166	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	3.153	11.105	1.455	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	1.691	5.958	0.781	1.378	0.537	19.974	1.000	0.176
Fed. Capital Ter.	912	0.003	0.010	0.001	0.003	0.001	0.034	0.002	0.000[1]
Commonwealth	2,974,581	9.610	33.847	4.436	7.827	3.048	113.469	5.681	1.000

1. 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 (3.522) and less than one-half the size of Queensland (0.462); 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 (9.610), 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 Capital Territory prevents its being shewn in this diagram.



	N.S.W.	V.	Qld.	S.A.	N.T.	W.A.	Tas.
% of 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 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 AND CONTINENT.

State.	Coast-line.	Area ÷ Coast-line.	State.	Coast-line.	Area ÷ Coast-line.
	Miles.	Sq. miles.		Miles	Sq. miles.
New South Wales[1]	700	443	South Australia ...	1,540	247
Victoria	680	129	Western Australia	4,350	224
Queensland ...	3,000	223	Continent[2] ...	11,310	261
Northern Territory	1,040	503	Tasmania ...	900	29

1. Including Federal Capital Territory. 2. 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 preceding issue 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, and No. 6, pp. 55-66 with the Mineral Springs of Australia. This practically completes the description of the ordinary physical features. The present issue contains a special article dealing with the geological history of Australia, particularly as regards the climatic changes evidenced therein. An orographical or vertical relief map of Australia will be found on p. 53.

§ 2. Salient Features in the Geological History of Australia, with Special Reference to Changes of Climate.*

(i.) *The Pre-Cambrian Age.* Rocks of definitely ascertained Pre-Cambrian age occupy a great area throughout Australia, while others, almost certainly of this age, underlie a vast extent of the surface of the continent. In South Australia and in the Northern Territory the association of fossiliferous Lower Cambrian strata with older schists defines the Pre-Cambrian age of the latter most satisfactorily. In Queensland, New South Wales, Victoria, Tasmania and Western Australia, lithological evidence points to the existence of Pre-Cambrian rocks; but stratigraphical and palæontological tests leave open the possibility of the beds belonging to some part of the Lower Palæozoic group. In South Australia three fairly well defined lithological series are represented by the rocks of Eyre's Peninsula, by those of northern Yorke's Peninsula, and by those of the Mount Lofty and Barossa Ranges respectively, which will probably be found to correspond with definite breaks in the geological sequence. The Mount Lofty and Barossa Range beds (Barossian series) are certainly altered sediments, including lime-

* Contributed by Professor W. G. Woolnough, D.Sc., University of Perth, W.A.

stones, but they yield no information as to climatic conditions in the Pre-Cambrian time. The same may be said of the Northern Territory beds. In most of the remaining Pre-Cambrian areas the rocks are granitoid in character, or else very highly metamorphosed crystalline schists.

(ii.) *The Cambrian Age.* Evidence as to climatic conditions in the Cambrian time is much more abundant and conclusive. In the Lower Cambrian beds near Adelaide there is developed a very important and extensive glacial series (Sturt River glacial beds). Some distance higher up in the series come limestones (Brighton limestones) and higher still great reefs of limestone (Archæocyathinæ limestones). It is possible, though by no means certain, that these limestones may indicate a change of the climate. The Archæocyathinæ limestones have certainly the *habit* of coral reefs, but the organisms are of so primeval a type that it would be rash to assume that they indicate a climate similar to that required for the growth of reef corals at the present day. In the Northern Territory, Cambrian time was ushered in by great volcanic activity. Then followed the deposition of immense beds of limestone, probably unsurpassed in extent anywhere in the world. Evidences of shallow water origin are not wanting, hence the accumulation of thousands of feet of limestone may be taken to indicate long continued subsidence. The upper beds of the Cambrian system (Roper River quartzites and Mount McMinns beds) are of very shallow water origin, and the predominance of red beds may indicate aridity of the adjacent continenal surface.

(iii.) *The Ordovician Age.* In Ordovician time, deep sea water stretched over Southern Australia, and very constant and characteristic *graptolite* beds are widely distributed. This deep ocean did not cover the whole of the continent, since in the "Larapintine system" of Central Australia the facies of the Ordovician system is quite different. Here were very shallow water conditions, evidenced by the occurrence of pseudomorphs of common salt crystals. In all probability Northern and Western Australia were occupied by continental land at this time.

(iv.) *The Silurian Age.* During the Silurian period conditions changed considerably, and South-eastern Australia was covered by shallow sea water. Immense limestone beds occur at intervals from Tasmania to Northern Queensland; and, as these are built up largely of true reef-building corals, the inference of a warm climate is not without justification. Evidences of volcanic activity are widespread.

(v.) *The Devonian Age.* In early Devonian time the south-eastern corner of Australia was occupied by an immense range of acid volcanoes, which built up the Snowy River porphyries. They may have attained altitudes of upwards of 15,000 feet above sea level.

Lying upon their denuded surfaces, but still of Middle Devonian age, are extensive coralline limestone, probably indicating the existence of warm shallow seas. These limestones occur at intervals from Gippsland, through New South Wales to the Burdekin and Fanning Rivers of Queensland.

Late Devonian time was marked by instability of the land surface, and by rather rapid alternations of marine and terrestrial conditions. The occurrence of red beds may indicate aridity of climate, but no deposits of salt or gypsum were produced. The earliest abundant plant remains (*Lepidodendron australe*) belong to this stage.

(vi.) *The Carboniferous Age.* In Carboniferous time the instability of level noted above continued, and became even more pronounced, so that interbedded marine and freshwater strata are a feature of this formation. Towards the close of the period, too, volcanic activity became very widespread. The organic life of the time was abundant and varied; its abrupt cessation, and the strong contrast presented by the succeeding fauna and flora, indicate that a warm climate obtained during Carboniferous time.

(vii.) *The Permo-Carboniferous Age.* Permo-Carboniferous time witnessed a return of intense glacial conditions, perhaps the most intense that have ever visited Australia. Victoria, South Australia, parts of Tasmania, and nearly the whole of Western Australia were continental land. Over this continent stretched a great, slow-moving ice sheet, wearing, polishing, and scratching the rock surfaces, and transporting fragments for hundreds of miles. From the directions of the scratches it is clear that the main centre

of ice distribution in Eastern Australia lay to the south-west of Tasmania. That is to say, high continental land existed, at that time, not far from what is now the eastern end of Jeffrey's Deep. After reaching sea level, near the border between Victoria and New South Wales, the ice sheet broke up into icebergs and "rafted" great blocks of rock far to the northward. These erratics are abundant in the Hunter River coalfield and in the Macleay River district of New South Wales, and the icebergs floated well within the limits of the tropics in Queensland, Central Australia, and Western Australia.

There is a remarkable alternation of shallow water marine beds with freshwater beds in Australia. It is in these freshwater beds that the most extensive of our productive coal measures were developed. Glacial action was not continuous throughout the whole period, but, after the first great glacial epoch, passed away for a time, and reoccurred to a much more limited extent later. The fauna and flora of the Permo-Carboniferous system offer a contrast to those of the preceding period so marked that, as above mentioned, a stupendous change of climate must have occurred in the interval indicated by the unconformity between the two formations.

(viii.) *The Lower Mesozoic Age.* The Lower Mesozoic (Triassic or Trias-Jura) beds of Australia seem, for the most part, to follow those of Permo-Carboniferous age, with very little evidence of great changes in the distribution of land and sea. In New South Wales and in Western Australia there appears to have been continuity of sedimentation. Nevertheless, there is a most striking *life-break* between the two systems, which, in absence of evidence of great land movements or long lapse of time, must be taken to indicate an extensive and relatively rapid change of climate. All the Lower Mesozoic beds of Australia are of freshwater origin, and, in Queensland, Victoria, Tasmania, and South Australia, contain workable coal measures. On the western slopes of the Main Divide of Eastern Australia and in Western Australia they contain supplies of artesian water.

(ix.) *The Upper Mesozoic Age.* In Upper Mesozoic time (Cretaceous) there was a very extensive transgression of the sea over the continental surface. In all probability, Australia was severed into two or more great continental islands lying to the east and west of a large mediterranean sea. In this latter, and in the ocean waters beyond the islands, were laid down marine beds. Those of the mediterranean sea, widely developed in Queensland, Northern Territory, and South Australia, and to a smaller extent in New South Wales and Western Australia, supply vast quantities of artesian water.

(x.) *The Early Tertiary Age.* In early Tertiary time the whole continent was subjected to a tilting movement, rising on the north and subsiding on the south. The former portion became dry land, but the sea transgressed extensively over Tasmania, Victoria, South Australia, and Western Australia, and laid down thick beds of limestone. Climatic conditions appear to have been quite mild. Extensive volcanic eruptions occurred along the borders of the old cretaceous sea.

(xi.) *The Later Tertiary Age.* In later Tertiary time came the gradual uplift, expelling the sea from the continental surface, and causing the formation of extensive plateau surfaces. Volcanic action on a large scale was widespread, and, in Western Victoria and South-eastern South Australia, continued to a very recent date. That the climate of Australia was much moister during this period than it is at the present day is shewn by evidences of former great extension of lake basins now dry or much shrunken, and by the remains of gigantic extinct animals, including crocodiles and turtles, in the now desert areas of Central Australia.

A third great glacial epoch occurred during late Tertiary time. On this occasion, continental ice-sheets were not developed, but the highlands of Tasmania and of the Australian Alps were covered by ice-caps, which descended some 3000 feet below the present summit levels.

The latest phases of the geological history of Australia are to be read from the distribution of land forms. These indicate that earth movements of a plateau-forming character are still taking place; the separation of Tasmania and New Guinea from the mainland, and the development of the Great Barrier Reef of Queensland, are important incidents in this phase of geological history.

§ 3. 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 will, however, preclude the inclusion in this issue of more than a passing reference to the subject.

§ 4. 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. VI., pp. 1190-6.

§ 5. Seismology in Australia.

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

Barisàl Guns. Reference may be made here to an interesting pamphlet published by Dr. J. Burton Cleland, in which the author sums up the available information regarding the peculiar explosive or booming noises heard at times in Australia as well as in other parts of the world. As far as inland Australia, at all events, is concerned, it seems clear that the explosions are of earth origin, and are probably due to the sudden sundering of immense rock masses, either as a result of climatic influences, or through folding movements in the earth's crust.

§ 6. 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 of the Geology of Australia on page 54. shews the geographical distribution of the more important geological systems and formations.

§ 7. Climate and Meterology of Australia.[1]

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 resumé of the subjects dealt with at the Meteorological Conference of 1907. Space will not permit of the inclusion of this matter in the present issue.

2. **Meteorological Publications.**—The following publications are issued daily from the Meteorological Bureau, viz.:—(i.) Weather charts. (ii.) Rainfall maps. (iii.) Bulletins, Victorian and Interstate, shewing pressure, temperature, wind, rain, cloud extent, and weather.

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

The Bulletins of Climatology are as follows:—No. 1.—A general discussion of the climate and meteorology of Australia, illustrated by one map and diagrams. No. 2.—A discussion of the rainfall over Australia during the ten years (1897-1906) compared with the normal, illustrated by one map. No. 3.—Notes and statistics of the remarkable flood rains over south-eastern Australia during the winter of 1909, illustrated by five maps and diagrams. No. 4.—A discussion of the monthly and seasonal rainfall over Australia, illustrated by one map and diagram. No. 5.—An investigation into the possibility of forecasting the approximate winter rainfall for Northern Victoria, illustrated by two diagrams. No. 6.—The physiography of the proposed Federal Territory at Canberra, illustrated by a relief map and 21 plates. No. 7.—On the climate of the Yass-Canberra district, illustrated by one map. No. 8.—Physiography of Eastern Australia, with 28 text illustrations.

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

3. **General Description of Australia.**—In the general description of Australia, page 48, 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[1] 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[2] 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 7300 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.

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

1. In the article "Australia" in the Encyclopædia Britannica, Vol. XXX., p. 796, this area is given as 1,145,000 square miles.

2. Given as 1,801,700 square miles in the work above quoted, where, however, the statistics are said "to refer only to the continental States of the Federation, not to Tasmania."

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 3rd April, 1911, was approximately as follows :—

Division	I.	II.	III.	IV.	V.
Population	282,000	429,000	607,000	1,540,000	1,597,000

In these divisions the order in which the capitals occur is as follows :—(i.) Perth, (ii.) Adelaide, (iii.) Brisbane, (iv.) Sydney, (v.) Melbourne, (vi.) Hobart, and for that reason the climatological and meteorological statistics will be set forth in the indicated order in this publication.

(i.) *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	51	Darwin ...	97	12	28	130	51
Adelaide ...	140	34	56	138	35	Daly Waters ...	700	16	16	133	23
Brisbane ...	137	27	28	153	2	Alice Springs ...	1926	23	38	133	37
Sydney	146	33	52	151	12	Dubbo ...	870	32	18	148	35
Melbourne ...	115	37	50	144	59	Laverton ...	1530	28	40	122	23
Hobart	160	42	53	147	20	Coolgardie ...	1402	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 places in the Southern Hemisphere.

The comparison is even more favourable when the Northern Hemisphere is included in the comparison, 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 8.5°, 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.

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.

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

Monthly Maximum and Minimum Temperatures. The mean monthly maximum and minimum temperatures can be best shewn by means of graphs, which exhibit the nature of the fluctuation of each for the entire year. In the diagram (on page 71) for nine representative places in Australia, the upper heavy curves shew the mean maximum, the lower heavy curves the mean minimum 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 71, which gives results based upon daily observations of the dry and wet bulb thermometers. 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 has the first place, while Melbourne, Hobart, Brisbane, Perth, and Adelaide follow in the order stated, Adelaide being the driest. The graphs on page 71 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"[1] and dams. The magnitude of the economic loss by evaporation will be appreciated from the records on pages 72 and 80 to 85, which show that the yearly amount varies from about 32½ inches at Hobart to 97 inches at Alice Springs in the centre of the Continent.

(i.) *Monthly Evaporation Curves.* The curves showing 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 diagram shewing also rainfalls (see page 72).

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

(ii.) *Loss by Evaporation.* In the interior of Australia the possible evaporation is often 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 and westerly trade winds. The southern limit of the south-east trade strikes the eastern shores at about 30° south latitude. Hence, we find that, 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 from the summer south-east trade winds. Here 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 trade winds, which skirt the southern shores, are responsible for the very reliable, although generally light, 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 preceding Year Books (see No. 6 pp. 72, 73, 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 150 and 166 inches. The maximum and minimum falls there are:—Goondi, 241.53 in 1894 and 76.24 inches in 1902, or a range of 165.29 inches; Innisfail, 211.24 in 1894 and 69.87 inches in 1902, or a range of 141.37 inches; Harvey Creek, 238.45 in 1901 and 80.47 inches in 1902, or a range of 157.98 inches.

On three 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 20 years.

Harvey Creek in the shorter period of 16 years has twice exceeded 200 inches, the total for 1910 being 201.28 inches.

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 it rarely exceeds 10 inches for the twelve months.

The inland districts of Western Australia have until recent years been regarded as the driest part of Australia, but authentic observations taken during the past decade at settled districts in the east of that State shew that the annual average is from 10 to 12 inches.

(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 77, 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.	Victoria.	Queensland.	South Aust.	Northe'n Territ'y.	Western Aust.	Tasmania. *	Commonwealth. *
	sqr. mls.	sqr. mls.	sqr. mls.	sqr. mls.	sqr. mls.	sqr. mls.	sqr. mls.	sqr. mls.
Under 10 inches	44,997	nil	62,805	317,600	138,190	513,653	nil	1,077,245
10—15 ,,	77,268	19,912	97,722	33,405	141,570	232,815	nil	602,692
15—20 ,,	57,639	12,626	116,790	14,190	62,920	89,922	937	355,024
20—30 ,,	77,202	29,317	218,528	13,827	93,470	95,404	7,559	535,307
30—40 ,,	30,700	14,029	80,556	984	40,690	40,750	4,588	212,297
Over 40 ,,	22,566	12,000	94,099	64	46,780	3,376	10,101	188,986
Total area ...	310,372	87,884	670,500	380,070	523,620	975,920	26,215	2,974,581

* Over 3030 sqr. miles no records 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 21.04 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 (17.44 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 78). 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 nothing falls in the middle of the year. The figures of 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 slight excesses in April and July ; the averages during the last six months are fair and moderately uniform. In general it may be said that one-fourth of the area of the continent, principally in the eastern and northern parts, enjoys an annual average rainfall of from 20 to 50 inches, the remaining three-fourths receiving generally from 10 to 15 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 72). 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, etc.

(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, 1840 to 1912.

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.
1840	...	...	...	24.23	99	...	29.32	...	...	58.52	150	...	22.57	...	...	...	...	...
1	...	...	...	17.96	93	...	49.31	...	...	76.31	142	...	30.18	...	...	13.95	...	...
2	...	...	...	20.32	122	...	28.81	...	...	48.32	137	...	31.16	...	...	23.60	...	...
3	...	...	...	17.19	104	...	51.67	...	...	62.78	168	...	21.54	...	...	13.43	...	...
4	...	...	...	16.88	136	...	63.20	...	...	70.66	157	...	30.74	...	...	26.25	...	...
5	...	...	...	18.83	125	...	39.09	...	...	62.01	132	...	23.93	...	...	16.68	...	...
6	...	...	...	26.89	114	...	31.41	...	41.83	43.83	139	...	30.53	...	...	21.96	...	...
7	...	...	...	27.61	109	...	...	...	(7 yr.)	42.81	142	...	30.18	...	...	14.46	...	...
8	...	...	...	19.74	114	21.07	42.59	...	...	59.17	137	58.27	33.15	...	28.22	23.62	...	19.24
9	...	...	...	25.44	110	(9 yr.)	...	...	...	21.49	140	(9 yr.)	44.25	...	(9 yr.)	33.52	...	(8 yr.)
1850	...	...	...	19.56	84	...	...	...	...	44.88	157	...	26.98	...	...	14.51	...	...
1	...	...	...	30.86	128	...	...	...	...	35.18	142	...	...	...	...	17.98	...	...
2	...	...	...	27.44	118	...	...	...	...	43.79	145	...	...	...	...	23.62	...	...
3	...	...	...	27.08	128	...	...	...	...	46.12	130	...	...	...	...	14.52	...	...
4	...	...	...	15.35	105	...	...	...	...	29.29	136	...	...	...	...	30.54	...	...
5	...	...	...	23.15	124	...	...	...	...	52.86	138	...	28.21	...	...	18.25	...	...
6	...	...	...	24.93	118	...	...	...	...	43.31	116	...	29.76	134	...	22.73	151	...
7	...	...	...	22.15	105	...	...	...	...	50.96	135	...	28.90	138	...	17.14	113	...
8	...	...	...	21.55	107	23.75	43.00	...	...	39.59	139	40.75	26.01	158	...	33.07	129	22.59
9	...	...	...	14.85	95	...	35.00	...	...	42.01	137	...	21.82	156	...	23.31	...	...
1860	...	...	...	19.67	119	...	54.63	144	...	82.76	180	...	25.38	133	...	21.05	...	...
1	...	...	...	24.04	147	...	69.45	155	...	59.36	157	...	29.16	159	...	28.19	...	...
2	...	...	...	21.85	119	...	28.27	98	...	23.99	108	...	22.08	139	...	21.72	...	...
3	...	...	...	23.68	145	...	68.83	146	...	47.08	152	...	36.42	165	...	40.67	...	...
4	...	...	...	19.75	121	...	47.00	114	...	69.12	185	...	27.40	144	...	28.11	...	...
5	...	...	...	15.51	108	...	24.11	52	...	36.15	140	...	15.94	119	...	23.07	...	...
6	...	...	...	20.11	116	...	51.18	142	...	36.90	156	...	22.41	107	...	23.55	...	...
7	...	...	...	19.05	112	...	61.04	112	...	59.56	140	...	25.79	133	...	22.27	...	...
8	...	...	...	19.99	113	19.85	35.98	110	47.55	42.98	161	49.99	18.27	120	24.47	18.08	...	25.00
9	...	...	...	14.74	117	...	54.39	114	...	48.00	150	...	24.58	129	...	23.87	...	...
1870	...	...	...	23.84	119	...	79.06	154	...	64.47	179	...	33.77	129	...	27.53	...	...
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	151	...	32.52	136	...	31.76	160	...
3	...	...	...	21.00	139	...	62.02	138	...	73.44	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	181	...
6	28.73	100	...	13.43	110	...	53.42	130	...	45.69	156	...	24.04	134	...	23.63	...	...
7	20.48	103	...	24.95	135	...	30.28	119	...	59.66	147	...	24.10	124	...	20.82	...	...
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	...	25.24
9	41.34	106	(3 yr.)	20.69	130	...	67.30	157	...	63.19	167	...	19.28	127	...	21.07	...	...
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	...	41.09	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	160	...
4	31.96	92	...	18.74	138	...	43.49	136	...	44.04	159	...	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	27.63	117	33.29	14.55	131	19.30	33.08	143	45.93	23.01	132	42.95	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	...	...
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	151	...
5	33.01	123	...	21.28	130	...	59.11	105	...	31.86	170	...	17.04	131	...	25.40	119	...
6	31.50	103	...	15.17	121	...	44.97	121	...	42.40	157	...	25.16	124	...	21.61	136	...
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	147	...
2	27.06	93	...	16.02	123	...	16.17	87	...	43.07	180	...	23.08	102	...	21.85	151	...
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	167	...
8	30.52	106	34.05	24.56	125	21.15	44.01	125	36.55	45.65	167	43.41	17.72	130	25.36	16.50	149	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	...
1	23.38	108	...	15.99	127	...	35.15	128	...	50.24	155	...	36.61	168	...	26.78	193	...
2	27.85	123	...	19.57	116	...	41.32	114	...	47.51	172	...	20.37	157	...	23.14	181	...
Aver.	...	...	33.11	...	...	21.04	...	...	46.70	...	...	48.27	...	...	26.20	...	...	23.57
No. of Yrs.			(37)			(74)			(63)			(73)			(69)			

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. 80-85, which are for a less number of years.

9. **Remarkable Falls of Rain.**—The following are the more remarkable falls of rain in the States of New South Wales, Queensland, Western Australia, and South Australia, which have occurred within a period of twenty-four hours :—

HEAVY RAINFALLS, NEW SOUTH WALES, UP TO 1912 INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt
		ins.			ins.
Anthony	28 Mar., 1887	17.14	Kembla Heights ...	13 Jan., 1911	17.46
,, ...	15 Jan., 1890	13.13	Leconfield	9 Mar., 1893	14.53
Araluen	15 Feb., 1898	13.36	Madden's Creek ...	13 Jan., 1911	18.68
Berry	13 Jan., 1911	12.05	Maitland W. ...	9 Mar., 1893	14.79
Billambil	14 Mar., 1894	12.94	Major's Creek ...	14 Feb., 1898	12.32
Bomaderry... ...	13 Jan., 1911	13.03	Morpeth	9 Mar., 1893	21.52
Broger's Creek ...	14 Feb., 1898	20.05	Mount Kembla ...	13 Jan., 1911	18.25
,, ,, ...	19 July, 1910	12.22	Nepean Tunnel ...	14 Feb., 1898	12.30
,, ,, ...	13 Jan., 1911	20.83	Nowra	13 Jan., 1911	13.00
Bulli Mountain ...	13 Feb., 1898	17.14	Prospect	28 May, 1889	12.37
Camden Haven ...	22 Jan., 1895	12.23	Richmond	28 ,, ,,	12.18
Castle Hill... ...	28 May, 1889	13.49	Rooty Hill	27 ,, ,,	11.85
Colombo Lyttleton ...	5 Mar., 1893	12.17	Taree	28 Feb., 1892	12.24
Condong	27 ,, 1887	18.66	Terara	26 ,, 1873	12.57
Cordeaux River ...	14 Feb., 1898	22.58	Tomago	9 Mar., 1893	13.76
,, ,, ...	13 Jan., 1911	14.52	Tongarra Farm ...	14 Feb., 1898	15.12
Dapto West ...	14 Feb., 1898	12.05	Towamba	5 Mar., 1893	20.00
Dunheved	28 May, 1889	12.40	South Head		
Holy Flat	12 Mar., 1887	12.00	(near Sydney)...	29 Apr., 1841	20.12
,, ,, ...	28 Feb., 1892	12.24	,, ,, ...	16 Oct., 1844	20.41

HEAVY RAINFALLS, QUEENSLAND, UP TO 1912 INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Anglesey	26 Dec., 1909	18.20	Crohamhurst		
Ayr	20 Sep., 1890	14.58	(Blackall Range)	2 Feb., 1893	35.71
Bloomsbury ...	14 Feb., 1893	17.40	,, ,, ...	9 June, ,,	13.31
,, ...	10 Jan., 1901	16.62	,, ,, ...	9 Jan., 1898	19.55
Bowen	13 Feb., 1893	14.65	,, ,, ...	6 Mar. ,,	16.01
Brisbane	21 Jan., 1887	18.31	,, ,, ...	26 Dec., 1909	13.85
Bromby Park (Bowen)	14 Feb., 1893	13.28	Croydon	29 Jan., 1908	15.00
Brookfield ...	14 Mar., 1908	14.95	Cryna (Beaudesert)...	21 ,, 1887	14.00
Buderim Mountain ...	11 Jan., 1898	26.20	Donaldson		
Burketown ...	15 ,, 1891	13.58	(now Granada)	8 ,, 1911	13.50
,, ...	12 Mar., 1903	14.52	,, ,,	9 ,, ,,	14.30
Cairns	11 Feb., 1889	14.74	Dungeness ...	16 Mar., 1893	22.17
,, ...	21 Apr., ,,	12.40	,, ...	17 Apr., 1894	14.00
,, ...	5 ,, 1891	14.08	Dunira	9 Jan., 1898	18.45
,, ...	11 Feb., 1911	15.17	,, ...	6 Mar., ,,	15.95
,, ...	2 Apr., ,,	20.16	Enoggera Railway ...	14 ,, 1908	12.14
Cape Grafton ...	5 Mar., 1896	13.37	Ernest Junction ...	,, ,,	13.00
Cardwell	30 Dec., 1889	12.00	Flat Top Island ...	22 Dec., 1909	12.96
,, ...	23 Mar., 1890	12.00	Floraville	11 Mar., 1903	12.86
,, ...	18 ,, 1904	18.24	Flying Fish Point ...	7 Apr., 1912	16.06
,, ...	3 Apr., 1911	12.84	Geraldton		
Clare	26 Jan., 1896	15.30	(now Innisfail)	11 Feb., 1889	17.13
Collaroy	30 ,, 1896	14.25	,, ,, ...	31 Dec., ,,	12.45
Cooktown	22 ,, 1903	12.49	,, ,, ...	6 Apr., 1894	16.02
Cooran	1 Feb., 1893	13.62	,, ,, ...	18 ,, 1899	13.20
,, ...	26 Dec., 1908	14.08	,, ,, ...	24 Jan., 1900	15.22
Cooroy	9 June, 1893	13.60	,, ,, ...	29 Dec., 1903	21.22
,, ...	10 Jan., 1898	13.50	,, ,, ...	11 Feb., 1911	14.48

HEAVY RAINFALLS, QUEENSLAND—Continued.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Geraldton (now Innisfail)	1 Apr., 1911	12.35	Kuranda	6 Mar., 1899	14.12
,, ,, ...	2 ,, ,,	15.00	,, ...	20 Apr., 1903	14.16
,, ,, ...	7 ,, 1912	20.50	,, ...	14 Jan., 1909	12.37
,, ,, ...	8 ,, ,,	12.15	,, ...	11 Feb., 1911	16.30
Gin Gin	16 Jan., 1905	13.61	,, ...	17 Mar., ,,	15.10
Gladstone	18 Feb., 1888	12.37	,, ...	31 ,, ,,	18.60
,, ...	31 Jan., 1893	14.62	,, ...	1 Apr., ,,	24.30
,, ...	4 Feb., 1911	18.83	,, ...	2 ,, ,,	28.80
Glen Broughton ...	5 Apr., 1894	18.50	Landsborough ...	2 Feb., 1893	15.15
Glen Prairie ...	18 ,, 1904	12.18	,, ...	9 June, ,,	12.80
Gold Creek Reservoir	14 Mar., 1908	12.50	,, ...	26 Dec., 1909	14.00
Goondi Mill (Gerald'n)	6 Apr., 1894	15.69	Low Island ...	10 Mar., 1904	15.07
,, ,,	18 Apr., 1899	14.78	,, ...	31 ,, 1911	14.70
,, ,,	24 Jan., 1900	13.30	,,	1 Apr., ,,	23.43
,, ,,	29 Dec., 1903	17.83	Lucinda	17 Feb., 1906	13.35
,, ,,	10 Feb., 1911	17.68	,, ...	10 Mar., 1906	14.60
,, ,,	31 Mar., ,,	12.38	Lytton	21 Jan., 1887	12.85
,, ,,	1 Apr., ,,	13.60	Mackay	23 Dec., 1909	13.96
,, ,,	6 Apr., 1912	15.55	Sugar Experimental Farm, Mackay ...	,, ,,	12.00
Halifax	5 Feb., 1899	15.37	Macnade Mill (Townsville) ...	18 Jan., 1894	12.56
,, ...	6 Jan., 1901	15.68	,, ...	17 Apr., ,,	14.26
,, ,, ...	8 Apr., 1912	12.75	,, ...	5 Feb., 1899	15.20
Hambledon Mill ...	13 Jan., 1909	13.80	,, ...	6 Jan., 1901	23.33
,, ,, ...	2 ,, 1911	18.61	Maleny	26 Dec., 1909	14.76
,, ,, ...	10 Feb., ,,	13.97	Mapleton	14 Mar., 1908	14.29
,, ,, ...	30 Mar. ,,	13.04	,, ...	26 Dec., 1909	15.72
,, ,, ...	31 ,, ,,	14.95	Marlborough ...	17 ,, 1888	14.24
,, ,, ...	1 Apr., ,,	19.62	Milton	14 Mar., 1908	12.24
Harvey Creek ...	8 Mar., 1899	17.72	Mirani	12 Jan., 1901	16.59
,, ,, ...	25 Jan., 1900	12.53	Molloy	31 Mar., 1911	20.02
,, ,, ...	25 May, 1901	14.00	,, ...	1 Apr., ,,	20.00
,, ,, ...	14 Mar., 1903	12.10	,, ...	2 ,, ,,	20.00
,, ,, ...	11 Jan., 1905	16.96	Mooloolah... ...	13 Mar., 1892	21.53
,, ,, ...	28 ,, 1906	12.29	,, ...	2 Feb., 1893	19.11
,, ,, ...	14 Jan., 1909	14.40	,, ...	6 Mar., 1898	14.43
,, ,, ...	3 Jan., 1911	27.75	Mount Crosby ...	14 Mar., 1908	14.00
,, ,, ...	11 Feb., ,,	12.88	Mount Cuthbert ...	8 Jan., 1911	18.00
,, ,, ...	1 Apr., ,,	13.61	Mourilyan ...	14 Jan., 1909	13.00
,, ,, ...	2 ,, ,,	16.46	,, ...	3 ,, 1911	12.70
Haughton Valley ...	26 Jan., 1896	18.10	,, ...	11 Feb., ,,	17.40
Hillcrest (Mooloolah)	26 Dec., 1909	13.35	,, ...	1 Apr., ,,	13.20
Holmwood (Woodf'd)	2 Feb., 1893	16.19	,, ...	7 ,, 1912	18.97
,, ,,	10 Jan., 1898	12.40	Mundoolun ...	21 Jan., 1887	17.95
Homebush ...	3 Feb., ,,	12.04	Musgrave	6 Apr., 1894	13.71
Howard	15 Jan., 1905	19.55	Nambour	9 Jan., 1898	21.00
Ingham	18 ,, 1894	12.60	,, ...	7 Mar., ,,	13.28
,, ...	6 ,, 1901	13.59	,, ...	27 Dec., 1909	16.80
,, ...	25 Dec., 1903	12.30	Nerang	15 June 1892	12.35
Inkerman	21 Sep., 1890	12.93	North Pine ...	16 Feb., 1893	14.97
Inneshowen (Johnstone River)	30 Dec., 1889	14.01	Nundah	14 Mar., 1908	12.00
Isis Junction ...	6 Mar., 1898	13.60	Oxenford	14 Mar., 1908	15.65
Kamerunga (Cairns)	20 Jan., 1892	13.61	Palmwoods ...	4 Feb., 1893	12.30
,, ,, ...	6 Apr., 1894	14.04	,, ...	10 Jan., 1898	15.85
,, ,, ...	5 ,, 1895	12.31	,, ...	7 Mar., ,,	13.02
,, ,, ...	11 Feb., 1911	13.07	,, ...	25 Dec., 1909	17.75
,, ,, ...	1 Apr., ,,	14.20	Peachester ...	26 ,, ,,	14.91
,, ,, ...	2 ,, ,,	21.00	Pittsworth ...	11 Mar., 1890	14.68

HEAVY RAINFALLL, QUEENSLAND—Continued.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Port Douglas ...	5 Mar., 1887	13.00	Victoria Mill ...	6 Jan., 1901	16.67
,, ,, ...	10 ,, 1904	16.34	Walsh River ...	1 Apr., 1911	13.70
,, ,, ...	11 Jan., 1905	14.68	Woodford	2 Feb., 1893	14.93
,, ,, ...	17 Mar., 1911	16.10	Woodlands (Yeppoon)	25 Mar., 1890	14.25
,, ,, ...	1 Apr., ,,	31.53	,, ,, ...	31 Jan., 1893	23.07
Ravenswood ...	24 Mar., 1890	17.00	,, ,, ...	9 Feb., 1896	13.97
Redcliffe	21 Jan., 1887	14.00	,, ,, ...	7 Jan., 1898	14.50
,, ...	16 Feb., 1893	17.35	Woombye... ...	26 Dec., 1909	13.42
Rosedale	6 Mar., 1898	12.60	Yandina	1 Feb., 1893	20.08
Sandgate	16 Feb., 1893	14.03	,, ...	9 June, ,,	12.70
Somerset	28 Jan., 1903	12.02	,, ...	9 Jan., 1898	19.25
St. Helens (Mackay)	24 Feb., 1888	12.00	,, ...	7 Mar., ,,	13.52
St. Lawrence ...	17 Feb., 1888	12.10	,, ...	28 Dec., 1909	15.80
,, ,, ...	30 Jan., 1896	15.00	Yarrabah	11 Feb., 1911	12.00
Tewantin	30 Mar., 1904	12.30	,, ...	2 Apr., ,,	30.65
The Hollow (Mackay)	23 Feb., 1888	15.12	Yeppoon	31 Jan., 1893	20.05
Thornborough ...	20 Apr., 1903	18.07	,, ...	8 ,, 1898	18.05
Townsville ...	24 Jan., 1892	19.20	,, ...	3 Feb., 1906	14.90
,, ...	28 Dec., 1903	15.00	,, ...	,, 1911	14.92

HEAVY RAINFALLS, SOUTH AUSTRALIA, UP TO 1912 INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Borroloola	14 Mar., 1899	14.00	Pine Creek ...	8 Jan., 1897	10.35
Lake Nash... ...	21 ,, 1901	10.25	Port Darwin ...	7 Jan., 1897	11.67

HEAVY RAINFALLS, WESTERN AUSTRALIA, UP TO 1912 INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Balla Balla ...	21 Mar., 1899	14.40	Whim Creek ...	2 Apr., 1898	7.08
Boodarie	21 ,, ,,	14.53	,, ...	3 ,, ,,	29.41
Cossack	3 Apr., 1898	12.82	,, ...	20 Mar., 1899	8.89
,, ...	16 ,, 1900	13.23	,, ...	21 ,, ,,	18.17
Croydon	3 Mar., 1903	12.00	Woodstock... ...	21 ,, 1912	13.00
Cocos Island ...	29 Nov., ,,	14.38	Wyndham	27 Jan., 1890	11.60
Derby	29 Dec., 1898	13.09	,, ...	11 ,, 1903	9.98
,, ...	30 ,, ,,	7.14	,, ...	12 ,, ,,	6.64
Fortescue	3 May, 1890	23.36	,, ...	13 ,, ,,	4.20
Kerdiadary ...	7 Feb., 1901	12.00	Yeeda	28 Dec., 1898	8.42
Obagama	28 ,, 1910	12.00	,, ...	29 ,, ,,	6.88
Point Torment ...	17 Dec., 1906	11.86	,, ...	30 ,, ,,	6.12
Thangoo	17-19 Feb.'96	24.18			

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 the 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 29.91 inches in the southern. The July mean pressure ranges from 29.90 inches at Darwin to 30.13 at Alice Springs. Barometer readings, corrected to mean sea-level, have, under anticyclonic conditions in the interior of the continent, ranged from 30.81 inches to as low as 28.44 inches. This lowest record was registered at Townsville during a hurricane on the 9th March, 1903. The mean annual fluctuations of barometric pressure for the capitals of Australia are shewn on page 73.

13. **Wind.**—Notes on the distinctive wind currents in Australia were given in 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 three months of the year these hurricanes appear to have their origin in the neighbourhood of the South Pacific Islands, their path being a parabolic curve 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, popularly known as "Willy Willies," are peculiar to the north-west coast of Western Australia from the months of December to March 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 at Whim Creek from one such occurrence. Falls of 10 inches

and over have frequently been recorded in the 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 their 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, 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 Forest 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.

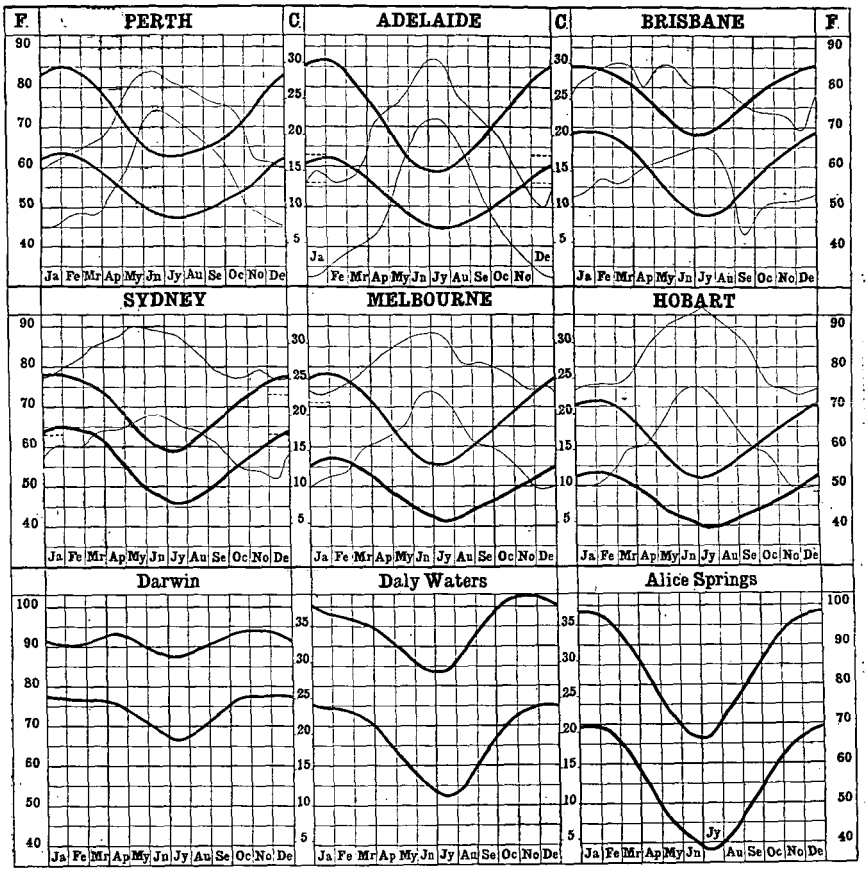
It is the rapid rate of evaporation, induced by both hot and cold winds, which injures crops and makes life uncomfortable on the plains. Whether the forest aids in increasing precipitation there may be doubt, but nobody can say that it does not check the winds and the rapid evaporation due to them.

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 to 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 :—

GRAPHS SHEWING ANNUAL FLUCTUATIONS OF MEAN 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.

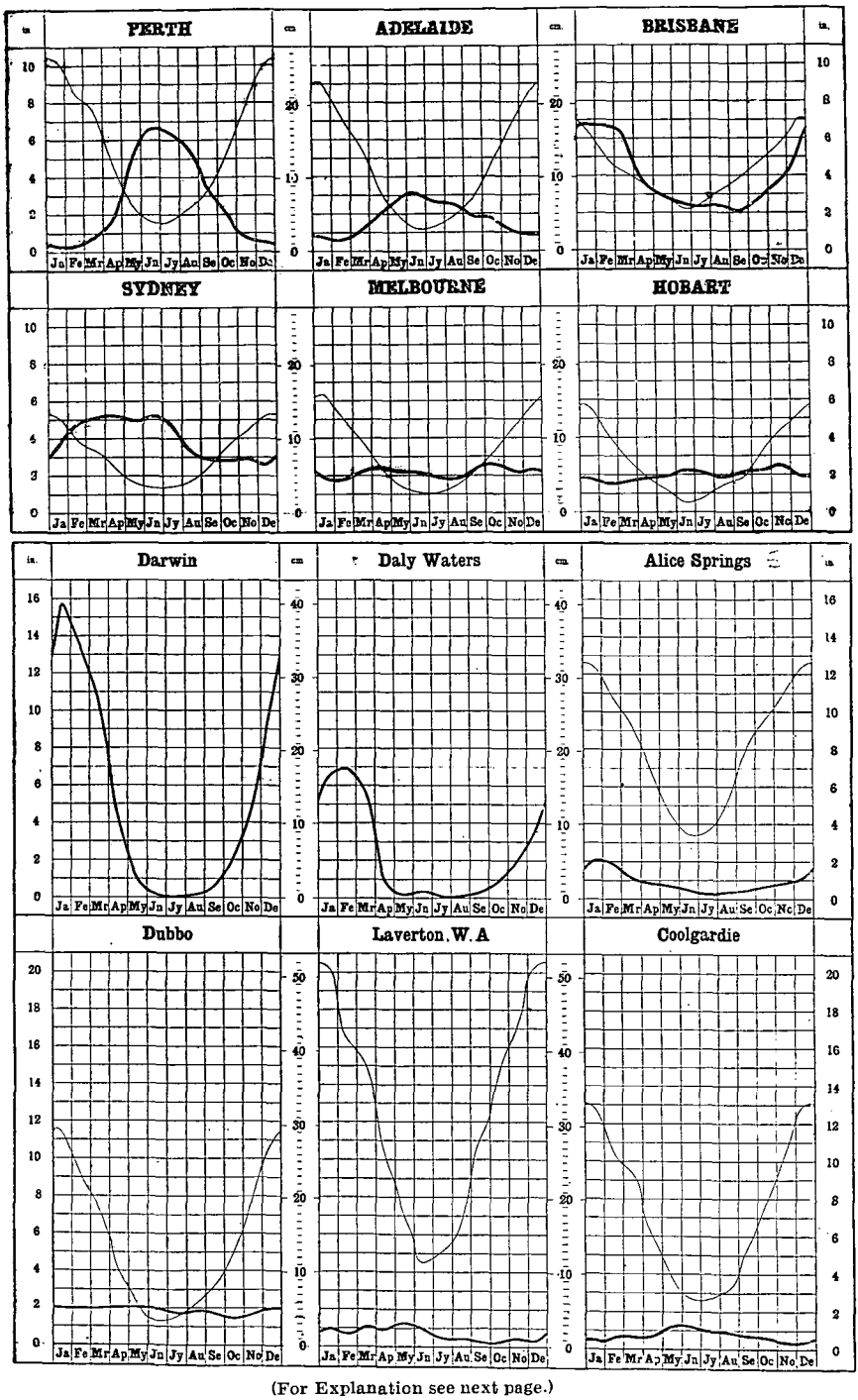
For the thin lines the degree numbers represent relative humidities, or the percentages of actual saturation on the total for the respective temperatures.

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 48°; in other words, at Perth, the degree of saturation of the atmosphere by aqueous vapour for the month of March ranges between 66 % and 48 %.

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



(For Explanation see next page.)

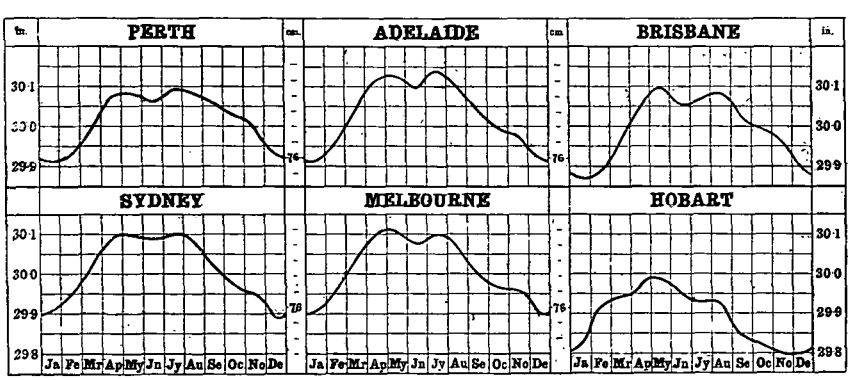
EXPLANATION OF THE GRAPHS OF RAINFALL AND EVAPORATION.—On the preceding graphs thick lines denote rainfall and thin lines evaporation, and shew the fluctuation of the mean rate of fall *per month* throughout the year. The results, plotted from the Climatological Tables hereinafter, are shewn in inches (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.

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 1½ inches at the middle of June.

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

—	Rainfall.	Evaporation.	—	Rainfall.	Evaporation.
Perth ...	33.11	66.13	Darwin... ...	61.72	—
Adelaide ...	21.04	54.21	Daly Waters ...	27.95	—
Brisbane ...	46.95	51.19	Alice Springs...	10.93	97.10
Sydney ...	47.99	36.92	Dubbo ...	22.30	66.37
Melbourne ...	25.51	38.38	Laverton, W.A.	9.24	—
Hobart ...	23.57	32.42	Coolgardie ...	9.09	87.74

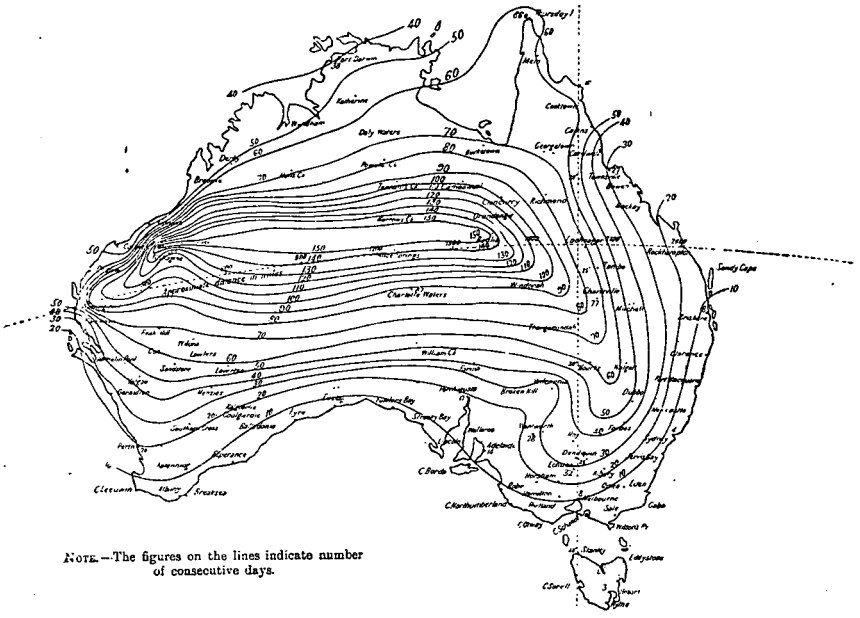
GRAPHS SHEWING ANNUAL FLUCTUATIONS OF MEAN BAROMETRIC PRESSURE FOR THE CAPITALS OF THE SEVERAL STATES OF THE COMMONWEALTH OF AUSTRALIA.



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.

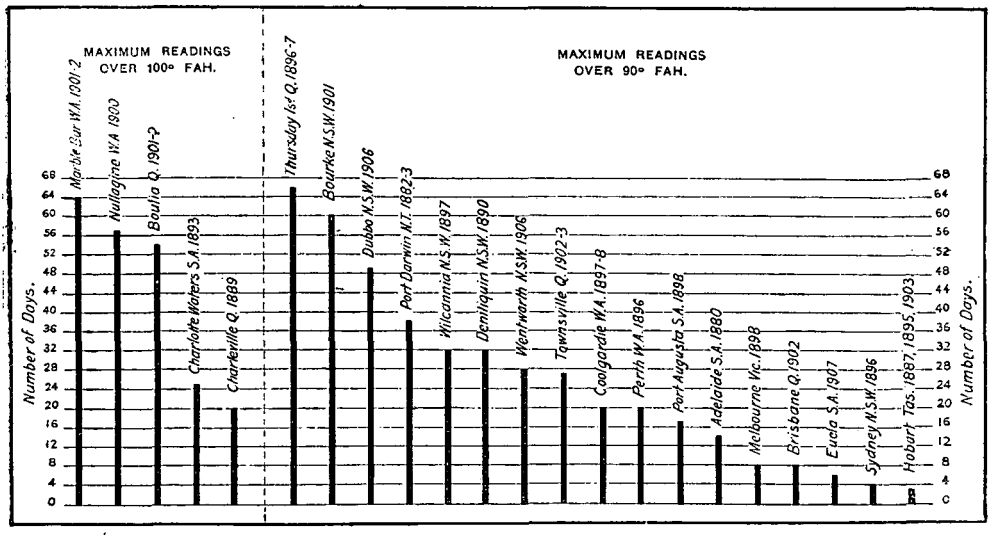
INTERPRETATION OF THE BAROMETRIC GRAPHS.—Taking the Brisbane graph for purposes of illustration, it will be seen that the mean pressure on 1st January is about 29.87 inches, and there are maxima in the middle of May and August of about 30.10 and 30.08 respectively. The double maxima appear clearly on each graph.

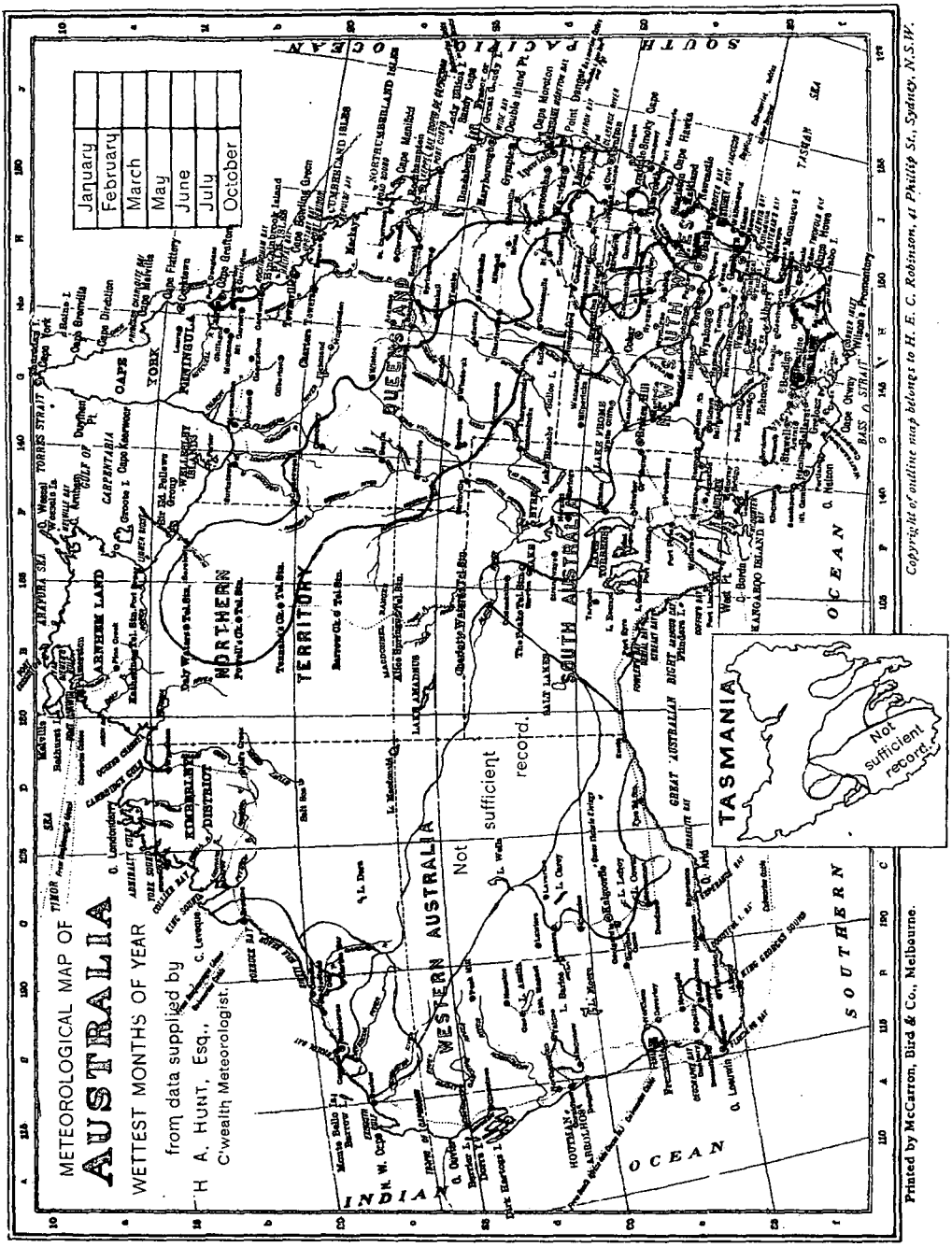
Chart indicating the area affected and period of duration of the Longest Heat Waves when the Maximum Temperature for consecutive 24 hours reached or exceeded 90° Fah.



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.





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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.

No.
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.

No.
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.

No.
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.

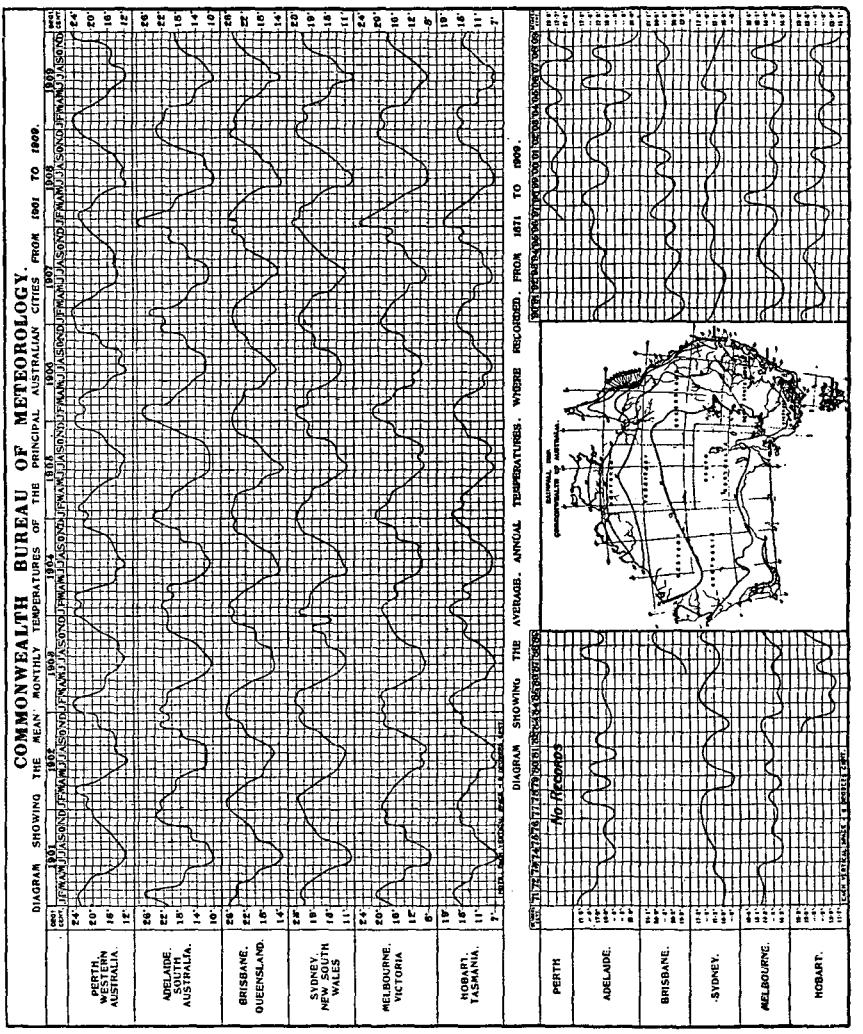
40. Gippsland.
41. North-East.
42. Central.

No.
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.

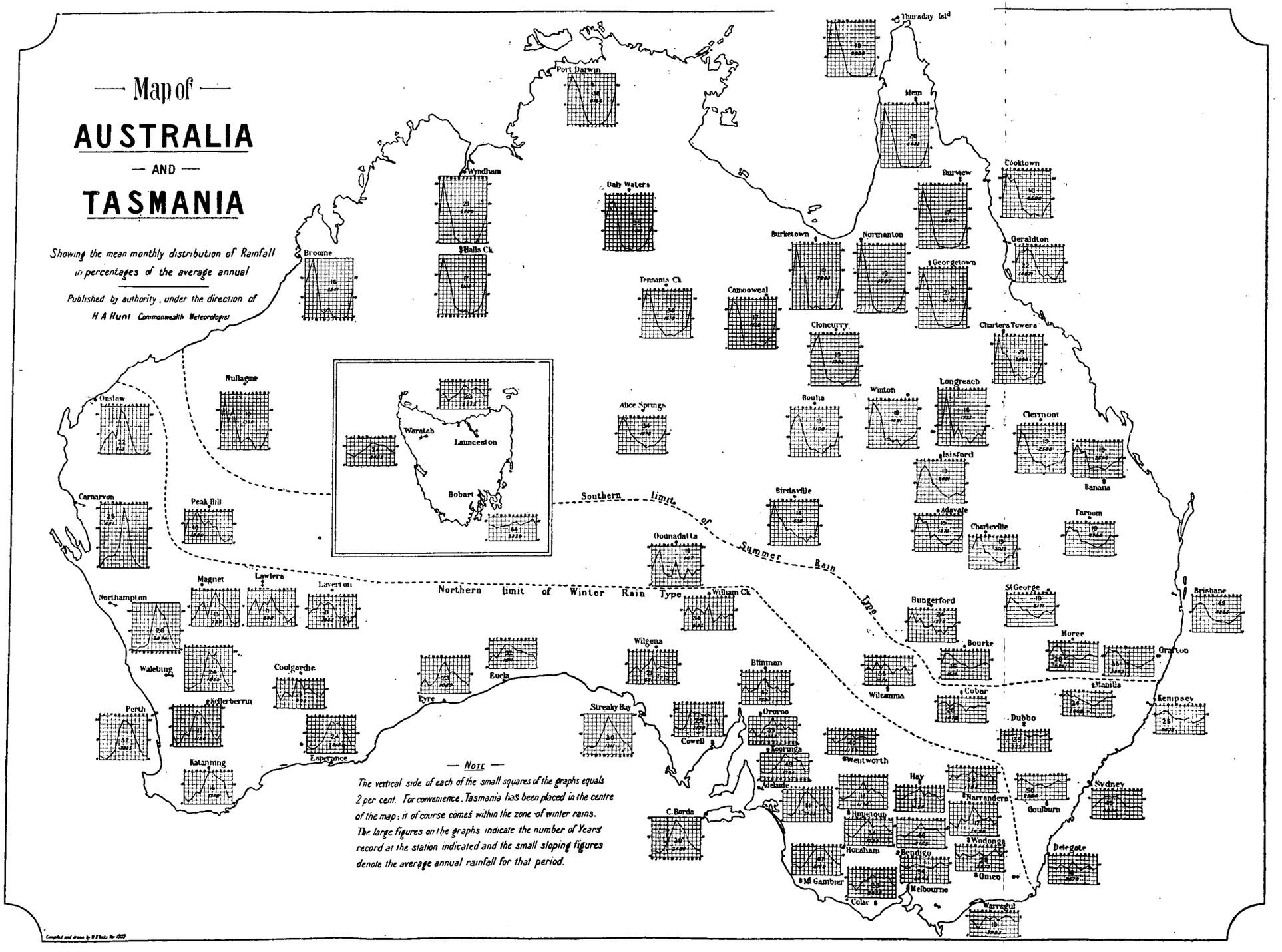


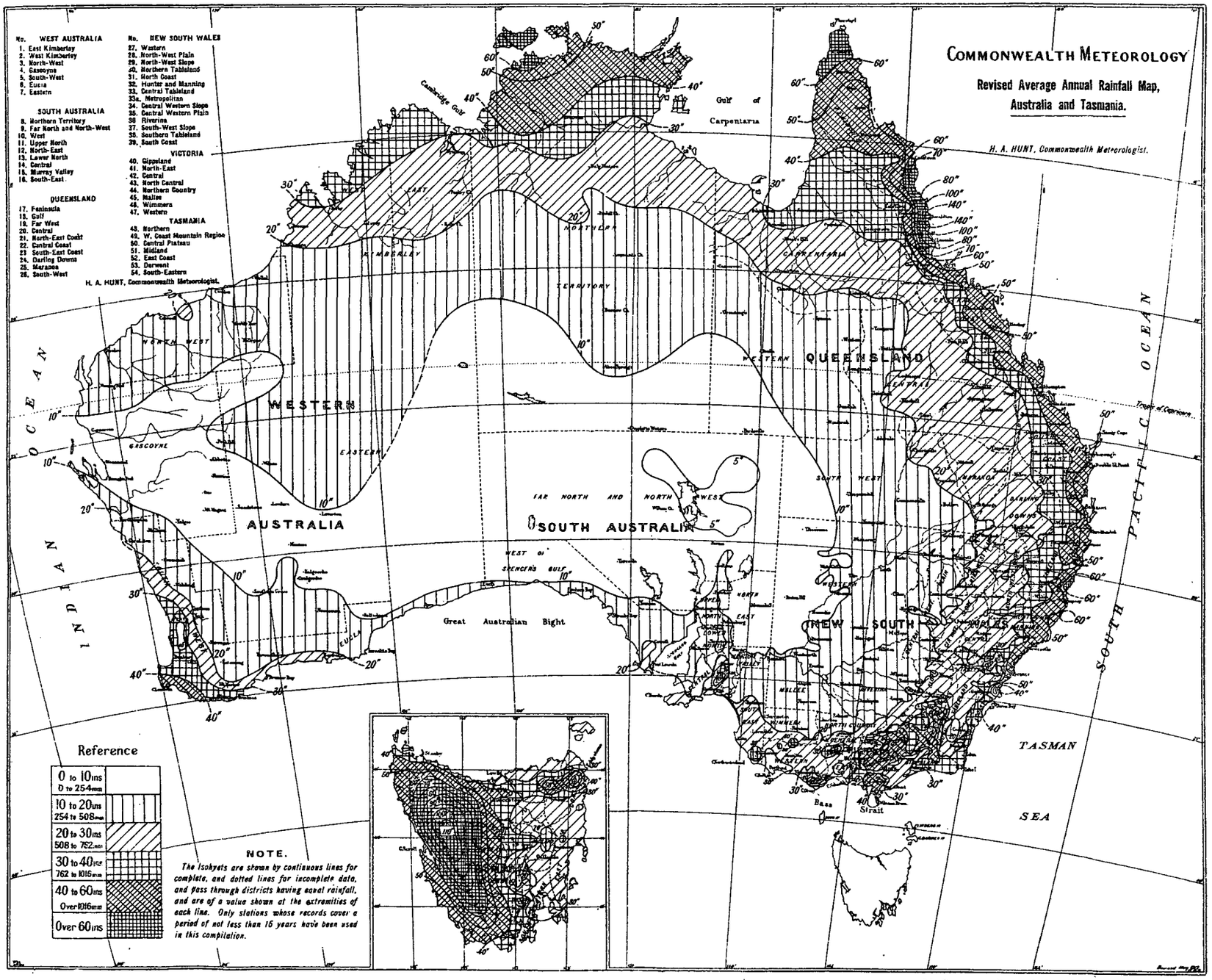
EXPLANATION OF GRAPH.

The six continuous curves on the upper part of the diagram shew the fluctuations of mean monthly temperatures of the Australian capitals from 1901 to 1909. The base of each small square denotes one month, and the vertical side 2° Centigrade or 3.6° Fahrenheit.

The six curves in lower portion of the diagram similarly shew the fluctuations of the mean annual temperatures, from 1871 in the case of Adelaide, Sydney and Melbourne, from 1883, 1887 and 1897 in the case respectively of Hobart, Brisbane and Perth. The base of each rectangle represents one year, and the vertical side 0.3° Centigrade or 0.54° Fahrenheit.

The map shews the areas affected by given amounts of annual rainfall, and is elsewhere given.


— Map of —
AUSTRALIA
— AND —
TASMANIA
Showing the mean monthly distribution of Rainfall in percentages of the average annual
Published by authority, under the direction of H A Hunt Commonwealth Meteorologist
Thursday Isl
Port Darwin
Mem
Wyndham
Daly Waters
Parview
Cooktown
Geraldton
Burketown
Normanton
Georgetown
Halls Ck
Broome
Tennants Ck
Camooweal
Cloncurry
Charters Towers
Nullagine
Onslow
Alice Springs
Boulia
Winton
Longreach
Clermont
Isisford
Banana
Waratah
Launceston
Hobart
Carnarvon
Peak Hill
Birdsville
Adavale
Charleville
Tarcoon
Southern limit of Summer Rain
Goonadatta
Northern limit of Winter Rain Type
William Ck
Magnet
Lawlers
Laverton
Northampton
Bungerford
St George
Brisbane
Bourke
Moree
Wilgena
Bimman
Coolgardie
Eucla
Eyre
Wilcannia
Cobar
Manilla
Kempsey
Walebing
Kellerberrin
Perth
Streaky Bay
Cowell
Ororoo
Dubbo
Esperance
Kooringa
Wentworth
Adelaide
Hay
Narrandera
Sydney
Goulburn
Hopetoun
Horsham
Bendigo
Wodonga
Omeo
Delegate
C. Borda
Mt Gambier
Colac
Melbourne
Warrnambool
— 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.



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

Place.	Height above M.S.L.	Annual Rainfall.			Temperature.					
		Average.	Highest.	Lowest.	*Mean Summer.	†Mean Winter.	Highest on Record.	Lowest on Record.	Average Hottest Month.	Average Coldest Month.
	Ft.	Ins.	Ins.	Ins.	Fahr.	Fahr.	Fahr.	Fahr.	Fahr.	Fahr.
Amsterdam ...	6	27.29	40.59	17.60	63.2	36.8	90.0	4.1	64.4	35.4
Auckland ...	125	43.31	63.72	26.32	66.1	52.5	91.0	31.9	67.2	51.8
Athens ...	351	15.48	33.32	4.55	79.2	49.1	106.5	19.6	81.1	47.5
Bergen ...	146	89.10	102.80	73.50	56.8	34.5	88.5	4.8	57.9	33.6
Berlin ...	115	22.95	30.04	14.25	64.7	32.2	98.6	—13.0	66.0	30.0
Berne ...	1,877	36.30	58.23	2469	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	22.00	28.01	16.45	63.9	30.0	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 ...	72	36.82	80.73	21.53	73.2	51.5	103.1	25.9	74.2	50.5
Calcutta ...	21	61.98	89.32	39.38	84.9	67.1	108.2	44.2	85.4	65.5
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	33.54	45.86	24.52	69.2	25.4	103.0	—23.0	72.4	24.0
Christchurch ...	25	25.45	35.30	13.54	61.1	43.4	95.7	21.3	61.6	42.4
Christiania ...	82	22.52	31.73	16.26	61.0	24.4	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 ...	46	22.33	28.78	13.94	60.7	32.1	90.5	—13.0	62.2	31.4
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	85.3	16.6	57.2	38.3
Geneva	1,328	33.48	46.89	21.14	64.4	33.7	...	...	62.2	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 ...	159	24.12	35.54	16.38	61.3	39.3	100.0	4.0	62.7	38.6
Hong Kong ...	110	84.10	119.72	45.83	81.3	60.3	97.0	32.0	81.8	58.1
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	18	24.04	38.20	18.23	61.2	39.3	94.0	9.4	62.8	38.7
Madras	22	49.06	88.41	18.45	86.7	76.0	113.0	57.5	87.6	75.3
Madrid	2,149	16.23	27.48	9.13	73.0	41.2	107.1	10.5	75.7	39.7
Marseilles ...	246	21.88	43.04	12.28	70.3	45.3	100.4	11.5	72.1	43.3
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	42.47	59.68	28.78	72.1	31.7	100.0	— 6.0	74.5	30.3
Ottawa	294	33.40	44.44	26.36	67.2	14.1	98.5	—33.0	69.7	12.0
Paris	165	21.92	29.56	16.44	63.5	37.1	101.1	—14.1	65.8	36.1
Pekin	143	24.40	36.00	18.00	77.7	26.6	114.0	— 5.0	79.2	23.6
Quebec	296	40.46	47.57	32.12	63.5	12.4	95.5	—34.3	66.3	10.1
Rome	166	32.57	57.89	12.72	74.3	46.0	104.2	17.2	76.1	44.6
San Francisco ...	155	22.83	38.82	9.31	59.0	51.0	101.0	29.0	61.0	50.0
Shanghai ...	14	44.13	62.52	27.91	77.4	39.4	102.9	10 2	79.7	37.4
Singapore ...	8	91.99	158.68	32.71	81.2	76.6	94.2	63.4	81.5	78.3
Stockholm ...	146	18.31	25.46	11.78	59.7	27.0	91.8	—22.0	62.1	25.7
St. Petersburg ...	16	21.30	29.52	13.75	61.1	17.4	97.0	—38.2	63.7	15.2
Tokio	70	59.17	77.10	45.72	73.9	38.9	97.9	15.4	77.7	37.1
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 ...	75	43.80	61.33	18.79	74.7	34.5	104.0	—15.0	76.8	32.9
Wellington (N.Z.)	110	49.70	67.68	30.02	61.7	48.4	98.0	30.0	62.4	47.5
Zurich	1,542	45.15	78.27	29.02	63.3	31.3	94.1	— 0.8	65.1	29.5
FEDERAL CAPITAL SITE.										
Canberra (Dist.) Queanbeyan ...	2,000 to 2,900	22.39	41.29	10.45	67.5*	41.8†	104.0	11.1	68.4	39.7
THE STATE CAPITALS.										
Perth	197	33.11	46.73	20.48	73.0*	55.7†	107.9	35.3	74.2	55.0
Adelaide	140	21.04	30.87	13.43	73.1	52.9	116.3	32.0	74.2	51.5
Brisbane	137	46.95	88.26	16.17	76.7	59.5	108.9	36.1	77 2	58.0
Sydney	146	47.97	82.76	21.49	70.9	53.8	108.5	35.9	71.6	52.3
Melbourne ...	115	25.51	36.61	15.61	66.5	49.9	111:2	27.0	67.5	48.4
Hobart	160	23.57	40.67	13.43	61.7	46.6	105.2	27.0	62.4	45.3

* Mean of the three hottest months. † 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. These are given in the following tables:—

CLIMATOLOGICAL DATA FOR PERTH, W.A.

LAT. 31° 57′ S., LONG. 115° 51′ 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.				Mean Amount of Evaporation.	No. of Days Lightning.	Mean Amount of Clouds. 9 a.m. & 3 p.m.	No. of Clear Days.
		Greatest Number of Miles in one day.	Mean Hourly Pressure. (lbs.)	Total Miles.	Prevailing Direction.				
No. of yrs. over which observation extends	28	15	15	15	15	14	15	16	15
January	29.911	797 27/98	0.71	11,458	S	10.39	1.4	2.7	16.7
February	29.927	650 6/05	0.67	10,097	S S E	8.76	1.2	2.8	14.1
March	29.990	601 17/99	0.55	10,100	S S E	7.67	1.0	3.3	14.3
April	30.074	955 25/00	0.45	8,850	S E	4.84	0.8	4.4	8.9
May	30.079	768 5/12	0.36	8,159	E N E	2.65	2.0	5.4	6.2
June	30.065	861 27/10	0.40	8,286	N N E	1.69	1.7	5.9	4.7
July	30.096	949 11/99	0.41	8,659	N N E	1.63	2.5	5.6	6.2
August	30.088	966 15/03	0.43	8,924	W S W	2.35	1.4	5.4	6.7
September	30.057	861 11/05	0.49	9,186	S W	3.30	1.7	5.4	6.8
October	30.034	686 15/98	0.55	10,061	S S W	5.27	0.9	5.2	7.8
November	29.994	777 18/97	0.61	10,240	S	7.72	0.8	3.9	12.3
December	29.932	672 31/98	0.67	11,115	S	9.86	1.5	3.1	16.0
Year { Totals ...	—	—	—	—	—	66.13	16.9	—	120.7
Year { Averages ...	30.021	—	0.52	9,600	S	—	—	4.4	—
Year { Extremes ...	—	966 15/8/03	—	—	—	—	—	—	—

TEMPERATURE.

Month.	Mean Temperature.			Extreme Shade Temperature.			Greatest Range.	Extreme Temperature.			Sea water mn. 3 ft. below surface
	Mean Max.	Mean Min.	Mean	Highest.	Lowest.			Highest in Sun.	Lowest on Grass.		
No. of yrs. over which observation extends	16	16	16	16	16		16	15	14		—
January	84.2	63.0	73.6	107.0 16/97	50.6	25/01	56.4	171.1 4/04	42.4	25/02	—
February	85.0	63.4	74.2	106.8 6/98	47.7	1/02	59.1	169.0 4/99	41.2	1/02	—
March	81.6	60.7	71.2	104.3 6,7/06	45.8	8/03	58.5	161.6 †	36.7	8/03	—
April	76.1	56.8	66.4	99.7 9/10	42.4	2/01	57.3	152.0 11/01	35.0	2/01	—
May	68.5	52.4	60.4	90.4 2/07	39.9	*	50.5	138.8 15/02	31.0	28/12	—
June	63.6	48.9	56.2	77.1 9/09	36.9	14/98	40.2	131.0 5/04	30.2	14/98	—
July	62.5	47.5	55.0	73.8 24/99	36.4	19/06	37.4	131.0 31/98	27.6	21/11	—
August	63.9	48.0	56.0	80.4 30/02	35.3	31/08	45.1	134.1 ‡	27.9	10/11	—
September	65.7	50.1	57.9	86.4 28/00	39.0	18/00	47.4	144.8 19/02	32.0	17/12	—
October	69.2	52.6	60.9	93.4 17/06	41.2	10 03	52.2	152.6 30/01	33.4	1/10	—
November	74.8	56.0	65.4	100.9 27/01	42.0	1/04	58.9	161.5 17/03	35.5	§	—
December	80.8	60.5	70.6	107.9 20/04	48.0	2/10	59.9	168.3 20/04	39.1	2/10	—
Year { Averages ...	73.0	55.0	64.0	—	—		—	—	—		—
Year { Extremes ...	—	—	—	107.9 20/12/04	35.3	31/8/08	72.6	171.1 4/1/04	27.6	21/7/11	—

* 17 and 18, 1899. † 1/99 and 1/09. ‡ 29/1898 and 18/1902. § 6/10 and 14/12.

HUMIDITY, RAINFALL, AND DEW.

Month.	Humidity.			Rainfall.							Dew.	
	Mean 9 a.m.	Highest Mean.	Lowest Mean.	Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.		Least Monthly.		Greatest in One Day.	Mean Amount of Dew.	Mean No. days Dew
No. of yrs. over which observation extends	16	16	16	37	37	37		37		37	—	16
January	52	59	45	0.33	3	2.17	1879	nil	*	1.74 28/79	—	2.6
February	54	64	48	0.31	2	2.30	1883	nil	†	0.90 10/83	—	2.1
March	57	66	48	0.71	4	4.50	1896	nil	‡	1.53 17/76	—	4.2
April	63	70	54	1.65	7	4.97	1882	0.05	‖	2.62 30/04	—	8.4
May	73	81	63	4.88	14	12.13	1879	0.98	1903	2.80 20/79	—	11.8
June	78	84	72	6.51	16	12.11	1890	2.16	1877	2.65 16/00	—	12.1
July	78	81	72	6.44	16	10.90	1902	2.42	1876	3.00 4/91	—	12.1
August	74	79	68	5.55	17	10.33	1882	0.46	1902	2.79 7/03	—	11.1
September	69	76	64	3.37	14	7.72	1903	0.69	1877	1.73 23/09	—	8.7
October	62	75	56	2.06	11	7.87	1890	0.49	1892	1.38 15/10	—	6.0
November	56	62	49	0.76	6	2.12	1880	nil	1891	1.11 30/03	—	4.5
December	52	61	46	0.54	4	3.05	1888	nil	1886	1.72 1/88	—	3.3
Year { Totals ...	—	—	—	33.11	114	—		—		—	—	86.9
Year { Averages ...	62	—	—	—	—	—		—		—	—	—
Year { Extremes ...	—	84	45	—	—	12.13	5/79	nil	§	3.00 4/7/91	—	—

* 1888, 1894, 1897, and 1911. † 1885, 1891, 1896, and 1903. ‡ 1877, 1884, and 1886. ‖ 1890 and 1894. § 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.	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	56	35	35	35	35	43	41	45	31
January	29.915	758 19/99	0.36	8,151	S W & S	8.96	2.2	3.5	7.7
February	29.952	691 22/96	0.31	6,903	S W & S	7.31	2.0	3.4	7.0
March	30.038	628 9/12	0.26	6,869	S W to S E	5.76	2.2	4.0	6.7
April	30.118	773 10/96	0.23	6,318	S W & S †	3.39	1.7	5.0	3.9
May	30.125	760 9/80	0.21	6,260	N E to N	2.00	1.8	5.7	1.7
June	30.099	750 12/78	0.26	6,723	N E to N	1.22	2.2	6.2	1.2
July	30.131	674 25/82	0.26	6,868	N E to N	1.28	1.5	5.8	1.4
August	30.100	773 31/97	0.29	7,273	N E to N ‡	1.84	2.2	5.7	2.0
September	30.038	720 * 2/87	0.32	7,445	N E & S W ‖	2.82	2.4	5.2	2.6
October	29.996	768 28/98	0.36	8,081	S W & N E ‖	4.73	3.5	4.9	3.7
November	29.973	677 2/04	0.35	7,754	W S W to S	6.53	3.9	4.5	5.4
December	29.920	675 12/91	0.36	8,131	W S W to S	8.37	2.8	3.8	6.9
Year Totals ...	—	—	—	—	—	54.21	28.4	—	50.2
Year Averages ...	30.034	—	0.30	7,231	S W	—	—	4.8	—
Year Extremes ...	—	773*	—	—	—	—	—	—	—

* 10/4/96 and 31/8/97. † With tendency N.E. ‡ With tendency S.W ‖ Equal.

TEMPERATURE.

Month.	Mean Temperature. Mean Max.	Mean Min.	Mean	Extreme Shade Temperature. Highest.	Lowest.	Greatest Range.	Extreme Temperature. Highest in Sun.	Lowest on Grass.	* Sea water mn. 3 ft. below surface
No. of yrs. over which observation extends	56	56	56	56	56	56	35	52	38
January	86.6	61.7	74.2	116.3 26/58	45.1 21/84	71.2	180.0 18/82	36.5 14/79	70.8
February	86.1	62.0	74.0	113.6 12/99	46.4 13/05	67.2	170.5 10/00	36.7 24/78	70.9
March	80.9	58.9	69.9	108.0 12/61	44.8 —/57	63.2	174.0 17/83	33.8 27/80	68.2
April	73.3	54.6	63.9	98.0 10/66	39.6 15/59	58.4	155.0 1/83	30.3 27/08	64.0
May	65.4	50.1	57.7	88.3 5/66	36.9 †	51.4	148.2 12/79	25.9 10/91	59.1
June	60.1	46.7	53.4	76.0 23/65	32.5 27/76	43.5	138.8 18/79	24.5 20/79	54.7
July	58.6	44.4	51.5	74.0 11/06	32.0 24/08	42.0	134.5 26/90	23.3 25/11	52.2
August	61.9	45.8	53.8	85.0 31/11	32.3 17/59	52.7	140.0 31/92	23.5 7/88	53.3
September	66.2	47.8	57.0	90.7 23/82	32.7 4/58	58.0	160.5 23/82	26.2 15/08	56.5
October	72.4	51.3	61.9	100.5 30/59	36.0 —/57	64.5	158.8 19/82	28.5 7/96	60.7
November	78.8	55.4	67.1	113.5 21/65	40.8 2/09	72.7	166.9 20/78	31.5 2/09	65.2
December	83.4	58.8	71.1	114.2 14/76	43.0 ‡	71.2	175.7 7/99	32.5 4/84	68.6
Year Averages ...	72.8	53.1	62.9	—	—	—	—	—	62.0
Year Extremes ...	—	—	—	116.3 26/1/58	32.0 24/7/08	84.3	180.0 18/1/82	23.3 25/7/11	—

* Taken at Lighthouse at entrance to Port River. † 26/1895 and 24/1904. ‡ 16/61 and 4/06.

HUMIDITY, RAINFALL, AND DEW.

Month.	Humidity. Mean 9 a.m.	Highest Mean.	Lowest Mean.	Rainfall. Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Dew. Mean Amount of Dew.	Mean No. days Dew
No of yrs. over which observation extends	45	45	45	74	74	74	74	74	—	41
January	36	59	33	0.73	4	4.00 1850	nil *	2.30 2/89	—	4
February	42	56	37	0.60	4	2.67 1858	nil †	1.81 5/90	—	5
March	47	58	40	1.06	6	4.60 1878	nil ‡	3.50 5/78	—	10
April	56	72	44	1.87	10	6.78 1853	0.06 1910	3 15 5/60	—	14
May	68	76	49	2.74	13	7.75 1875	0.20 1891	2.75 1/53	—	16
June	77	84	70	3.10	16	7.80 1847	0.42 1886	1.45 2/49 ‖	—	15
July	76	87	72	2.66	16	5.38 1865	0.36 1899	1.75 10/65	—	17
August	71	77	65	2.51	16	6.24 1852	0 76 1911	2.23 19/51	—	16
September	63	72	54	1.95	14	4.64 1840	0.45 1896	1.42 25/93	—	15
October	52	67	44	1.74	11	3.83 1870	0.31 1888	2.24 16/08	—	12
November	44	57	38	1.14	8	3.55 1851	0.04 1885	1.88 28/58	—	7
December	39	50	33	0.94	6	3.98 1861	nil 1904	1.89 29/40	—	4
Year Totals ...	—	—	—	21.04	124	—	—	—	—	135
Year Averages ...	54	—	—	—	—	—	—	—	—	—
Year Extremes ...	—	87	33	—	—	7.80 6/47	nil §	3.50 5/3/78	—	—

* 1848, 1849, 1878 and 1906. † 1848, 1860, etc. ‡ 1859, etc. § January, February, March and December, various years. ‖ and 25/84.

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. & 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.	No. of Days Lightning.	Mean Amount of Clouds. 9 a.m. & 3 p.m.	No. of Clear Days.
No. of yrs. over which observation extends	26	—	—	—	26	3	—	26	—
January ...	29.869	—	—	—	E	6.49	—	6.2	—
February ...	29.893	—	—	—	S E	4.85	—	6.2	—
March ...	29.951	—	—	—	S	4.35	—	6.0	—
April ...	30.043	—	—	—	S	3.83	—	5.1	—
May ...	30.097	—	—	—	S	2.95	—	4.9	—
June ...	30.060	—	—	—	S & W	2.19	—	4.3	—
July ...	30.062	—	—	—	S & W	2.42	—	3.9	—
August ...	30.087	—	—	—	S & S W	2.48	—	4.0	—
September ...	30.024	—	—	—	S	3.90	—	3.8	—
October ...	29.996	—	—	—	N & N E	4.99	—	4.5	—
November ...	29.960	—	—	—	N E & E	5.65	—	5.2	—
December ...	29.883	—	—	—	N E & E	7.09	—	5.6	—
Year Totals ...	—	—	—	—	—	51.19	—	—	—
Year Averages ...	29.994	—	—	—	S'ly to El'y	—	—	5.0	—
Year Extremes ...	—	—	—	—	—	—	—	—	—

TEMPERATURE.

Month.	Mean Temperature. Mean Max.	Mean Min.	Mean	Extreme Shade Temperature. Highest.		Lowest.		Greatest Range.	Extreme Temperature. Highest in Sun.		Lowest on Grass.		Sea water mn. 3 ft. below surface
No. of yrs. over which observation extends	26	26	26	26		26		26	26		26		—
January ...	85.4	69.0	77.2	108.9	14/02	58.8	4/93	50.1	162.7	20/89	49.9	4/93	—
February ...	84.5	68.5	76.5	101.9	11/04	58.7	*	43.2	165.2	6/02	49.3	9/89	—
March ...	82.2	66.5	74.3	96.8	16/83	55.6	30/95	41.2	160.0	1/87	46.0	28/02	—
April ...	78.9	61.5	70.2	95.2	†	48.6	17/00	46.6	150.1	1/08	37.0	17/00	—
May ...	73.5	55.3	64.4	88.8	18/97	41.3	24/99	47.5	147.0	1/05	29.8	8/97	—
June ...	69.3	50.7	60.0	81.5	6/06	36.3	29/08	45.2	133.9	6/06	25.4	23/88	—
July ...	68.2	47.9	58.0	83.4	28/98	36.1	‡	47.3	134.4	29/89	23.9	11/90	—
August ...	71.2	49.9	60.6	87.5	28/07	37.4	6/87	50.1	140.7	30/88	27.1	9/99	—
September ...	75.8	54.6	65.2	95.2	16/12	40.7	1/96	54.5	155.5	26/03	30.4	1/89	—
October ...	79.8	59.8	69.8	101.4	18/93	43.3	3/99	58.1	156.5	31/89	34.9	8/89	—
November ...	82.7	63.9	73.3	105.4	13/98	48.5	2/05	56.9	162.3	7/89	38.8	1/05	—
December ...	85.5	67.5	76.5	105.9	26/93	56.4	13/12	49.5	159.5	23/89	49.1	3/94	—
Year Averages ...	78.1	59.6	68.8	—		—		—	—		—		—
Year Extremes ...	—	—	—	108.9	14/1/02	36.1	‖	72.8	165.2	6/2/10	23.9	11/7/90	—

* 10/11/04. † 9/96 and 5/03. ‡ 12/94 and 2/96. ‖ 12/7/94 and 2/7/96.

HUMIDITY, RAINFALL, AND DEW.

Month.	Humidity. Mean 9 a.m.	Highest Mean.	Lowest Mean.	Rainfall. Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Dew. Mean Amount of Dew.	Mean No. days Dew
No of yrs. over which observation extends	26	26	26	61	53	61	61	—	—	—
January ...	67	82	54	6.66	14	27.72 1895	0.61 1882	18.31 21/87	—	—
February ...	71	84	57	6.63	14	40.39 1893	0.77 1904	8.36 16/93	—	—
March ...	74	87	56	6.20	16	34.04 1870	0.58 1868	11.18 14/08	—	—
April ...	72	80	61	3.64	13	15.28 1867	0.04 1897	3.93 20/92	—	—
May ...	74	86	63	2.92	10	13.85 1876	0.00 1846	5.62 9/79	—	—
June ...	74	83	64	2.62	8	14.03 1873	0.02 1895	6.01 9/93	—	—
July ...	72	80	65	2.33	8	8.46 1889	0.00 1841	3.54 ‡	—	—
August ...	70	80	63	2.35	7	14.67 1879	0.00 *	4.89 12/87	—	—
September ...	65	76	43	2.05	8	5.43 1886	0.10 1907	2.46 2/24	—	—
October ...	62	74	51	2.78	10	9.99 1882	0.14 1900	1.95 20/89	—	—
November ...	60	73	52	3.65	10	10.43 1846	0.00 1842	44.6 16/86	—	—
December ...	63	68	53	5.12	12	13.97 1910	0.35 1865	6.60 28/71	—	—
Year Totals ...	—	—	—	46.95	130	—	—	—	—	—
Year Averages ...	69	—	—	—	—	—	—	—	—	—
Year Extremes ...	—	87	43	—	—	40.39 2/1893	0.00 †	18.31 21/1/87	—	—

— signifies no record kept.

* 1862, 1869, 1880. † 5/1846, 7/1841, 8/1862, 1869, 1880, 11/1842. ‡ 15/76, 16/89.

** Means and Extremes to end 1912.

CLIMATOLOGICAL DATA FOR SYDNEY, N.S.W.

LAT. 33° 52′ S., LONG. 151° 12′ E. HEIGHT ABOVE M.S.L. 146 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.	No. of Days Lightning.	Mean Amount of Clouds.	No. of Clear Days.
No. of yrs. over which observation extends	54	44	44	43	51	33	53	50	48
January	29.901	721 1/71	0.38	8,322	N E	5.10	4.7	5.9	1.8
February	29.945	871 12/69	0.35	7,235	N E	3.96	4.2	6.1	1.1
March	30.037	943 20/70	0.26	6,884	N E	3.35	4.1	5.7	1.7
April	30.095	803 6/82	0.23	6,324	N E	2.45	3.9	5.1	2.5
May	30.098	758 6/98	0.22	6,432	W	1.63	3.5	4.9	3.1
June	30.080	712 7/00	0.30	7,208	W	1.36	2.2	4.8	3.3
July	30.092	930 17/79	0.29	7,353	W	1.41	2.6	4.4	4.1
August	30.093	756 22/72	0.27	7,042	W	1.72	3.4	4.1	4.5
September	30.012	964 6/74	0.31	7,319	W	2.56	4.1	4.4	3.5
October	29.966	926 4/72	0.34	7,965	N E	3.71	5.0	5.0	2.1
November	29.953	720 13/68	0.35	7,783	N E	4.41	5.6	5.6	1.5
December	29.881	938 3/84	0.36	8,214	N E	5.26	5.6	5.4	1.8
Year Totals	—	—	—	—	—	36.92	48.9	—	31.0
Year Averages	30.013	—	0.31	7,340	N E	—	—	5.1	—
Year Extremes	—	964 6/9/74	—	—	—	—	—	—	—

TEMPERATURE.

Month.	Mean Temperature. Mean Max.	Mean Min.	Mean	Extreme Shade Temperature. Highest.	Lowest.	Greatest Range.	Extreme Temperature. Highest in Sun.	Lowest on Grass.	Sea water mn. 3 ft. below surface*
No. of yrs. over which observation extends	54	54	54	54	54	54	53	53	50
January	78.3	64.9	71.6	108.5 13/96	51.2 14/65	57.3	160.9 13/96	44.2 18/97	71.4
February	77.2	64.8	71.1	101.0 19/66	49.3 28/63	51.7	162.1 16/98	43.4 25/91	71.9
March	75.4	63.0	69.2	102.6 3/69	48.8 14/86	53.8	172.3 4/89	42.3 13/93	71.0
April	70.9	58.1	64.6	89.0 4/09	44.6 27/64	44.4	144.1 10/77	38.0 13/92	68.4
May	65.0	52.0	58.5	83.5 1/59	40.2 22/59	43.3	129.7 1/96	30.9 7/88	64.2
June	60.4	48.2	54.3	74.7 24/72	38.1 29/62	36.6	123.0 14/78	28.7 30/95	59.9
July	58.9	45.7	52.3	74.9 17/71	35.9 12/90	39.0	144.3 15/93	24.0 4/93	57.3
August	62.3	47.5	54.9	82.0 31/84	36.8 3/72	45.2	149.0 30/78	27.7 30/95	57.6
September	66.4	51.4	58.9	91.1 24/07	40.8 18/64	50.3	142.2 12/78	30.1 17/05	60.0
October	71.1	55.8	63.5	99.7 19/98	43.3 2/99	56.4	149.9 13/96	32.7 9/05	63.3
November	74.3	59.6	67.0	102.7 21/78	45.8 1/05	56.9	158.5 28/99	38.8 1/05	66.9
December	77.3	62.8	70.1	107.5 31/04	49.3 2/59	58.2	171.5 4/88	42.2 8/75	69.6
Year Averages	69.8	56.2	63.0	—	—	—	—	—	65.0
Year Extremes	—	—	—	108.5 13/1/96	35.9 12/7/90	72.6	172.3 4/3/89	24.0 4/7/93	—

* Taken at Fort Denison.

HUMIDITY, RAINFALL, AND DEW.

Month.	Humidity. Mean 9 a.m.	Highest Mean.	Lowest Mean.	Rainfall. Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Dew. Mean Amount of Dew.	Mean No. days Dew
No. of yrs. over which observation extends	54	54	54	54	54	54	54	54	52	52
January	70	78	59	3.62	14.2	15.26 1911	0.43 1888	7.08 13/11	0.002	1.3
February	73	81	60	4.74	14.3	18.56 1873	0.34 1902	8.90 25/73	0 004	2.0
March	75	85	63	5.14	15.4	18.70 1870	0.42 1876	5.66 25/90	0.007	3.3
April	77	87	64	5.25	13.2	24.49 1861	0.06 1868	7.52 29/60	0 016	6.0
May	77	90	66	4.92	15.4	20.87 1889	0.21 1885	8.36 28/89	0.022	6.6
June	76	89	68	5.13	12.9	16.30 1885	0.19 1904	5.17 16/84	0.018	5.5
July	77	88	66	4.79	12.5	13.21 1900	0.12 1862	5.72 28/08	0.016	5.4
August	74	84	64	3.26	11.6	14.89 1889	0.04 1885	5.33 2/60	0.014	5.0
September	69	79	60	2.85	12.2	14.05 1879	0.08 1862	5.69 10/79	0.008	4.0
October	68	77	55	2.79	12.6	10.81 1902	0.21 1867	6.37 13/02	0.006	3.0
November	67	79	54	2.91	12.5	9.88 1865	0.19 1910	4.23 19/00	0.004	2.3
December	68	77	52	2.59	12.8	8.47 1910	0.45 1876	4.75 13/10	0.003	1.6
Year Totals	—	—	—	47.99	159.6	—	—	—	0.120	46.0
Year Averages	73	—	—	—	—	—	—	—	—	—
Year Extremes	—	90	52	—	—	24.49 4/1861	0.04 8/1885	8.90 25/2/73	—	—

CLIMATOLOGICAL DATA FOR MELBOURNE, VICTORIA.

LAT. 37° 50′ S., LONG. 144° 59′ E. HEIGHT ABOVE M.S.L. 115 FT.

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

Month.	Bar. corrected to 32° F. 1in. 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.	No. of Days Lightning.	Mean Amount of Clouds.	No. of Clear Days.
No. of yrs. over which observation extends	55	43	43	43	43	40	—	55	—
January	29.913	583 10/97	0.29	7,345	S W, S E	6.34	—	5.1	—
February	29.962	566 8/68	0.28	6,441	S W, S E	5.01	—	5.1	—
March	30.037	677 9/81	0.22	6,398	S W, S E	3.88	—	5.5	—
April	30.101	597 7/68	0.19	5,719	S W, N W	2.35	—	5.9	—
May	30.106	693 12/65	0.19	5,958	N W, N E	1.46	—	6.5	—
June	30.078	761 13/76	0.24	6,461	N W, N E	1.10	—	6.7	—
July	30.097	755 8/74	0.23	6,482	N W, N E	1.05	—	6.3	—
August	30.067	637 14/75	0.26	6,882	N W, N E	1.47	—	6.3	—
September	29.996	617 11/72	0.29	7,108	N W, S W	2.25	—	6.1	—
October	29.965	899 5/66	0.29	7,377	S W, N W	3.27	—	6.0	—
November	29.952	734 13/66	0.29	7,083	S W, S E	4.50	—	5.8	—
December	29.896	655 1/75	0.30	7,503	S W, S E	5.70	—	5.5	—
Year { Totals ...	—	—	—	—	—	38.38	—	—	—
Year { Averages ...	30.014	—	0.26	6,730	S W, N W	—	—	5.9	—
Year { Extremes ...	—	899 5/10/66	—	—	—	—	—	—	—

TEMPERATURE.

Month.	Mean Temperature. Mean Max.	Mean Min.	Mean	Extreme Shade Temperature. Highest.	Lowest.	Greatest Range.	Extreme Temperature. Highest in Sun.	Lowest on Grass.	Sea water mn. 3 ft. below surface
No. of yrs. over which observation extends	57	57	57	57	57	57	53	52	—
January	78.3	56.7	67.5	111.2 14/62	42.0 28/85	69.2	178.5 14/62	30.2 28/85	—
February	77.8	56.8	67.3	109.5 7/01	40.3 9/65	69.2	167.5 15/70	30.9 6/91	—
March	74.9	54.6	64.7	105.5 2/93	37.1 17/84	68.4	164.5 1/68	28.9 *	—
April	68.4	50.6	59.5	94.0 6/65	34.8 24/88	59.2	152.0 8/61	25.0 23/97	—
May	61.5	46.6	54.1	83.7 7/05	31.3 26/95	52.4	142.6 2/59	23.2 21/97	—
June	56.8	43.9	50.3	72.2 1/07	28.0 11/66	44.2	129.0 11/61	20.4 17/95	—
July	55.4	41.5	48.4	68.4 24/78	27.0 21/69	41.4	125.8 27/80	20.5 12/03	—
August	58.8	43.3	51.0	77.0 20/85	28.3 11/63	48.7	137.4 29/69	21.3 11/02	—
September	62.5	45.4	54.0	82.3 30/07	31.1 16/08	51.2	142.1 20/67	24.7 13/07	—
October	66.9	48.1	57.5	96.1 30/85	32.1 3/71	64.0	154.3 28/68	25.9 3/71	—
November	71.5	51.1	61.3	105.7 27/94	36.5 2/96	69.2	159.6 29/65	24.6 2/96	—
December	75.3	53.7	64.5	110.7 15/76	40.0 4/70	70.7	170.3 20/69	33.2 10/4	—
Year { Averages ...	67.3	49.4	58.3	—	—	—	—	—	—
Year { Extremes ...	—	—	—	111.2 14/1/62	27.0 21/7/69	84.2	178.5 14/1/62	20.4 17/6/95	—

* 17/1884 and 20/1897.

HUMIDITY, RAINFALL, AND DEW.

Month.	Humidity. Mean 9 a.m. 3 p.m.	Highest Mean.	Lowest Mean.	Rainfall. Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.	Least Monthly.	Greatest in One Day.	Dew. Mean Amount of Dew.	Mean No. days Dew
No. of yrs. over which observation extends	55	55	55	57	56	56	56	53	—	—
January	64	73	52	1.85	7	5.68 1904	0.04 1878	2.97 9/97	—	—
February	65	75	53	1.74	7	6.24 1904	0.03 1870	2.14 7/04	—	—
March	67	78	59	2.18	9	7.50 1911	0.18 1859	3.05 15/78	—	—
April	72	83	62	2.32	11	6.71 1901	0.33 1908	2.28 22/01	—	—
May	78	86	64	2.15	12	4.31 1862	0.45 1901	1.85 7/91	—	—
June	80	88	73	2.11	14	4.51 1859	0.73 1877	1.74 21/04	—	—
July	80	88	73	1.86	13	7.02 1891	0.57 1902	2.71 12/91	—	—
August	75	81	65	1.81	14	3.59 1909	0.48 1903	1.87 17/81	—	—
September	72	81	61	2.35	14	5.87 1870	0.52 1907	2.62 12/80	—	—
October	70	79	60	2.64	13	7.61 1869	0.57 1895	3.00 17/69	—	—
November	66	75	53	2.20	10	5.05 1881	0.25 1895	2.57 16/76	—	—
December	64	75	49	2.30	9	7.18 1863	0.11 1904	2.62 28/07	—	—
Year { Totals ...	—	—	—	25.51	138	—	—	—	—	—
Year { Averages ...	71	—	—	—	—	—	—	—	—	—
Year { Extremes ...	—	88	49	—	—	7.61 20/10/69	0.03 1/2/70	3.05 15/3/78	—	—

— signifies no record kept.

CLIMATOLOGICAL DATA FOR HOBART, TASMANIA.

LAT. 42° 53′ S., LONG. 147° 20′ E. HEIGHT ABOVE M.S.L. 160 FT.

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

Month.	Bar. corrected to 32° F. Mn. Sea Level and Gravity from 9 a.m. and 3 p.m. readings.	Wind.				Mean Amount of Evaporation.	No. of Days Lightning.	Mean Amount of Clouds.	No. of Clear Days.
		Greatest Number of Miles in one day.	Mean Hourly Pressure. (lbs.)	Total Miles.	Prevailing Direction.				
No. of yrs. over which observation extends	28	—	—	—	5	3	5	50	—
January	29.832	—	—	—	S E	5.74	0.6	5.9	—
February	29.918	—	—	—	S E & N	4.18	1.2	5.9	—
March	29.941	—	—	—	N & S E	2.88	1.0	6.1	—
April	29.945	—	—	—	N to N W	1.99	1.0	5.9	—
May	29.992	—	—	—	N to N W	1.21	0.2	5.9	—
June	29.955	—	—	—	N to N W	0.64	1.2	6.0	—
July	29.929	—	—	—	N to N W	0.87	0.4	5.7	—
August	29.931	—	—	—	N to N W	1.24	1.4	5.8	—
September	29.839	—	—	—	N to N W	1.73	1.2	6.7	—
October	29.832	—	—	—	N	2.80	1.0	6.2	—
November	29.799	—	—	—	N & S E	4.18	1.0	6.2	—
December	29.803	—	—	—	N W & S E	4.86	2.2	5.9	—
Year Totals	—	—	—	—	—	32.42	12.4	—	—
Year Averages	29.893	—	—	—	N	—	—	5.9	—
Year Extremes	—	—	—	—	—	—	—	—	—

TEMPERATURE.

Month.	Mean Temperature.			Extreme Shade Temperature.				Greatest Range.	Extreme Temperature.				Sea water mn. 3 ft. below surface
	Mean Max.	Mean Min.	Mean	Highest.		Lowest.			Highest in Sun.		Lowest on Grass.		
No. of yrs. over which observation extends	42	42	42	66		66		66	17		41		—
January	71.7	53.0	62.4	105.0	1/00	40.3	2/06	64.7	160.0	†	30.6	19/97	—
February	71.6	53.1	62.4	104.4	12/99	39.0	20/87	65.4	165.0	24/98	28.3	1887	—
March	68.2	50.7	59.5	98.8	5/46	36.0	31/05	62.8	150.0	3/05	27.5	30/02	—
April	62.7	47.4	55.1	90.0	2/56	30.0	25/56	60.0	142.0	1893	25.0	1886	—
May	57.3	43.5	50.4	77.5	1/41	29.2	20/02	46.3	122.0	1889	20.0	19/02	—
June	52.6	40.9	46.8	75.0	7/74	28.0	22/79	47.0	122.0	12/94	21.0	6/87	—
July	51.6	38.9	45.3	72.0	22/77	27.0	1866	45.0	118.7	19/96	18.7	16/86	—
August	54.8	40.7	47.7	82.0	1862	30.0	10/73	55.0	129.0	1887	20.1	7/09	—
September	58.6	42.9	50.8	80.0	9/72	30.0	12/41	50.0	138.0	23/93	22.7	1886	—
October	62.7	45.2	53.9	91.5	28/45	32.0	12/89	59.5	156.0	9/93	23.8	‡	—
November	66.7	48.3	57.5	98.0	20/88	37.0	*	61.0	154.0	19/92	26.0	1/08	—
December	69.7	51.0	60.3	105.2	30/97	38.0	3/06	67.2	156.0	18/05	27.2	1886	—
Year Averages	62.3	46.3	54.3	—		—		—	—		—		—
Year Extremes	—	—	—	105.2	30/12/97	27.0	1866	78.2	165.0	24/2/98	18.7	16/7/86	—

* 24/84, 13/87, 11/85, and 7/00. † 5/86 and 13/05. ‡ 1886 and 1899.

HUMIDITY, RAINFALL, AND DEW.

Month.	Humidity.			Rainfall.						Dew.	
	Mean 9 a.m.	Highest Mean.	Lowest Mean.	Mean Monthly.	Mean No. of Days Rain.	Greatest Monthly.		Least Monthly.		Greatest in One Day.		Mean Amount of Dew.	Mean No. days Dew
No. of yrs. over which observation extends	33	33	33	70	54	70		70		61		—	—
January	62	75	51	1.80	10	5.91	1893	0.03	1841	2.59	30/05	—	—
February	64	76	51	1.45	9	9.15	1854	0.07	1847	4.50*	25/54	—	—
March	68	76	59	1.65	10	7.60	1854	0.02	1843	2.06	14/11	—	—
April	75	85	60	1.80	11	6.50	1909	0.07	1904	5.02	20/09	—	—
May	80	90	68	1.91	14	6.37	1905	0.10	1843	3.22	14/58	—	—
June	83	94	75	2.22	15	8.15	1889	0.22	1852	4.11	14/89	—	—
July	83	97	74	2.10	15	5.98	1849	0.30	1850	2.00	18/78	—	—
August	80	92	68	1.83	14	10.16	1858	0.23	1854	4.35	12/58	—	—
September	74	87	61	2.14	15	7.14	1844	0.39	1847	3.50	29/84	—	—
October	67	75	58	2.24	16	6.67	1906	0.26	1850	2.58	4/06	—	—
November	62	74	50	2.50	14	8.94	1849	0.16	1868	3.70	30/85	—	—
December	59	73	51	1.93	12	9.00	1875	0.11	1842	2.27	27/07	—	—
Year Totals	—	—	—	23.57	155	—		—		—		—	—
Year Averages	72	—	—	—	—	—		—		—		—	—
Year Extremes	—	97	50	—	—	10.16	8/1858	0.02	3/1843	5.02	20/4/09	—	—

— Signifies no record kept. * 4.50, 25/54; 4.18, 26.54.