SECTION III.

PHYSIOGRAPHY.

§ 1. General Description of Australia.

1. **Geographical Position.**—The Australian Commonwealth includes Australia proper lying in the Southern Hemisphere, an island continent, and Tasmania, 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.	Northern Territory.	Western Australia.	Total.
	Sq. miles.	Sq. miles.	Sq. miles.	Sq. miles.
Within Tropical Zone	359,000	426,320	364,000	1,149,320
Within Temperate Zone	311,500	97,300	611,920	1,020,720
Ratio of Tropical part to whole State ...	0.535	0.814	0.373	0.530
Ratio of Temperate part to whole State ...	0.465	0.186	0.627	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 9.

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 about 25 times as large as any one of the following, viz., the United Kingdom, Hungary, Norway, 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," p. 787, are respectively 113° 5′ E., 153° 16′ E., 10° 39′ S., and 39° 11½′ S., but these figures are obviously defective.

2. Its correct value for 1910.0 is 23° 27′ 3″.58, 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 (1.29775) 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.
	Sq. miles.		
Continents—			
Europe	3,860,269	0.77	1.29775
Asia	16,970,491	0.18	5.70517
Africa	10,423,869	0.29	3.50432
North and Central America and West Indies ...	8,554,490	0.35	2.87586
South America	7,343,561	0.41	2.46877
Australasia and Polynesia	3,459,618	0.86	1.16306
Total, exclusive of Arctic and Antarctic Conts.	50,612,298	0.06	17.01497
Europe—			
Russia (inclusive of Poland, Ciscaucasia & Finland)	2,122,527	1.40	0.71355
Austria-Hungary (incl. of Bosnia & Herzegovina)	261,035	11.39	0.08776
Germany	208,780	14.25	0.07011
France	207,054	14.37	0.06969
Spain	194,770	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)	55,348	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	3,860,269	0.77	1.29775
Asia—			
Russia (inclusive of Transcausia, 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	1,097,821	2.71	0.36906
Independent Arabia	966,700	3.08	0.32499
Turkey (including Samos)	693,790	4.29	0.23324
Feudatory Indian States	675,267	4.41	0.22701
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
Afghanistan	250,000	11.90	0.08405
Siam	195,000	15.25	0.06555
Japan (inclusive of Formosa, Pescadores, and Southern Sakhalin)	174,919	17.01	0.05880
Philippine Islands (inclusive of Sulu Archipelago)	127,853	23.27	0.04298
Laos	98,000	30.35	0.03295
Korea	86,000	34.59	0.02891
British Borneo and Sarawak	83,106	35.79	0.02794
Bokhara	83,000	35.83	0.02790
Omán	82,000	36.27	0.02757
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	26,380	112.74	0.00887
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.	7,330	406.50	0.00246
Cyprus	3,584	833.33	0.00120
Brunei	3,000	991.53	0.00101
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	390	7692.31	0.00013
Wei-hai-wei	285	10623.50	0.00009
Bahrein Islands	250	11898.32	0.00008
Kiauchau	200	14872.91	0.00007
French India (Pondicherry, etc.)	196	15176.43	0.00007
Labuan	30	99152.70	0.00001
Italian Concession, Tientsin	18	165254.50	0.00001
Macao, etc.	4	743643.25	...
Total, Asia	16,970,491	0.18	5.70517
Africa—			
Turkey (inclusive of Egypt and Soudan) ...	1,748,900	1.70	0.58796
French Sahara	1,544,000	1.93	0.51907
Congo Independent State	909,654	3.27	0.30582
French Congo	669,000	4.46	0.22491
Angola	484,800	6.14	0.16298
Rhodesia	439,575	6.77	0.14778
German East Africa	384,000	7.74	0.12909
Algeria	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
Cape Colony	276,995	10.74	0.09312
Bechuanaland Protectorate	275,000	10.82	0.09245
Northern Nigeria Protectorate	256,400	11.60	0.08620
Madagascar and adjacent Islands	228,000	13.05	0.07665
Morocco	219,000	13.58	0.07362
Abyssinia	200,000	14.87	0.06724
British East Africa Protectorate	200,000	14.87	0.06724
Kamerun	191,130	15.56	0.06425
Ivory Coast	130,000	22.87	0.04370
Italian Somaliland	129,700	22.93	0.04360

Country.	Area.	Australian Commonw'lth in comparison with—	In comparison with Australian C'wealth.
AFRICA (continued)—	Sq. miles		
Gold Coast Protectorate	119,260	24.94	0.04009
Transvaal	116,962	25.43	0.03932
Uganda Protectorate	117,681	25.27	0.03956
French Guinea	95,000	31.31	0.03194
Southern Nigeria and Protectorate	77,260	38.51	0.02597
Senegambia and Niger	70,000	42.49	0.02353
Rio de Oro, etc.	70,000	42.49	0.02353
British Somaliland	68,000	43.74	0.02286
Dahomey	65,000	45.77	0.02185
Orange River Colony	50,392	59.03	0.01694
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
Natal	35,371	84.10	0.01189
Togoland	33,700	88.26	0.01133
Sierra Leone and Protectorate	30,000	99.11	0.01009
Portuguese Guinea	13,940	213.22	0.00469
Basutoland	10,293	289.02	0.00346
Rio Muni, etc.	9,800	303.95	0.00329
French Somali Coast, etc.	5,790	513.74	0.00194
Gambia Protectorate	3,615	819.67	0.00121
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	835	3562.37	0.00028
Fernando Po, etc.	780	3846.15	0.00026
Comoro Islands	620	4761.91	0.00021
French Senegal	438	6791.28	0.00015
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	35	84988.03	0.00001
Spanish North and West Africa	13	228813.92	...
Total, Africa	10,423,869	0.29	3.50432
North and Central America and West Indies—			
Canada	3,745,574	0.79	1.25919
United States	2,974,159	1.00	0.99985
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	44,000	67.61	0.01479
Costa Rica	18,400	161.55	0.00619
San Domingo	18,045	164.74	0.00607
Haiti	10,204	291.55	0.00343
British Honduras	7,562	393.70	0.00254
Salvador	7,225	411.52	0.00243
Bahamas	5,450	545.79	0.00183
Jamaica	4,200	708.23	0.00141
Porto Rico	3,435	869.57	0.00115
Trinidad and Tobago	1,868	1592.39	0.00063
Leeward Islands	701	4243.33	0.00024
Guadeloupe	688	4323.52	0.00023
Windward Islands	672	4426.46	0.00023

Country.	Area.	Australian Commonwe'lth in comparison with—	In comparison with Australian C'wealth.
	Sq. miles.		
N. & C. AMERICA & W. INDIES (continued)—			
Curaçao and Dependencies	403	7381.09	0.00014
Martinique	381	7807.30	0.00013
Turks and Caicos Islands	169	17601.07	0.00006
Danish West Indies	138	21554.94	0.00005
St. Pierre and Miquelon	93	31984.74	0.00003
Bermudas	20	148729.05	0.00001
Total, N. and C. America and W. Indies ...	8,554,490	0.35	2.87586
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	605,400	4.91	0.20352
Colombia	435,100	6.84	0.14627
Venezuela	393,870	7.55	0.13241
Chile	292,580	10.17	0.09836
Ecuador	116,000	25.64	0.03900
Paraguay	98,000	30.35	0.03295
British Guiana	90,277	32.95	0.03035
Uruguay	72,210	41.19	0.02428
Dutch Guiana	46,060	64.60	0.01548
Panamá	31,500	94.43	0.01059
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	7,343,561	0.41	2.46877
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
German New Guinea	70,000	42.50	0.02353
Bismarck Archipelago	20,000	148.73	0.00672
British Solomon Islands	12,000	247.88	0.00403
New Caledonia and Dependencies	8,548	347.99	0.00287
Fiji	7,435	400.08	0.00250
Hawaii	6,449	460.83	0.00217
New Hebrides	5,000	594.92	0.00168
German Solomon Islands	4,200	709.22	0.00141
French Establishments in Oceania	1,520	1960.78	0.00051
German Samoa	1,000	2974.58	0.00034
Caroline and Pelew Islands	560	5311.75	0.00019
Tonga	390	7627.13	0.00013
Marianne Islands	250	11898.32	0.00008
Guam	200	14872.91	0.00007
Gilbert Islands	166	17919.16	0.00006
Marshall Islands	150	19830.54	0.00005
Samoa (U.S.A. part)	79	37652.92	0.00003
Norfolk Island	10	297458.10	...
Total, Australasia and Polynesia ...	3,459,618	0.86	1.16306
British Empire...	11,467,294	0.26	3.85510

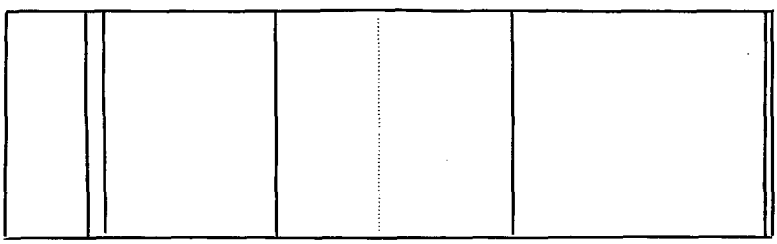
3 **Relative Size of Political Subdivisions.**—As already stated, Australia is divided into six States, the areas of which, in relation to one another and to the total of Australia, are shewn in the following table :—

RELATIVE SIZES OF STATES AND COMMONWEALTH.

State.	Area.	Ratio which the Area of each State bears to that of other States and Commonwealth.						
		N.S.W.	Victoria.	Q'land.	S.A. (Total.)	W. Aust.	Tas.	C'wlth.
	Sq. miles.							
N.S.W. ...	310,372	1.000	3.532	0.463	0.344	0.518	11.840	0.104
Victoria ...	87,884	0.283	1.000	0.131	0.097	0.090	3.352	0.030
Queensland	670,500	2.160	7.629	1.000	0.742	0.687	25.577	0.225
S.A. (total)	903,690	2.912	10.283	1.348	1.000	0.926	34.472	0.304
S.A. (proper)	(380,070)	(1.225)	(4.325)	(0.567)	(0.421)	(0.389)	(14.498)	(0.128)
N. Terr. ...	(523,620)	(1.687)	(5.958)	(0.781)	(0.579)	(0.537)	(19.974)	(0.176)
W. Aust. ...	975,920	3.144	11.105	1.455	1.080	1.000	37.228	0.328
Tasmania ...	26,215	0.085	0.298	0.039	0.029	0.027	1.000	0.009
Total ...	2,974,581	9.584	33.847	4.436	3.292	3.048	113.469	1.000

Thus, looking at the top line, New South Wales is seen to be over three-and-a-half times as large as Victoria (3.532) and less than one-half the size of Queensland (0.463); 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 (9.584), 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.



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...	700	443	South Australia ...	1,540	247
Victoria	680	129	Western Australia	4,350	224
Queensland ...	3,000	223	Continent[1] ...	11,310	261
Northern Territory	1,040	503	Tasmania ...	900	29

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

5. **Geographical Features of Australia.**—As indicated in the preceding issues of this Year Book, it is intended each year to give fairly complete information concerning some special geographical element. Thus No. 1 Year Book, pp. 60-68, contains an enumeration of Coastal features, No. 2, pp. 66-77, deals with Hydrology, and No. 3, pp. 59-72, with Orography. In the present issue the Lakes of Australia constitute the special feature treated. An orographical or vertical relief map of Australia will be found on page 85.

2. Lakes of the Commonwealth.

1. **General.**—The following section contains the latest available official information concerning the lakes of each State. It will, of course, be understood that both the area and depth of the mainland lakes are subject to considerable variation according to the season.

2. **New South Wales.**—(i.) *Introductory.* The accompanying information regarding the lakes of New South Wales has been compiled from particulars supplied by the Lands Department of that State. The name, position, area, etc., of each of the lakes will be found in the tabular statement on pp. 62 *et seq.*

Where the space in columns has not been filled in, the information is not obtainable.

The letters in the column headed "Geological character" refer to classification adopted in (iv.) following. An explanation of the numbers and signs attached to the names of the lakes in the table will be found in the accompanying notes.

(ii.) *Flora of the Lakes of New South Wales.* As a botanical survey of the Lakes of New South Wales has never been undertaken information relating to their characteristic flora is necessarily incomplete.

With regard to the coastal or estuarine lakes containing either salt or brackish water, the low-lying margins are commonly the habitat of a "Swamp Oak," *Casuarina glauca*, the trees often extending for a short distance into the water.

Lake George—In 1898 the water was high in the shallow lake, but rapidly receding, and wherever the water receded a dense green carpet appeared of a creeping Chenopodium, determined by Professor Murr as *Chenopodium glaucum L. var. ambiguum*, a small salt-bush, and considered valuable as a fodder for sheep.

Lake Oxley lies at the foot of Mount Oxley, and is filled only perhaps once in 10 years. In 1883 it was a smooth plain of white clay, with the sharply defined shore of a lake. A special feature of this plain was the "Cane-grass," *Glyceria ramigera*, F.v.M.,

a bamboo-like grass often 10 feet high, which studded the plain. The "Lignum Scrub," *Muehlenbeckia cunninghami*, (F.v.M.), grows in many of these clay-pans, but is absent at Lake Oxley.

The *Tuggerah Lakes*, consisting of three lakes known as the Entrance, Middle, and Upper lakes, are brackish and slightly affected by the ocean tides. They are very shallow and are much overgrown with *Ruppia* or *Zostera*. The principal shore plants are :—

Banksia integrifolia, B. serrata, Eupomatia laurina, Alsophia cooperi, Scolopia brownii, Euroschinus falcatus, Casuarina glauca, Duboisia myoporoides, Cryptocarya glaucescens, Rhodomyrtus psidioides, Endiandra sieberi, Monotoca elliptica, Wilkia macrophylla, Trochocarpa laurina, Phyllanthus ferdinandi, Alphitonia excelsa, Cryptocarya australis, Rhus rhodanthema, Panax elegans, Diploglottis cunninghami, Livistona australis, Festuca littoralis, Spinifex hirsuta, Zoysia pungens, Mesembryanthemum æquilaterale, Convolvulus erubescens, Senecio australis.

Lake Cargelligo is a large area of impounded water, which, after a copious rainfall, possesses considerable depth, and floods over large areas of low land at its entrance. In times of drought it becomes very shallow, and dries up sufficiently to allow sedges and annual grasses to grow, when it becomes a favourite spot for cattle to graze over while other places are destitute of fodder. The following plants are characteristic of the vegetation in and around the lake :—

Vallisneria spiralis grows profusely when the water is present, and attracts numbers of wild ducks and swans: when the water recedes cattle feed upon this vegetation to advantage.

Potamogeton obtusifolius, Damasonium australe, Philydrum lanuginosum, Lemna trisulca. These are the principal water plants.

The plants on the extreme edge of the lake are :—*Heliotropium curassavicum, Atriplex semibaccata, Cyperus vaginatus, C. eragrostic, Lepturus cylindricus.*

On the drier ground such plants as *Eucalyptus bicolor* and *E. rostrata* are the predominant trees; *E. melliodora, E. melanophloia, E. hemiphloia var. albens,* and *E. conica* are fairly plentiful.

Principal wattles—*Acacia pendula, A. salicina, A. decurrens, A. harpophylla,* and *A. juniperina.*

Fodder plants, etc.—*Mesembryanthemum australe, Zygophyllum fruticulosum, Clianthus dampieri, Swainsona galegifolia, Glyceria ramigera, Danthonia penicellata, Themeda forskalli, &c.*

Introduced plants (weeds)—*Lantana camara, Rosa rubiginosa, Ricinus communis, Datura stramonium, D. tatula, Solanum sodomœum.*

Hordeum murinum is the principal grass for fodder purposes.

(iii.) *Fauna of the Lakes of New South Wales.* The Lakes of the State may be grouped zoologically into

(*a*) The Coast Lagoons such as Lake Illawarra,
(*b*) The Lakes of the Western Plains of which Lake Menindie is an example, and
(*c*) The Lakes of the Kosciusko Highlands, of which the Blue Lake is the most famous.

Lake George and *Lake Bathurst* are anomalous lakes which run dry at intervals, and cannot therefore contain a permanent fauna.

The coast lakes which regularly or temporarily communicate with the sea, have the usual estuarine fauna, not to be distinguished from that of the mouths of the Clarence, Hunter, and Hawkesbury Rivers. All are more or less brackish and shallow. Their mud or sandy floors are carpeted with such vegetation as *Poseidonia* and *Zostera.* A large proportion of the fish supply of the State comes from the lakes. Large quantities of mullet (*Mugilidæ*), whiting (*Sillaginidæ*), bream (*Chrysophrys australis*), blackfish

(*Girella tricuspidata*), flathead (*Platycephalidæ*), and flatfish (*Pleuronectidæ*), are caught annually and forwarded to the Sydney markets. The Crustacea are represented by the prawn (*Metapenaeus macleayi*), the swimming crab (*Portunus pelagicus*), the mangrove crab (*Scylla servata*), and the mud crabs (*Hellocius cordiformis, Sesarma crythrodactyla,* and *Chasmagnathus lævis*

Characteristic molluscs are the cockle (*Arca trapezia*), the oyster (*Ostrea mordax*), the whelk (*Pyrazus perculeus*), with species of *Tapes, Taparium, Tellina,* and *Salinator*

The fauna of the western lakes and billabongs still awaits a thorough examination. In favorable seasons they are thronged with numerous animals, which in dry weather either die, seek refuge in the mud, or remain in a state of suspended animation. Among the higher forms of life may be noted the fresh water catfishes (*Copidoglanis tandanus*, and *C. obscurus*), golden perch (*Plectroplites ambiguus*), macquarie perch (*Macquaria australasica*), and the murray cod (*Oligorus macquariensis*). The bay-bream (*Dorosoma erebi*) occurs in plenty in the lagoons.

Several kinds of frogs (*Limnodynastes dorsalis, Chiroleptes platycephalus and Notaden bennetti*) chorus in rainy weather. The Crustacea are represented by forms of *Apus, Estheria, Limnadopsis, Astacopsis,* and perhaps *Potamon*. Pond snails and mussels (*Melania, Vivipara, Isadora and Unio*) are common mollusca.

Far more peculiar and of greater scientific interest are the Kosciusko Lakes, viz., the Blue Lake, Lake Albina, Lake Cootapatamba, the Club Lake and Hedley Tarn. These are situated at an elevation of over 6000 feet and are all enclosed by moraine dams left by vanished glaciers. Their fauna is related in the first instance to that of Tasmania, and in a wider sense to that of New Zealand, South America, and Antarctica: as a rule the species are restricted to the Australian Alps. This fauna has not yet been exhaustively investigated, but various expeditions from the Australian Museum have partly explored it. The fish that swims the highest in Australia is *Galaxias findlayi:* a rare and remarkable crustacean is *Phreatoicus australis. Annelids* (worms) discovered in the Blue Lake are *Tubifex davidi, Branchiura pleuretheca,* and *Phreodrilaides notabilis.*

(iv.) *Geological Character and Probable Origin of the Lakes of New South Wales.* From the lists it will be seen that there are a great number of so-called lakes in the Southern and New England Tablelands with regard to which no information is available. Probably many of these occupy basins due to geological disturbance, but as it would be misleading to class them under that heading they are placed under the general heading of "Lakes occupying local depressions in areas of drainage" (*c*). The only lakes with regard to which any definite information as to the geological cause is available, are Guyra Lagoon (Crater Lake), Lake George (a lake occupying a faulted area), and Lake Bathurst.

The classification adopted is admittedly unsatisfactory, but it appears to be the best under the circumstances:—

(A) Coastal Lakes or Lagoons, caused by the formation of bars and banks of river silt and the joint action of tides and prevailing winds.

(B) Shallow Lakes found along the courses of rivers, more especially the Murray and Darling Systems, and formed by the building up of flood barriers and plains.

(C) Lakes of the Western and Central areas formed by the filling of local depressions. In flood there is direct connection between (*b*) and (*c*) of the Paroo River System and Ana-branches.

(D) Lakes of the Kosciusko Highlands, due to the formation of barriers of moraine material.

(E) Special Lakes due to distinct geological causes:—Lake George, Lake Bathurst, and Guyra Lagoon.

LAKES OF NEW SOUTH WALES.

Name of Lake.	Position.	Approx. Area.	Greatest Length.		Greatest Breadth.		Maximum Depth.	Average Depth.	Geological Character.
			Miles.	Chains.	Miles.	Chains.			
		Acres.					ft	ft	
Agnes (1)	Wakool, 6 miles S. of Moulamein (*f*)	*e*	—	48	—	32	6	*a*	C
Albert	Wynyard, 4 miles S. of Wagga (*f*)	240	1	—	—	45	10	6	C
Albina (2)	Selwyn, 1¾ miles N. of Mount Kosciusko (*f*)	36	—	50	—	10	—	—	D
Altiboulka (3) *D* ...	Yantara, 27 miles N.E. of Yantara Lake (*f*)	1,000	2	—	—	60	10	5	C
Amphitheatre (4) *D*	Livingstone, 22 miles E. of Menindee (*f*) ...	1,920	2	—	1	40	6	*h*	C
Arable (5)	Beresford, 9 miles S.W. of Cooma (*f*) ...	45	—	37	—	16	—	—	B*
Avon (6)	Wellesley, 14 miles S.W of Nimmitabel (*f*)	360	—	93	—	75	—	—	B*
Baleka (7)	Tandora, 18 miles N.E. of Menindee (*f*) ...	640	1	40	1	—	10	*g*	B*
Bally Castle or Taylors (8)	Barrona, 20 miles S.W. of Goombalie (*s*) ...	1,000	2	—	—	60	4	2	C
Bancanya (9) ...	Mootwingee, 30 mls. S.W. of Koonenberry (*f*)	10,240	8	—	3	—	20	*g*	C
Baragoot (10) ...	Dampier, 2½ miles S. of Bermaguee (*s*) ...	100	—	80	—	30	—	—	A
Barnato (11) ...	Booroondarra, 50 miles W. of Cobar (*f*) ...	320	—	60	—	40	6	3	C
Barney (7) *d* ...	Rankin, 49 miles N.E. of Wilcannia (*f*) ...	Dry	—	—	—	—	—	—	C
Barney (12) *d* ...	Manara, 23½ miles S.W. of Ivanhoe (*f*) ...	Dry	—	—	—	—	—	—	C
Bathurst or Bundong (6)	Argyle, 1 mile E. of Tarago (*b*)...	3,600	3	35	2	35	10	4	E
Beard's or Black (6)	Wellesley, 16 miles S.W. of Nimmitabel (*f*)	500	1	35	—	57	—	—	B*
Big Sand Hill (13) ...	Wakool, 19 miles S.E. of Balranald (*f*) ...	320	1	—	—	64	6	*a*	C
Bijiji (7)	Tandora, 14 miles N.E. of Menindee (*f*) ...	1,600	3	—	1	—	10	*i*	B
Bingery (Goodbo) ...	Windeyer, 44½ miles W. of Pooncaira ...	—	—	—	—	—	—	—	B
Bintullia (14) ...	Menindee, 26¼ miles S.W. of Menindee (*f*) ...	—	—	—	—	—	—	—	B
Birroul (10) ...	Dampier, 5⅝ miles N. of Moorooma (*s*) ...	500	1	20	1	8	—	—	A
Black (6)	Wellesley, 2 miles S.E. of Bibbenluke (*f*))	140	—	53	—	40	—	—	B*
Blue (15)	Wallace, 4½ miles N.E. of Mt. Kosciusko (*f*...	60	—	30	—	20	—	—	D
Blue	Tara, 51 miles W. of Pooncaira	—	—	—	—	—	—	—	B
Bondi (10)	Auckland, 3 miles S. of Tathra (*s*)	67	—	49	—	23	—	—	C*
Boocathan (16) ...	Cairn, 7 miles N.W. of Oxley (*f*)	960	2	—	1	—	7	*g*	C
Boolaboolka (17) *D* ...	Livingstone, 44½ miles S.E. of Menindee (*f*)	7,680	9	—	2	—	20	*g*	C
Booloombayt (18) ...	Gloucester, adjoins the Broadwater on N. (*s*)	3,500	7	—	1	40	—	—	A
Boolpoora (7) ...	Killara, 54 miles S.W. of Louth (*f*)	Dry	—	—	—	—	—	—	C
Boundary (15) ...	Wallace, 3 miles E. of Dalgety (*f*)	3	—	9	—	4	—	—	C*
Brennan (17) *D* ...	Livingstone, 52½ miles E. of Menindee (*f*) ...	960	2	40	1	40	20	*g*	C
Brickkiln (17) *D* ...	Livingstone, 55 miles N.E. of Menindee (*f*)	320	2	—	—	40	—	*g*	C
Brisbane Water (19)	Northumberl'nd, adjoins Broken Bay on N. (*s*)	7,000	6	40	3	—	20	16	A
Brommeys (17) ...	Livingstone, 55 miles E. of Menindee (*f*) ...	1,920	3	—	2	—	—	*g*	C
Buckley (6)... ...	Wallace, 6½ miles N.E. of Dalgety (*f*)... ...	145	—	54	—	50	—	—	C*
Bulbararing (20) ...	Northumberland, 4½ mls. N.E. of Gosford (*b*)	200	1	20	—	60	—	—	A
Bullanamang (5) ...	Beresford, 3¼ miles S.W. of Bredbo (*f*) ...	28	—	22	—	17	—	—	B*
Bullea	Evelyn, 28 miles S. of Milparinka	—	—	—	—	—	—	—	C
Bullenbalong (21) ...	Wallace, 8 miles N.W. of Berridale (*f*) ...	50	—	33	—	20	—	—	B*
Bullogal (22) ...	Waljeers, 27 miles S.W. of Booligal (*f*) ...	640	1	40	1	—	7	*h*	C
Bunda (23)	Young, 44½ miles W. of Wilcannia (*b*) ...	Dry	—	—	—	—	—	—	C
Bungarry (24) [Duckshott]	Waljeers, 14 miles N.E. of Oxley (*f*)	160	—	60	—	40	12	*g*	C
Bunumburt (25) ...	Cairn, 9½ miles W. of Oxley (*f*)	100	—	40	—	30	8	4	C
Burkanoko (26) ...	Barrona, 36 miles W. of Ford's Bridge (*s*) ...	160	2	—	—	10	12	6	C
Burns (27) [3 lakes] ..	Wellesley, 12 miles S.W. of Nimmitabel (*f*)	40 25 15	— — —	40 38 27	— — —	17 10 7	)))	—	B*
Burra Burra (5) ...	Georgiana, 5 miles N.W. of Taralga (*f*) ...	290	1	—	—	78	—	—	B*
Burrill	St. Vincent, 2 miles S.W. of Ulladulla (*s*) ...	1,120	2	40	1	60	7	3	A
Cargelligo (28) ...	Dowling, at Cargelligo (*f*)	2,500	3	40	1	56	15	9	B
Carroll's (5) ...	Wallace, 4 miles E. of Berridale (*f*)	20	—	19	—	14	—	—	B*
Cathie (29)... ...	Macquarie, 9 miles S. from Pt. Macquarie (*b*)	635	1	60	1	—	—	—	A
Cawndilla (30) ...	Menindee, 9 miles S.W. of Menindee (*f*) ...	23,040	8	—	6	—	12	*g*	C
Chesney (11) ...	Barrona, 28 miles W. of Goombalie	160	—	40	—	40	4	2	C
Club (15)	Wallace, 3⅛ mls. N.E. from summit of Mount Kosciusko (*f*)	10	—	12	—	9	—	—	D
Cobaki Broadwater (31)	Rous, 3 miles N.W. from Chinderah (*s*) ...	450	1	40	—	50	3	1¼	A
Cobham (32) ...	Yantara and Evelyn, 30 miles S.E. of Milparinka (*f*)...	1,280	2	40	1	40	12	8	C
Cockrone (19) ...	Northumberland, 5 miles E. of Gosford (*b*)	120	1	—	—	20	—	—	A
Cohens (10) ...	Auckland, 1⅝ miles W. of Tathra (*s*)... ...	96	—	66	—	58	—	—	A
Coila (10)	Dampier, 6¾ miles S. of Moruya (*s*)	1,850	3	5	1	25	—	—	A
Collins	Menindee and Windeyer, 29 miles S.W. of Menindee	—	—	—	—	—	—	—	C
Comayjong (33) ...	Waljeers, 1 mile N. of Oxley (*f*)	200	—	60	—	40	—	—	C
Condoulpe (34) ...	Wakool, 12 miles S.E. of Balranald (*f*) ...	*e*	2	16	1	16	10	*a*	C
Conjola (10) ...	St. Vincent 6 miles N. of Ulladulla (*s*) ...	1,600	3	60	2	60	7	3	A
Coolamatong (6) ...	Wallace, 2¼ miles W. of Berridale (*f*)... ...	84	—	46	—	35	—	—	E
Coomaroop (35) ...	Wakool, ½ mile E. of Tooleybuc (*f*)	800	1	40	1	—	—	*a*	B
Coombah (36) *D* ...	Windeyer, 62 miles N.W. of Pooncaira (*f*) ...	2,560	5	—	1	—	8	*g*	B
Coonbilly (37) ...	Irrara, 17 miles N.W. of Ford's Bridge (*s*)...	500	2	—	—	30	12	6	C

LAKES OF NEW SOUTH WALES.—(Continued).

Name of Lake.	Position.	Approx. Area.	Greatest Length.		Greatest Breadth.		Maximum Depth.	Average Depth.	Geological Character.
			Miles.	Chains.	Miles.	Chains.			
		Acres.					ft	ft	
Coopers (5)... ...	Wellesley, 7¼ miles W. of Nimmitabel (*f*) ...	70	—	30	—	28	—	—	B*
Coorpooka (38) *d* ...	Killara, 36 miles N.E. of White Cliffs (*f*) ...	Dry	—	—	—	—	—	—	B
Cootralantra (39) ...	Wallace, 7½ miles N.E. of Nimmitabel (*f*) ...	350	1	5	—	74	—	—	B*
Coralo (10)	Auckland, ½ mile N. of Eden (*s*)	180	1	3	—	48	—	—	A
Corega (40)... ...	Young, 44 miles W. of Wilcannia (*f*)... ...	640	1	40	1	—	8	*g*	C
Corunna (10) ...	Dampier, 3 miles S. of Noorooma (*s*) ...	480	2	5	1	30	—	—	A
Cowal (41)	Gipps, 6½ miles N.E. of Marsden (*f*)	15,000	16	60	5	60	10	4⅝	C*
Cudgen (42) ...	Rous, 8 miles E. from Murwillumbah (*s*) ...	320	1	20	—	50	10	4⅝	A
Cudmirrah (136) ...	St. Vincent, 11 miles S.W. of Huskisson)*s*)	960	1	50	1	20	5	2	A
Cullamulcha (43) ...	Delalah, 59 miles N.W. of Wanaaring (*b*) ...	1,200	3	—	—	50	6	3	C
Cullewie (7) *c* ...	Killara, 24 miles N.E. of Wilcannia (*f*) ...	Dry	—	—	—	—	—	—	B
Cullivel (44) ...	Urana, 12 miles N.E. of Urana (*f*)	3,240	3	40	2	10	—	—	C
Cuttagee (10) ...	Dampier, 4 miles S. of Bermaguee (*s*) ...	298	1	50	—	60	—	—	A
Dead Horse (45) *b* ...	Livingstone, 36 miles N.E. Menindee (*f*) ...	100	—	40	—	40	6	*g*	C
Deadmans (45) *b* ...	Livingstone, 39 miles N.E. of Menindee (*f*)	—	—	—	—	—	6	*g*	C
Deewhy Lagoon(136)	Cumberland, 4 miles N. of Manly (*s*)... ...	80	—	40	—	28	5	2	A
Denman (46) ...	Irrara, 20 miles N.W. of Ford's Bridge (*f*)...	1,000	2	—	—	60	12	6	C
Dennys (17) *b* ...	Livingstone, 54 miles E. of Menindee (*f*) ...	2,560	3	—	2	—	6	*g*	C
Dick (47) *d*	Young, 25 miles N. of Wilcannia (*b*)	3,200	2	40	2	40	6	6	B
Dry (48)	Barrona, 14 miles N.W. of Goombalie (*f*) ...	600	2	—	—	40	4	2	C
,, (49) *b*	Tara, 47 miles W. of Pooncaira (*f*)	80	—	40	—	30	4	*k*	B
,, (50) *b*	Livingstone, 49 miles E. of Menindee (*f*) ...	1,920	2	40	2	—	7	*k*	C
,, (51) *d*	Mossgiel, 9 miles S. of Ivanhoe (*f*) ...	Dry	—	—	—	—	—	—	C
,, (22)	Waljeers, 24½ miles S.W. of Booligal (*f*) ...	640	1	—	1	—	6	*k*	C
,, (52)	Wakool, 22½ miles N.E. of Moulamein (*f*) ...	*e*	1	40	1	24	6	*a*	C
Dudal Comer (53) ...	Hume, ½ mile S.W. of Henty (*f*)	2,100	3	70	2	50	—	—	C
Dukes (5)	Wellesleys. 13 miles S.W. of Nimmitabel (*f*)	50	—	30	—	25	—	—	B
Dundomallee (54) *c*...	Cairn, 13½ miles N. of Balranald (*f*)	1,280	2	40	1	40	10	*l*	C
Durras Water (10) ...	St. Vincent, 6½ miles N.E. of Bateman (*s*) ...	1,200	3	40	2	—	—	—	A
Eckerboon (23) ...	Tandora, 46 miles W. of Wilcannia (*b*) ...	160	—	40	—	40	*k*	—	C
Emu (7)	Menindee, 5 miles S.W. of Menindee (*f*) ...	3,200	3	0	2	0	8	*g*	B
Eucalyptus (50) *b* ...	Livingstone, 54 miles E. of Menindee (*f*) ...	1,920	3	40	1	40	15	*g*	C
Eucumbene (55) ...	Wallace, 4 miles S. of Adaminaby (*f*) ...	32	—	35	—	15	—	—	B*
Eukobilli	Menindee, 9 miles S.W. of Menindee (*f*) ...	320	1	0	—	40	8	*g*	C*
Fort Grey Basin or Pinaroo (56) ...	Poole, 52 miles N.W. of Tibooburra (*b*) ...	1,000	2	—	—	60	12	6	C
Ganaway (57) *c* ...	Caira, 24 miles S.W. of Oxley (*f*)	—	—	—	—	—	—	—	C
Geer (58)	Wakool, 9 miles E. of Tooleybuc (*f*)... ...	*e*	—	64	—	40	5	*a*	B C
Genoe (59)	Wakool, 10 miles E of Tooleybuc (*f*)... ...	*e*	1	16	—	72	6	*a*	B C
George or Werriwa	Murray 3½ miles N. of Bungendore (*b*) ...	38,500	15	60	6	6	*g*	—	E F
Gilman	Mitchell, 6½ miles S.W. of Kingston (*f*) ...	206	1	35	—	20	8	4	C
Golgol (60)... ...	Wentworth, 2 miles N. of Gol-Gol (*f*) ...	640	1	40	1	—	10	*g*	C
Goonimur (61) ...	Wakool, 9½ miles S.E. of Tooleybuc (*f*) ...	*e*	—	56	—	24	5	*a*	B C
Goran (62)	*Pottinger, 20 miles S. of Gunnedah (f)* ...	10,000	5	—	3	—	3	1½	C
Green (63)	Wellesley, 2 miles S.E. of Bibbenluke (*f*) ...	30	—	27	—	16	—	—	B
,, (64)	Evelyn, 26 miles S.E. of Milparinka (*f*) ...	—	—	—	—	—	—	—	C
Guises	Wallace, 10 miles W. of Dalgety (*f*)	3	—	8	—	4	—	—	B
Gum Lake (50) ...	Livingstone, 51 miles S.E. of Menindee (*f*)	1,600	2	40	1	40	8	*g*	C
Gunbar (65) ...	Nicholson, 13 miles N.W. of Gunbar (*b*) ...	*e*	—	56	—	40	6	⅛	C
Gunnagia	Mossgiel, 24 miles N.W. of Hillston (*f*) ...	320	1	—	—	40	4	3	C
Gunyulka (66) *d* ...	Werunda, 12 miles S.E. of Wilcannia (*f*) ...	Dry	—	—	—	—	—	—	C
Harvey's (67) ...	Wakool, 16½ miles S.E. of Balranald (*f*) ...	*e*	—	40	—	40	6	*a*	C
Haystack (50) b ...	*Livingstone, 55½ miles N.E. of Menindee (f)*	60	1	20	1	—	8	*g*	C
Hedley Tarn (68) ...	Wallace, 4⅛ miles N.E. of summit of Mount Kosciusko (*f*)	10	—	17	—	8	—	—	D
Hiawatha	Clarence, 20 miles S.E. of Grafton (*f*) ...	860	2	25	—	70	—	15	A
Hogans (69) ...	Livingstone, 45 miles N.E. of Menindee (*f*)	160	1	—	—	40	—	—	C
Hugundara (5) ...	Wallace, 19 miles W. of Cooma (*f*)	15	—	18	—	11	—	—	B
Illawarra (136) ...	Camden, 4 miles S. of Wollongong (*s*) ...	8,500	4	70	3	30	13	5	A
Innes or Burrawan (70)	Macquarie, 2½ miles S. of Pt. Macquarie (*f*)	6,150	4	60	3	—	—	—	A
Island (55)	Wallace, 12 miles W. of Cooma (*f*)	12	—	13	—	10	—	—	B
Island (55)	Wallace, 20 miles S.W. of Nimmitabel (*f*)...	45	—	28	—	25	—	—	B
Jillimatong (6) ...	Wallace, 13½ miles W. of Dalgety (*f*) ...	70	—	41	—	30	—	—	B
Kangaroo (71) ...	Menindee, 20 miles S.W. of Menindee (*f*) ...	1,280	1	40	2	—	—	—	C
Kerkeri (72) ...	Wakool, 15 miles N.W. of Moulamein (*f*) ...	200	—	56	—	32	8	—	C
Kiah (55)	Wallace, 3 miles N.W. of Berridale (*f*) ...	50	—	31	—	20	—	—	B
Killen (73)	Delalah, 50 miles N.W. of Wanaaring (*b*) ...	300	—	60	—	50	6	3	C
Killmacoola (39) ...	Beresford, 11 miles W. of Cooma (*f*)... ...	100	—	54	—	25	—	—	B
Kopago (74) ...	Young, 22½ miles N. of Wilcannia (*f*)... ...	640	1	40	1	—	10	6	B
Lake, unnamed ,, (salt) ,, (75)	Barrona. 38 miles W. of Goombalie (*s*) ...	—	—	—	—	—	—	—	C
	Barrona, 37 miles S.W. of Goombalie (*s*) ...	—	—	—	—	—	—	—	C
	Barrona, 44 miles S.W. of Goombalie (*s*) ...	—	—	—	—	—	—	—	C
	Landsborough, 48 mls.S.W. of Goombalie (*s*)	—	—	—	—	—	—	—	C
Loriwa (76)... ...	Wakool, 19½ miles S.E. of Balranald (*f*) ...	*e*	—	64	—	48	5	*a*	C

LAKES OF NEW SOUTH WALES.—(Continued).

Name of Lake.	Position.	Approx. Area.	Greatest Length.		Greatest Breadth.		Maximum Depth.	Average Depth.	Geological Character.
			Miles.	Chains.	Miles.	Chains.			
		Acres.					ft	ft	
Lignam (22) ...	Caira, 5 miles S.W. of Oxley (*f*)	120	—	60	—	20	3	1	C
Llangothlin ...	Clarke, 7 mls. E. of Ben Lomond Rly. Stn. (*f*)	980	2	—	1	50	6	3	B*
Little (49) *b* ...	Windeyer, 40 miles N.W. of Pooncaira (*f*) ...	640	1	20	1	—	3	*k*	B
Little Sand Hill (77)	Wakool, 20 miles S.E. of Balranald (*f*) ...	*e*	—	40	—	32	4	*a*	B*
Little Amphitheatre (4) *b*	Livingstone, 20 miles E. of Menindee (*f*) ...	160	—	40	—	40	—	—	C
Little Llangothlin (78)	Clarke, 8 mls. E. of Ben Lomond Rly. Stn. (*f*)	285	—	65	—	65	4	2	B*
Little Mother of Ducks	Sandon, 4 miles S. of Guyra (*f*)	80	—	50	—	27	6	2	B*
Long (50) *b*... ...	Livingstone, 5½ miles N.E. of Menindee (*f*)	1,120	2	40	—	60	—	—	C
,, (49) *b*... ...	Windeyer, 35 miles S.W. of Menindee (*f*) ...	320	1	20	—	40	—	—	B
Loorica (79) ...	Caira, 17 miles E. of Balranald (*f*)	*e*	1	40	—	64	6	*a*	C
Lyle (80)	Wakool, 9 miles N.W. of Moulamein (*f*) ...	150	—	48	—	32	6	*a*	C
Macommon (81) ...	Caira, 16 miles N. of Balranald (*f*)	—	—	—	—	—	—	—	C
Macquarie (19) ...	Northumberland, 8½ miles S.W. from Newcastle (*s*)	29,000	15	—	5	—	40	25	A
Maffra (82)	Wellesley, 8½ miles S.E. of Dalgety (*f*) ...	70	—	63	—	30	—	—	B
Malta (7)	Tandora, 25 miles N.E. of Menindee (*f*) ...	640	1	40	1	20	8	*k*	B
Manies (83)... ...	Dowling, ½ mile S. of Cargelligo (*f*)	1.000	2	40	1	—	8	5	B
Marias (84)... ...	Dowling, 3 miles S. of Cargelligo (*f*)	600	2	—	1	—	8	5	B
May or Cootapatamba (2)	Selwyn, ¼ mile S.E. of Mount Kosciusko (*f*)	15	—	23	—	9	—	—	D
Menindee (7) ...	Menindee & Tandora, 2 miles W. of Menindee (*f*)	38,400	9	—	8	—	20	*k*	B
Mere (8)	Barrona, 26 miles S.W. of Goombalie (*f*) ...	200	—	50	—	40	6	3	C
Merrimbula (10) ...	Auckland, 1 mile N. of Panbula (*s*)	1,350	2	57	1	60	—	—	A
Merrimageel (85) ...	Waljeers, 14½ miles W. of Booligal (*s*) ...	320	1	—	—	40	4	2	B
Merwin (86) ...	Wakool, 17 miles S.E. of Balranald (*f*) ...	*e*	—	64	—	64	6	*a*	C
Mickwilly (87) *d* ...	Rankin, 66 miles N.E. of Wilcannia (*f*) ...	Dry	—	—	—	—	—	—	C
Milkengay (49) *b* ...	Wentworth, 42 miles S W. of Pooncaira (*f*)	6,400	4	40	3	—	15	—	B
Mindona (49) *b* ...	Windeyer, 31 miles N.W. of Pooncaira (*f*) ...	15,360	7	—	4	—	7	—	B
Minnie Water ...	Clarence, 19½ miles S.E. of Grafton (*f*) ...	128	—	48	—	40	—	15	A
Miroo (136)	St. Vincent, 2 miles S.E. of Termeil (*s*) ...	400	1	30	—	70	6	2	A
Moon Moon (88) ...	Nicholson, 14½ miles N.E. of Booligal (*f*) ...	*e*	1	—	—	56	—	—	B C
Mooratchie (89) ...	Yungnulgra, 36 miles N.E. of Wilcannia (*f*)	320	1	—	—	40	8	6	B
Moornanyah (90) *c* ...	Manara, 20 miles S.W. of Ivanhoe (*f*) ...	Dry	—	—	—	—	—	—	C
Moseys (50) *b* ...	Livingstone, 54½ miles E. of Menindee (*f*) ...	640	1	20	1	20	8	—	C
Mother of Ducks (91)	Hardinge, at Guyra (*f*)	1140	2	—	1	30	8	2	E C
Muckee (92) *c* ...	Caira, 14 miles N.W. of Balranald	—	—	—	—	—	—	—	C
Muddah (6) ...	Beresford, 10 miles N.W. of Cooma (*f*) ...	50	—	38	—	21	—	—	B*
Muetta (93)... ...	Beresford, 12 miles S. of Cooma (*f*)	20	—	30	—	15	—	—	B*
Mullawooka Basin (94)	Fitzgerald, 58 miles S.W. of Wanaaring (*f*)	1600	3	40	1	—	10	5	B
Mummuga (95) ...	Dampier, 3½ miles N. of Noorooma (*s*) ...	460	1	35	1	6	—	—	A
Mungundi (74) ...	Fitzgerald, 30 miles S. of Wanaaring (*f*) ...	100	—	40	—	27	10	8	B
Munmorah (20) ...	Northumberland, adj'ng Tuggerah Lakes (*s*)	2000	3	—	2	—	—	—	A
Myall (18)	Gloucester, 18 mls. N.E. from Pt. Stephens (*s*)	15300	9	20	5	40	—	—	A
Nangudga (10) ...	Dampier, 1¾ miles S. of Noorooma (*s*) ...	200	—	65	—	25	—	—	A
Nargal or Nuttal (10)	Dampier, 3½ miles S. of Noorooma (*f*) ...	45	—	45	—	32	—	—	A
Naroolpilly (7) *d* ...	Rankin, 62 miles N.E. of Wilcannia (*f*) ...	Dry	—	—	—	—	—	—	C
Narrabeen (136) ...	Cumberland, 6½ N. of Manly (*s*)	600	1	40	1	20	7	3	A
Narran or Terewah	Finch & Narran, 52 mls. N.E. of Brewarina (*f*)	35,000	19	—	6	—	15	7	C
Nearia (49) *b* ...	Windeyer, 39 miles W. of Pooncaira (*f*) ...	7,560	4	—	3	—	4	*k*	B
Noeyanga (60) ...	Taila, 9⅝ miles E. of Euston (*f*)	1,560	2	40	—	40	10	3	B
Nettlegoe (7) ...	Menindee, 25 miles S.W. of Menindee (*f*) ...	7.040	4	40	3	—	8	*k*	B
New (97)	Menindee, 20 miles S.W. of Menindee (*f*) ...	160	—	60	—	40	10	4	B
Nialia (49) *b* ...	Tara, 48½ miles W. of Pooncaira (*f*)	7,680	5	40	3	—	4	*k*	B
Nichebulka (98) ...	Barrona, 38 miles W. of Ford's Bridge (*s*) ...	300	1	—	—	40	6	3	C
Nine Mile (47) *d* ...	Yungnulgra & Young, 31 miles N.E. of Wilcannia (*f*)	Dry	—	—	—	—	—	—	B
Nitchie (49) *b* ...	Windeyer & Wentworth, 43 miles W. of Pooncaira (*f*)	1,280	2	—	1	20	4	*k*	B
North (50) *b* ...	Livingstone, 38 miles E. of Menindee (*f*) ...	3,200	3	—	2	60	6	*k*	C
Nucha (Nutchie) (99)	Mootwingee, 37 miles N.E. of Toorawangee (*f*)	1,280	2	—	1	20	6	*k*	C
Oil Tree Lagoon (100)	Hume, 14 miles N.W. of Howlong (*f*)... ...	1,460	1	70	1	50	—	—	—
Oleopoloko (74) *d* ...	Fitzgerald & Killara, 34 miles N.E. of White Cliffs (*f*)	Dry	—	—	—	—	—	—	B
Oxley	Cowper, 20 miles S.E. of Bourke	—	—	—	—	—	—	—	—
Oulilla (7) *d* ...	Killara, 24 miles N.E. of Wilcannia (*f*) ...	Dry	—	—	—	—	—	—	B
Paika (57) *c* ...	Caira, 15 miles N. of Balranald	—	—	—	—	—	—	—	C
Pamamaroo (7) ...	Tandora, 5 miles N.E. of Menindee (*f*) ...	16,640	6	—	5	—	10	—	B
Panbula (10) ...	Auckland, 5½ miles N. of Eden (*s*)	700	1	40	1	—	—	—	A
Paradise (49) *b* ...	Windeyer, 30 miles S.W. of Menindee (*f*) ...	480	1	—	—	60	6	—	B
Patagorah (14) ...	Windeyer, 51 miles N.W. of Pooncaira ...	—	—	—	—	—	—	—	B

LAKES OF NEW SOUTH WALES.—(Continued).

Name of Lake.	Position.	Approx. Area.	Greatest Length.		Greatest Breadth.		Maximum Depth.	Average Depth.	Geological Character.
			Miles.	Chains.	Miles.	Chains.			
		Acres.					ft	ft	
Patterson (101) ...	Evelyn, 30 miles S.E. of Milparinka (*f*) ...	1,920	2	20	1	40	6	—	C
Peri (Peery) (74) *d* ...	Killara, 28 miles E. of White Cliffs (*f*) ...	Dry	—	—	—	—	—	—	B
Pine	Tara, 50½ miles W. of Pooncaira	—	—	—	—	—	—	—	B
Pinpira	Evelyn, 34 miles W. of Koonenberry (*f*) ...	160	—	40	—	40	1	*k*	C
Pitarpunga (102) *c* ...	Caira, 15 miles N. of Balranald (*f*)	—	—	—	—	—	—	—	C
Pollioillaluka (103) *d*	Werunda, 13 miles S.E. of Wilcannia (*f*) ...	Dry	—	—	—	—	—	—	C
Poomah (104) ...	Wakool, 9½ miles S.E. of Tooleybuc (*f*) ...	450	1	—	—	72	16	*a*	B C
Poon Boon (105) ...	Wakool, 10½ miles S.E. of Tooleybuc (*f*) ...	1,000	1	48	1	16	7	*a*	B C
Poopelloe (7) *d* ...	Werunda, 33 miles W. of Wilcannia (*f*) ...	Dry	—	—	—	—	—	—	C
Popilta (49) *b* ...	Windeyer and Tara, 49½ miles N.W. of Pooncaira (*f*)	22,400	10	—	5	—	10	*k*	B
Popio (49) *b* ...	Windeyer, 42 miles N.W. of Pooncaira (*f*)...	15,360	8	—	4	—	10	,,	B
Pysant (50) *b* ...	Livingstone, 42 miles N.E. of Menindee (*f*)	320	1	—	—	60	2	,,	C
Qucens (106) ...	Macquarie, 1 mile N. of Camden Haven (*s*)	2,560	3	10	2	—	—	—	A
Racecourse (107) ...	Sandon, 2 miles S. of Uralla (*f*)	46	—	25	—	21	15	3	B*
Ratcatchers (50) *b* ...	Livingstone, 44½ miles E. of Menindee (*f*) ...	6,400	6	—	3	—	15	*k*	C
Redbank (49) *b* ...	Windeyer, 36 miles S.W. of Menindee (*f*) ...	320	1	—	—	40	4	*k*	B
Rodmans	Yungnulgra, 30 miles N. of Wilcannia ...	—	—	—	—	—	—	—	B
Roping Pole (100) ...	Mitchell, 3 miles W. of Uranquintry (*f*) ...	480	1	40	—	55	—	—	C
Round Swamp (108)	White, 16 miles W. of Narrabri (*f*)	90	—	32	—	32	10	3½	C
Ryans (22)	Waljeers, 19 miles N.E. of Oxley (*f*)	160	—	40	—	40	4	*k*	C
Salisbury	Sandon, 2½ miles S. of Uralla (*f*)	130	—	55	—	30	8	8	B*
Salt (19)	Wallace, 6½ miles E. of Berridale (*f*)... ...	35	—	26	—	22	—	—	B
Sayers (50) *b* ...	Livingstone, 53 miles S.E. of Menindee (*f*)	2,560	4	40	1	—	15	*k*	C
Shadbolts (14) ...	Windeyer, 37 miles S.W. of Menindee (*f*) ...	40	—	20	—	20	—	—	B
Silistria (14) ...	Tandora, 39 miles E. of Willyama (Broken Hill)	—	—	—	—	—	—	—	C
Smith (20)	Gloucester, 26⅔ mls.N.E.from Pt.Stephens(*s*)	2,500	3	40	1	60	—	—	A
Speculation (7) ...	Menindee and Tandora, 10½ miles W.of Menindee (*f*)	640	2	—	1	—	20	*k*	C
Spring Creek (110) ...	Wallace, 4½ miles N.E. of Berridale (*f*) ...	12	—	15	—	9	—	—	B
St. George's Basin (136)	St. Vincent, 4 miles S. of Huskisson (*s*) ...	9,200	6	40	3	50	40	23	A
Tacubah	Rankin, 52 miles N.E. of Wilcannia ...	—	—	—	—	—	—	—	C
Taila (60)	Taila, 8 miles N.E. of Euston (*f*)	—	—	—	—	—	20	5	B
Tala (111)	Caira, 9 miles N.E. of Balranald (*f*)	1,400	2	—	1	40	8	*a*	C
Talbetts (112) ...	Wakool, 18 miles S. of Balranald	—	1	8	—	72	—	—	C
Talpile (113) ...	Wakool, 9 miles S.E. of Tooleybuc (*f*) ...	180	—	56	—	40	8	*a*	C B
Tandon (7)... ...	Menindee, 22 miles S.W. of Menindee (*f*) ...	38,400	12	—	7	—	6	*k*	C
Tandure (7) ...	Tandora, 10 miles N.E. of Menindee (*f*) ...	5,120	4	—	2	—	10	—	B
Tarragal (114) ...	Northumberland, 5 miles E. of Gosford (*f*)	80	—	60	—	20	—	—	A
Tarrawong (115) ...	Waljeers, 38 miles W. of Booligal (*f*) ...	320	1	—	—	60	5	*k*	C
Teare (116)... ...	Wakool, 11 miles N.W. of Moulamein (*f*) ...	*e*	—	32	—	32	—	*a*	B
Termeil (136) ...	St. Vincent, 2½ miles E. of Termeil (*s*) ...	120	—	65	—	30	6	2	A
Terranora Broadwater (31... ...	Rous, 2½ miles W. of Chinderah (*s*)	1,100	1	60	1	60	6	1½	A
Teryaweynya (50) *b*	Livingstone, 54½ miles E. of Menindee (*f*) ...	5,120	4	40	2	40	15	*k*	C
The Back (10) ...	Auckland at Merrimbula (*s*)	100	—	60	—	35	—	—	A
The Boundary (15) ...	Wellesley, 9 miles W. of Nimmitabel (*f*) ...	60	—	30	—	19	—	—	B*
The Broadwater (18)	Gloucester, 11 miles N.E. of Pt. Stephens (*s*)	5,500	5	—	2	40	—	—	A
The Broadwater (117)	Clarence, joins Clarence River between Ashby and Lawrence (*s*)	4,700	3	70	2	67	—	6	A
The Little (10) ...	Dampier, 8¾ miles S. of Noorooma (*s*) ...	30	—	30	—	20	—	—	A
The Dry (22) ...	Waljeers, 6 miles N.E. of Oxley (*f*)	320	1	—	—	60	5	*k*	B
The Long (110) ...	Wallace, 11 miles E. of Adaminaby (*f*) ...	45	—	40	—	17	—	—	B*
The Salt Lake (118)	Yantara, 30 miles S.E. of Milparinka (*s*) ...	16,000	6	—	5	—	—	—	C
The Tinkers (110) ...	Beresford, 8¾ miles S.W. of Cooma (*f*) ...	7	—	12	—	9	—	—	B*
Thubergal (119) ...	Beresford, 6½ miles S.E. of Cooma (*f*) ...	30	—	25	—	15	—	—	B*
Tilba Tilba (10) ...	Dampier, 6½ miles S. of Noorooma (*s*) ...	300	1	45	—	48	—	—	A
Tilpilly (66) *d* ...	Rankin, 56 miles N.E. of Wilcannia (*f*) ...	Dry	—	—	—	—	—	—	C
Tommys (110) ...	Wallace, 5 miles W. of Lake Jellimatong (*f*)	9	—	14	—	8	—	—	D*
Toms	Waljeers, 18 miles N.W. of Booligal (*f*) ...	40	—	20	—	20	4	2	B
Tom Thumb Lagoon (136)	Camden, ½ mile S. of Wollongong (*s*) ...	450	1	20	—	60	5	2	A
Toubouree (136) ...	St. Vincent, 5 miles S.W. of Ulladulla (*s*) ...	350	2	30	—	60	4	1½	A
Tongo (74) *d* ...	Fitzgerald, 56 miles S.W. of Wanaaring (*f*)	Dry	—	—	—	—	—	—	B
Tooim (120) ...	Wakool, 6 miles S.E. of Puah (*f*)	850	2	—	—	72	16	—	C
Travellers (121) ...	Windeyer, 36 miles S.W. of Menindee (*f*) ...	480	1	—	—	60	—	—	B
Tuggerah (114) ...	Northumberland, 8¾ miles N. of Gosford (*s*)	18,500	10	40	4	—	—	—	A
Tuross (10)... ...	Dampier, 9 miles S. of Moruya Heads (*s*) ...	1,400	1	70	1	35	—	—	A
Twin (49) *b*... ...	Tara, 56½ miles N.W. of Pooncaira (*f*) ...	40	—	20	—	20	6	*k*	C
Tyson (14)	Kilfera, 28 miles N.W. of Oxley	—	—	—	—	—	—	—	C
Ulenia (122) ...	Yantara, 28 miles S.E. of Milparinka (*f*) ...	2,000 *l*	3	—	1	40	12	6	C
Unnamed (119) ...	Wellesley, 3 mls. S.W. of Beards or Black (*f*)	65	—	42	—	22	—	—	B*
Upper Sand Hill (13)	Wakool, 19 miles S.E. of Balranald (*f*) ...	270	1	—	—	32	6	*a*	—

LAKES OF NEW SOUTH WALES.—(Continued).

Name of Lake.	Position.	Approx. Area.	Greatest Length.		Greatest Breadth.		Maximum Depth.	Average Depth.	Geological Character.
			Miles.	Chains.	Miles.	Chains.			
		Acres.					ft	ft	
Urana (123) ...	Urana, 2 miles W. of Urana (*f*)	14,500	8	25	4	35	—	—	C
Urangong (124) ...	Urana, 7 miles S.E. of Urana (*f*)	1,160	1	55	1	30	—	—	C
Victoria (50) *b* ...	Livingstone, 56½ miles E. of Menindee (*f*)...	3,840	4	—	2	—	15	*k*	B
Victoria (60) ...	Tara, 34 miles W. of Wentworth (*f*)	25,600	9	—	6	—	30	5	B
Wagonga or Bullengella (10)... ...	Dampier, 1½ miles S.E. of Noorooma (*f*) ...	30	—	37	—	15	—	—	A
Waldaira (125)	Caira, 12½ miles W. of Balranald (*f*) ...	640	1	20	1	20	15	5	C
Waljeers (22) ...	Waljeers, 17½ miles S.W. of Booligal (*f*) ...	1,280	2	—	1	20	6	4	B
Wallace (14) ...	Livingstone, 28 miles E. of Menindee (*f*) ...	—	—	—	—	—	—	—	C
Wallaga (10) ...	Dampier, 2 miles N. of Bermaguee (*s*) ...	1,800	2	40	2	10	—	—	A
Wallagoot (10) ...	Auckland, 4½ miles S. of Tathra (*s*)	950	2	10	1	10	—	—	A
Wallis (19)	Gloucester, on coast near Cape Hawke (*s*)	19,000	11	—	5	40	—	—	A
Wamberal (114) ...	Northumberland, 5½ miles E. of Gosford (*b*)	140	1	—	—	20	—	—	A
Wapengo (10) ...	Dampier, 8 miles N of Tathra (*s*)	870	2	50	—	77	—	—	B*
Wannah (126) ...	Wakool, 5 miles N. of Tooleybuc (*f*) ...	*e*	—	40	—	16	5	*a*	—
Warracoocarie (7) *d*	Rankin, 49 miles N.E. of Wilcannia (*f*) ...	Dry	—	—	—	—	—	—	C
Warrawenia (49) *b* ...	Tara, 49 miles W. of Pooncaira (*f*)	...	—	—	—	—	—	—	B
Washpool (119) ...	Wellesley, 17 miles S.W. of Nimmitabel (*f*)	15	—	22	—	9	—	—	B*
Watchie (127) ...	Fitzgerald, 34 miles S.W. of Wanaaring (*f*)	320	1	40	—	40	12	10	B
Waterloo (50) *b* ...	Livingstone, 54 miles E. of Menindee (*f*) ...	2,880	3	40	1	60	15	*k*	C
Watson Taylor (20)	Macquarie, 2 mls. S. from Camden Haven (*s*)	3,000	3	40	2	—	—	—	A
White Water (50) *b*	Livingstone, 51 miles E. of Menindee (*f*) ...	160	1	—	—	40	10	,,	C
Willeroo (128) ...	Barrona, 8 miles S.W. of Goombalie (*f*) ...	300	1	—	—	40	8	¼	C
Windamingle (49) *b*	Tara, 43½ miles W. of Pooncaira (*f*)	1,920	3	0	1	40	6	*k*	B
Windaunka (129) ...	Mootwingee, 28 miles W. of Koonenberry (*f*)	640	1	—	1	...	6	1½	C
Wollare (130) ...	Wakool, 9½ miles S.E. of Tooleybuc (*f*) ...	380	1	—	—	64	10	*a*	B C
Wooromur (131) ...	Wakool, 12 miles E. of Tooleybuc (*f*) ...	750	1	32	1	—	5	*a*	B C
Wollumboola (136)...	St. Vincent, 1¼ miles N. of Jervis Bay (*s*) ...	1,500	2	20	1	55	4	1½	A
Wongallarra (7) *d* ...	Werunda, 57 miles W. of Wilcannia (*f*) ...	11,520 *l*	7	—	4	—	—	—	C
Wooloweyah (117) ...	Clarence, 2 miles S. of Yamba (*s*)	6,400	5	55	2	70	—	5	A
Woytchugga (132) *d*	Young, 6 miles W. of Wilcannia (*f*)	1,280 *l*	2	—	1	40	—	—	B
Yandaroo (133)	Barrona, 8 miles S.W. of Goombalie (*f*) ...	240	1	—	—	30	6	3	C
Yanga (134) ...	Caira, 4 miles S.E. of Balranald (*f*)	3,000	3	16	2	—	18	*a*	B C
Yantara (122)	Yantara, 25 miles S.E. of Milparinka (*f*)	6,000	4	—	3	—	15	8	C
Yantla (132)	Windeyer, 26 miles N.W. of Pooncaira (*f*)...	2,880	3	—	2	—	10	*k*	B
Yarrie (103)	White, 11 miles S.E. of Wee Waa (*f*) ...	180	—	42	—	41	10	3½	C
Yeltow (49) *b* ...	Windeyer, 41½ miles W. of Pooncaira (*f*) ...	6,400	5	—	2	40	6	*k*	B
Yentabangee (74) *d*	Fitzgerald, 42 miles N.E. of White Cliffs (*f*)	Dry	—	—	—	—	—	—	B
York (136)	Wallace, 2 miles S. of Adaminaby (*f*) ...	36	—	23	—	21	—	—	B*

* Origin doubtful.

NOTES.

a After the first 10 chains from the shore all these lakes are practically flat bottomed, so that the average depth is very little less than the greatest depth.

b Lakes of the Ana Branch and Teryawynia Creek Systems. The lower lakes of the first-mentioned system, those situated on Avoca, Bunneringa and Lake Victoria Holdings, are controlled by a private trust constituted of the lessees of these holdings. Under this trust no water (the supply is overflow by way of connecting channels in times of flood from the Ana Branch) is allowed to enter these lakes until the water of the Ana Branch meets that of the Darling at or near their lower confluence, a very rare occurrence.

Similarly with the Teryawynia Creek System. A private trust, constituted of the lessees of Teryawynia, Albemarle, and Tolarno Holdings, controls the intake to these lakes. A large dam and regulator have been constructed on the Teryawynia Creek at its offtake from the Talyawalka Creek. The regulator is kept shut until the Talyawalka water meets that of the Darling at or near their lower confluence. It is questionable if it will ever be opened again. The lakes with water therein constantly receding are looked upon as death traps for stock, and again from a grazing point of view these lakes are considered more valuable in a dry state than if holding water. This system only fills at intervals of 20 years and the lessees have expressed the determination to keep the lakes permanently dry.

c Referring to the lakes on the Lower Murrumbidgee, a large number, notably Paika, Pinaru, Dundomalee, Pitarpunga, and Muckee, with, in the near future, Ganaway and Tori, are and will be kept dry by means of dams across their influent channels, the dry bed of these lakes being looked upon as more valuable for grazing purposes than as storage for water. Within the area of Paika Lake there is a very prolific irrigated area.

d None of the lakes marked thus is filled annually, and many of them are supplied only at long intervals after flood waters have receded. Probably not one retains over 8 feet of water and in numerous instances the depth is very much less.

e No water in ordinary seasons.

g Generally dry.

h Only retains water for short periods.

i Only has water after high flood.

k No average.

l Dry.

(1) Generally dry, fills from the Niemur River.

(2) Very deep, fed by snow springs; presumably old volcanic craters.

(3) Large clay pan filled from surrounding hills by drain from the Bulloo overflow when in flood. Water yellow, fresh when full, brackish when low, good for stock. Often dry.

(4) Probably fills from Talywalka Creek in very high floods.

(5) Alienated, often dry for years.

(6) Reserved, often dry for years.

(7) Only fills after heavy Darling floods.

(8) Large shallow clay pan filled from surrounding country, yellow, good stock water when full.

(9) Fills with drainage from surrounding hilly country.

(10) Coastal.

(11) Clay pan filled from surrounding hills; shallow, yellow water, fresh when full, good for stock. Not permanent.

(12) Filled only in wet seasons or high Willandra floods. Merely regarded as a plain.

(13) Generally contains water, local catchment, alienated to Pultaney Main (Part of Portion 18).

(14) Only looked upon as a plain.

(15) Reserved.

(16) Fills from Lachlan and Murrumbidgee in very high floods.

(17) Fills via Talywalka and Teryaweynia in times of high flood in Darling River.

(18) One of a chain of lakes, Myall, Boolambayt, and Broadwater, connected with Port Stephens by Myall River. Remarkable for its scenery, and abounding in fish.

(19) Popular health and pleasure resort, noted for its beauty and diversity of scenery, and abounding in fish. The entrance is deep enough to allow vessels of considerable tonnage to enter and ply upon its waters.

(20) Noted for its scenery and abounding with fish.

(21) Partly alienated, often dry for years.

(22) Fills from flood waters of Lachlan River.

(23) Not permanent; shallow, filled only in wet seasons.

(24) Fills through Ballogath by artificial channel in times of high flood.

(25) This lake is filled annually owing to an artificial channel and low banks.

(26) Fills from surrounding country, generally contains clear water which is brackish and fit for stock when full.

(27) Three shallow lagoons; alienated.

(28) Originally filled by overflow from the Lachlan River, later by the construction of a weir on the river and the improvement of the channel therefrom to the lake, and by the construction also of embankments, floodgates, etc., Lake Cargelligo is not a permanent sheet of water, and is filled in flood times and stored until the summer months when the Lachlan River ceases running. Water is then allowed to run out of the lake till there is an average depth of about 5 feet, when the floodgates are closed. Two-thirds of this surplus water is allowed to run down the Lachlan and one-third down Willandra Creek. The latter proceeding is effected by a weir (the Willanthry), about 40 miles from Cargelligo, on the Lachlan River. Fish and game abound in and on the lake, and it is an ideal sheet of water for skiff racing and shallow centre-board sailing. The Works Department propose to raise the embankments, etc., 3 feet, and so double the present capacity of the lake.

(29) The water of this lake is generally brackish. Its outlet to the Pacific becomes periodically choked up by a sandbank. During this time it is quite safe and practicable to ride or drive along the barrier of sand which effectually excludes all tides from the lake. Whilst this position lasts the water loses its salinity, but never becomes quite fresh. Should local rainfall be heavy, causing an unusual flow from back lands into the lake, the waters become sufficiently fresh to affect the life and quality of the oysters cultivated on the foreshores. A very heavy downfall locally is generally followed by an outburst through the sandy bar. More often than not the outburst is hastened by local residents using shovels to give the impounded water a start. After such outbursts the lake again becomes tidal and salt for a period, but gradually the silting up process sets in again. The lake is not navigable.

(30) Fills by natural channels and overflow from Menindie Lake in times of high flood.

(31) Terranora and Cobaki Broadwater form the western estuary of the Tweed River and cover an area affected by tides of about 3½ square miles and a watershed of 48 square miles. Terranora Broadwater has a maximum depth of 5 or 6 feet in places, but parts are dry at low water. The average depth at low water average spring tides would not exceed 12 or 18 inches.

Practically the whole of Cobaki Broadwater is dry at low tide except in the channel, where the greatest depth is about 3 feet and the average about 18 inches.

Recently the Public Works Department has had channels cut through Terranora Broadwater to a depth of 6 feet at low tide and 50 feet wide. A dredge is now at work cutting a channel 40 feet wide and 6 feet deep up Cobaki Broadwater, and this will probably be completed in about 18 months' time. The completed channels are navigable for droghers of about 50 or 60 tons, and allow of sugar cane being carried in punts to the mill.

(32) Filled in abnormal seasons by local creeks, will last two or three years. Sandstorms have choked the main channel, and its chief supply is now diverted.

(33) Sandstorms have so filled its feeding channel that its main source of supply is cut off.

(34) Generally dry; local catchment connected by natural channels with Lake Yanga, but a rise of about 7 feet near the centre of channel and corresponding fall further on prevents it from filling. Within W.R.2979 and Yanga, 18th Section Lease.

(35) Within W.R.2013, 44,075, and 44,076.

(36) Fills from overflow from Ana Branch in times of high floods. Questionable if water will ever again reach it.

(37) Local catchment, generally contains water, fit for stock when full and brackish.

(38) Fills by Paroo flood waters, will last 12 months.

(39) Partly alienated, partly reserved. Sometimes dry.

(40) Dry. Filled only in wet seasons from run off of surrounding high country. Not permanent, shallow.

(41) The area of the lake when full is about 40,000 acres, but the area under water is continually changing according to the season and annual rainfall. The average area submerged would probably not exceed 15,000 acres per annum, and taking the last 15 years only the area would be considerably less.

The lake was at one time timbered with gum trees in places, interspersed with "Coba" or "Cooba." These trees have been dead many years, and apparently were killed by the water, an indication that for many years previously the lake bed could not have remained under water for periods of any great length. There are similar green trees along the edge of the lake at the present time, and it is noted that they only stand in water for short periods with long intervals between. Brackish water can be obtained by boring into the lake bed, which consists of stiff clay, and is of considerable depth. The lake is not permanent, and affords good pasture over a large area in dry seasons. The bed of the lake is lower than the bank of the Lachlan River at Jemalong. The waters of the lake are replenished chiefly from the Lachlan River and the Bland Creek when in flood.

(42) This lake is slightly affected by tides when the mouth of Cudgen Creek is open, but it is more often blocked by sand, and at its best, this entrance is impossible for shipping.

(43) Yellow clay pan. Local catchment, fit for stock when full, brackish when low.

(44) Broad shallow clay pan, occasionally dry.

(45) Fills from overflow of Talyawalka Creek in times of high floods.

(46) Filled by Kerribree Creek in flood and also has local catchment. Generally contains good stock water, brackish when low.

(47) Filled by high Paroo flood, will last 9 months.

(48) Local catchment, thick brackish water when low, suitable for stock when full, cane grass swamp.

(49) One of the Ana Branch system of lakes, which only fills at wide intervals.

(50) One of the Teryawynia Creek System.

(51) Filled by Willandra flood waters.

(52) Generally dry, local catchment. Dry at present and covered with grass.

(53) Broad shallow lagoon periodically covered with water.

(54) Water is not allowed to reach this lake. A dam erected by Crown lessees keeps the flood water out.

(55) Alienated. Sometimes dry.

(56) Fills from the surrounding hills, generally contains water, good and fresh when full, brackish when low.

(57) Now kept dry by a dam across its feeding channel.

(58) Generally dry, fills from the Murray.

(59) Generally dry, fills from the Murray.

(60) Fills from flood waters of Murray.

(61) Generally dry, fills from the Murray, joins Lake Wollare.

(62) This is in reality a big swamp, which holds water only in wet seasons. During 4 years out of every 5 it is held under grazing leases, affording excellent pasturage.

(63) Not alienated. Often dry for years.

(64) Not permanent.

(65) Old clay pan, partially filled up with sand hummocks.

(66) Filled by Darling floods. Will last 6 months.

(67) Generally dry, fills from Lake Condoulpe.

(68) Reserved. Tourist Resort.

(69) Always dry.

(70) The deepest portion is surrounded to the extent of about half a mile by low swamp lands which gradually merge into the lake. Its water is, generally speaking, fresh; it has two outlets indirectly leading into the Pacific, one is Cathie Creek, a shallow, sluggish body of water connecting with the lake of that name. The other is through the lake swamp, thence by Kooloonbung Creek, which flows into Hastings River near Port Macquarie; this creek is a sluggish swampy body of fresh water for part of its course, but a dam erected many years ago in Port Macquarie has influenced its flow, and has excluded tidal waters. The lake is not used for navigation, but its depth is possibly sufficient to carry light draught vessels.

(71) Only gets a supply about once in 20 years. Fills from Darling River flood waters.

(72) Fairly permanent, local catchment.

(73) Local catchment, good stock water when full, often dry, shallow clay pan, brackish water when low.

(74) Filled with Paroo flood waters. Will last an ordinary season.

(75) Large salt clay pan filled about once every 30 years when Kerribree Creek overflows. Contains shallow water when full, evaporation very great.

(76) Generally dry, local catchment.

(77) Within alienated portions 61, 62, and 64.

(78) Generally dry except for small hole in south-east corner.
(79) Generally dry, local catchment, within Tara 18th Section Lease.
(80) Fair water supply, but frequently dry, local catchment, partly within alienated portion 77.
(81) Water not allowed to flow into it.
(82) Reserved, sometimes dry.
(83) A natural extension to Lake Cargelligo. Since the construction of dams on the latter it is now dry and is good grazing country. Partly within Sp. Ls. 07.7, 07.8, 07.9, 07.10.
(84) Partly within Sp. Ls. 08.6 and 08.7. A natural extension of Lake Cargelligo. It used to fill from the Lachlan overflow through that lake. Owing to the construction of dams on Lake Cargelligo it is now dry and is good grazing country providing excellent grass.
(85) Not permanent, only a plain filled by Lachlan flood waters.
(86) Generally dry, local catchment, within alienated portion 19.
(87) Filled in wet seasons only.
(88) Within South Thoronga 18th Section Lease.
(89) Filled by Bunker Creek, lasts an ordinary season.
(90) Filled only in high Lachlan floods brought down Willandra billabong.
(91) Of late years generally dry, fills quickly after rain and empties quickly.
(92) Only looked upon as a plain. Water kept out by a dam on Paika Creek.
(93) Partly reserved. Often dry for years.
(94) Filled with Paroo flood waters.
(95) Coastal, often dry.
(96) This lake is filled by the Narran River in flood and overflows into the Bokhara River. Evaporation very great, often dry.
(97) Fills from Stephen's Creek.
(98) Local catchment. Good brackish stock water when full, salt when low.
(99) Fills with local rainfall.
(100) Very shallow clay pan, land alienated and useless for storage area.
(101) Fills very rarely, is a debouchure of Mount Brown Creek.
(102) Fills from Packsaddle Creek at very wide intervals.
(103) Filled by Darling floods down Talywalka, will last 6 months.
(104) Permanent water, fills from the Murray. Poon Boon station is on the shore of this lake.
(105) Permanent water, fills from the Murray.
(106) The lake is tidal and salt. It has an outlet into Camden Haven Inlet, thence a short distance by that inlet to the Pacific. It is a clear sheet of water and its shores are readily approachable by solid land. It is fed from inland by Heron's Creek and Queen's Lake River, and is navigable and regularly used for punting timber by vessels drawing from 3 to 4 feet.
(107) In 1894 a regatta was held on this lagoon, but of late years the depth has gradually decreased. It has never been known to overflow.
(108) When full after heavy rain about 10 feet deep at most, sinks rapidly to a normal of about 5 feet greatest depth. Catchment small, and occasionally lake is dry. Surrounding country of a rather sandy character and thickly timbered. This lake has been a great resort of wild-fowl, but closer settlement is to some extent driving them away.
(109) Alienated, dry, this lake is fresh when full.
(110) Alienated, often dry.
(111) Permanent, fills from the Murrumbidgee River, fairly picturesque, within W.R. 3021. Reserve 44162 for preservation of game, set apart for preservation of birds and partly within Tara 18th Section Lease.
(112) Dry except for occasional rain water. No other water since 1870 floods.
(113) Permanent water, fills from the Murray, within W.R. 1960.
(114) Popular health and pleasure resort, noted for beauty and diversity of scenery; abounding with fish.
(115) Fills through Merrimageel Creek from Lachlan River.
(116) A swamp, generally dry within C. and W.R. 2591.
(117) Excellent breeding ground for fish.
(118) Filled by local creeks, will last 12 months. Through sandstorm diversions takes practically all the Worrominta Creek water.
(119) Alienated.
(120) Fairly picturesque, practically permanent, being last dry in 1897. Fills from Murray River (nearest point of which is distant 3 miles), water commencing to flow in when the river is 10 ft. 9 in. high at Swan Hill. In the future this lake may be very useful for storage purposes in connection with any Murray River water conservation scheme. It is covered by W.R. 2109 and is surrounded by "Murray Downs" freehold lands.
(121) Only a plain, but gets water at wide intervals.
(122) Filled by Yancowinna and local creeks after exceptionally heavy rain. Has a large, quick catchment. Ulenia and Yantara Lakes, which are joined together, were filled only once from 1881 to 1896, viz., in 1885, and replenished by a foot or so a few times. The lake is not permanent, evaporation is great, average annual rainfall about 8 inches.
(123) Broad shallow clay pan, rarely flooded in late years, but in 1870 covered to a depth of from 10 to 18 feet.
(124) Shallow clay pan, last year 2 to 3 feet of water stored.
(125) Fills from Murrumbidgee River.
(126) Generally dry, fills from the Murray, within W.R. 2964.
(127) Permanent, filled by Paroo flood waters.
(128) Good, quick local catchment, good stock water.
(129) Fills with run off from surrounding high country, holding capacity improved by a low dam at mouth of effluent creek.
(130) Permanent water, fills from the Murray, within W.R. 1957, joins Lake Goonimur.
(131) Supply channel blocked, not allowed to fill, now used for grazing, excellent grass, partly within W.R. 2977 and T.S.R. 11411, within Poon Boon 18th Section Lease.
(132) Fills from overflow in high Darling floods. Practically empties as waters recede.
(133) Local catchment, often dry, good stock water.
(134) Fills from the Murrumbidgee River. Yanga Station is situated on the shores of this lake. Within W.R. 3020, Reserve 44155 for preservation of game, and Yanga 18th Section Lease.
(135) Often dry.
(136) These are not lakes in a geographical sense, but lagoons connected with the ocean.

3. **Victoria.**—The accompanying information regarding the lakes of Victoria has been furnished by the Survey Branch of the Department of Lands.

(*1.*) *Flora of Victorian Lakes.* The Victorian lakes, owing to variety of conditions such as altitude, depth, geological surroundings, area, etc., have different floras. Salt, brackish, and fresh water types exist, but these are linked by gradations which render the drawing of a hard and fast line of demarcation between types practically impossible, yet the salt marsh of the plain and the mountain tarn are remote and distinct.

The salt lakes may be divided into two groups, viz., inland and estuarine. The former are situated in the western and north-western parts of the State, those of the west occupying basins probably formed by the subsidence of the roof of cavities in the volcanic plain, and those of the north-west are said to be due to saucer-like depressions once filled by river overflow and since replenished, some of them by rainfall and direct surface drainage, and others by streams which flow through them. Many of these northern and western lakes become areas of dried mud or salt pans in summer time.

The estuarine or Gippsland lakes are a series brought into being by the reclamation of a portion of the sea through the formation first of the ridge behind the Ninety-mile Beach by sea and wind agencies, and the subsequent deposition of river silt on the landward side. Continued deposition is decreasing the area of these lakes, which are the remnants of a once large open lagoon. Of those forming individual lakes, one (Lake Wellington) is already isolated except for the river outlet at the eastern end. The arboreal vegetation of the inland lake margins in the western and northern districts is scanty, and is more in evidence near the inlets of creek water, while salaceous plants occupy the immediate margin, and when dry those basins of less saline nature carry a growth of salty-flavoured herbage which is relished by cattle and valued as fodder. Redgum, tea-trees, and other shrubby growths may be found in the vicinity. The vegetation of the Gippsland estuarine lakes varies from the southern mangrove of the muddy shores and flats, and marine weeds of the tidal mouth, to the fringing myrtaceous shrubs and other tea-trees, eucalyptus, etc., which creep down to the water's edge in the comparatively or absolutely fresh water parts towards the river mouths within the estuary.

Of fresh water lakes there are those of natural and artificial origin, and these are scattered throughout the State. The most rare is the mountain tarn. At about 3000 feet altitude a landslip on Mount Wellington, in Gippsland, has blocked a small, steep valley, and the cold, deep water (Lake Karng) is held by steep, rocky walls, from which conspicuous littoral flora is absent.

Another land-locked, fresh water body is the Yan Yean Reservoir, which occupies the site of an old marsh amongst silurian hills of the lowlands at an elevation of only 519 feet above sea level, an embankment having been thrown across a narrow outlet from a considerable drainage area. The surface of this lake—the supply to which is augmented by diverted mountain drainage—approximates to 1360 acres at high level. The depth is 24 feet in parts. The surrounding arboreal vegetation is partly native eucalyptus, banksia, but largely consists of pinus insignis, with many shrubs, native and exotic, interspersed, while a continuous carpet of native kangaroo grass shelters an abundance of native herbaceous and small shrubby plants. The margin of the bays is marked by a growth of sedges, rushes, and reeds, while a variety of water weeds extend across the shallow inlets, and require periodical cutting. Microscopic forms are abundant. Generally speaking, the Yan Yean Reservoir has a richer littoral and purely aquatic vegetation than any other Victorian lake.

Other fresh water lakes are those of the south-western plains, with visible or secret outlets and fresh or slightly brackish water, but these for the most part are poorly vegetated owing to the low banks and the exposure to strong winds, while the geological conditions which result in almost treeless plains as an environment, together with the instability of the water level, do not permit of tree growths at the margins.

Lake Wendouree, at Ballarat, is a shallow, fresh water lake, the area being sheltered physiographically and also by liberal planting of introduced and native trees with which city improvements have surrounded it. The water weeds grow so luxuriantly here as to require special weed cutting to keep the tracks clear for the small pleasure steamers.

Another type of freshwater lake is that resulting from former meanderings of rivers such as the Murray and the Goulburn in their lower reaches across the tertiary plains: portions of old courses, mostly curved in sinuous or horse-shoe pattern, and cut off by silting up when the streams were diverted into new natural channels, the old reaches becoming lagoons or billabongs of considerable extent. The banks of these bear finely developed Eucalyptus rostrata; large areas along the Murray being reserved as forest land. Other plants (many myrtaceous trees and shrubs) luxuriate there, and smaller plants find shelter among these, while water weeds are in abundance.

Finally, there is a type of lake—small, deep, and almost devoid of vegetation —occupying the old craters of volcanic mounts. Such is Tower Hill Lake at Koroit, in the Western district, where the hollow formed by the falling in of the scoriæ and tuff has filled with water of unknown depth.

(*2.*) *Fauna of the Victorian Lakes.* For the purpose here required the fauna of the Victorian lakes may be roughly divided into three districts, viz:—The Tidal Lakes and Inlets, the Western District Lakes, and the Northern District and Mallee.

Only the more numerous varieties are mentioned below, the list not being in any way exhaustive, and with few exceptions, the species mentioned in one district are to be found in the other two in more or less numbers.

(*a*) *The Tidal Lakes and Inlets* consist principally of the Gippsland Lakes, Lake Tyers, and Mallacoota Inlet. In the vicinity of these lakes native bear, opossum, wallaby and kangaroo may be seen, and at Mallacoota Inlet platypi are perhaps more numerous than elsewhere. Aquatic birds are chiefly the black swan, coot, musk and black duck, and gull, all of which are plentiful. Other birds in these localities are the laughing jackass, magpie, sulphur-crested, leach black, and gang-gang cockatoo, bell-miner, native companion, nankeen heron, crow-shrike, honey eater, hawk, robin, king and pennant parrot, satin bower birds, and wren. The emu is occasionally seen, but the lyre-bird is rarely met with.

(*b*) *Western District Lakes* comprise those lakes in the South Western portion of Victoria and are very numerous in the vicinity of Colac and Camperdown, the largest being Lake Corangamite.

Bandicoot and native cats are occasionally to be seen. The birds that haunt the waters of these lakes are ducks, swans, coot, water-fowl and mountain duck. In the district generally are to be found the magpie, parrot, ground-lark, snipe and plover.

In many places in this district the remains of the extinct diprotodon have been found.

(*c*) *Northern District and Mallee.* Lake Hindmarsh, Albacutya, Tyrrell, Lonsdale and Kow Swamp are among the chief natural depressions in this district. The three

first named are frequently dry and in time of drought may so remain for years. Bird and other life is then very scarce.

The black swan, waterfowl, musk and black duck, coot, black cormorant, white and straw-necked ibis, moorhen and marsh tern frequent the lakes and marshes. The mallee fowl, native companion, nankeen heron, yellow-legged spoonbill, magpie, laughing jackass, hawk, galah, cockatoo and wren are also met with. Wedge-tailed eagles and the emu are occasionally to be found.

(*3*) *Geological Characteristics.* In regard to their geological characteristics, the lakes of Victoria may be divided into four classes, viz.:—(i.) Lakes in basalt plains, (ii.) Lakes in Wimmera and adjoining districts, (iii.) The Gippsland lakes, and (iv.) Lakes formed by flood plains of rivers.

(i.) *Lakes in the Basalt Plains.* Most of these have no streams entering them, and the basalt is of late tertiary age. They may be classified as follows:—

(A) Shallow lakes in hollows due to irregularities in the original volcanic surface, to erosion by wind, or to both; generally small, and irregular in shape. Many of them become dry in summer and are liable to remain so for protracted periods. These lakes are very abundant in the Western District.

(B) Deeper lakes occupying calderas or craters; more or less circular as a rule. The calderas mark the sites of volcanic explosion and possibly have been deepened by the sinking of their floors. There are few if any lakes occupying true craters in Victoria.

(C) Lakes filling subsided areas which have resulted from the adjustment of the surface to the new conditions following the transference of large quantities of rock from underground to the surface in the form of lava flow (basalt).

(ii.) *Lakes in the Wimmera and Adjoining Districts.* The basins are formed in sedimentary rocks of late tertiary age. The lakes are generally shallow, many of them being little more than swamps, and they may become dry for considerable periods. They may be grouped as follows:—

(A) Basins formed by subsidence due to the removal by solution of the underlying limestone or by wind erosion, or by both.

(B) Expansions of rivers caused by the blocking up of shallow valleys by silt or wind-blown material; some caused or assisted by wind erosion.

(iii.) *The Gippsland Lakes.* These have resulted from the growth of the land seawards, owing to the deposition of silt from the Gippsland rivers, combined with the action of the tides, which sweep eastwards along the coast and deflect the river mouths in that direction. The rocks are of tertiary and recent age and the action is still in progress.

(iv.) *Lakes formed by Flood Plains.* These lakes, formed by the building up of flood plains by the rivers, are situated principally near the Murray.

(*4*) *Names, Positions, and Special Features of Victorian Lakes.* The subjoined statement gives particulars in tabular form of Victorian lakes. The numbers attached to the names of some of the lakes in this statement refer to the footnotes at the end of the table. The letters (*f*), (*s*), and (*b*) given in the second column of the table indicate that the lake referred to is either fresh, salt, or brackish. The reference signs given in the column dealing with geological characteristics and probable origin refer to the articulation figures and letters of the preceding paragraph (*3*) hereof, and have the meanings given thereunder.

LAKES OF VICTORIA.

Name.	Position.	Approx. Area. Acres.	Length. Miles.	Length. Chains.	Breadth. Miles.	Breadth. Chains.	Max. Depth.	Geological Characteristics and Probable Origin.
Albacutya (1) ...	Weeah, 10 miles N. of Lake Hindmarsh (*f*) ...	14,430	7	40	3	60	15	(ii) B
Albert Park (2) ...	South Melbourne (*f*)	105	1	5	—	35	5	—
Bael Bael	Tatchera, 9 miles W. of Kerang (*f*)	1,075	3	20	—	60	12	(ii) B
Baker	Tatchera, 7 m. S.E. of Castle Donnington (*f*)...	700	1	10	—	70	6	(iv)
Barracoota ...	Croajingolong, 6 miles W. of Cape Howe (*f*)...	600	2	—	—	70	20	(iii)
Beeac	Grenville, 10 miles N. of Colac (*s*)	1,500	2	—	1	50	—	(i) A, C
Birdebush ...	Hampden, 8 miles N.W. of Camperdown (*b*)...	64	—	55	—	15	—	(i) A
Bitterang	Karkarooc 45 miles N.W. of Lake Tyrrell (*f*)	180	—	60	—	30	6	(iv)
Boga	Tatchera, 8 m. S.E. of Castle Donnington (*f*)	2,120	2	23	1	70	12	(iv)
Bolac	Ripon, 6 miles E. of Wickliffe (*f*)	3,500	3	40	2	30	—	(i) C
Bookaar (3) ...	Hampden, 6 miles N.W. of Camperdown (*b*) ...	1,075	2	15	1	10	—	(i) A
Booroopki ...	Lowan, 14 m. E. of S. Aust. boundary line (*f*)	1,030	—	50	—	30	—	(ii)
Boort	Gladstone, fed by overflow of Loddon (*f*) ...	1,127	1	70	1	30	6	(ii) A, B
Bringalbert ...	Lowan, 10 miles N.E. of Apsley (*f*)	250	—	65	—	45	—	(ii)
Bullen Merri (4)...	Hampden, 1 mile S.W. of Camperdown (*b*) ...	1,330	1	70	1	65	266	(i) B
Buloke (5)	Borung, 4 miles N. of Donald (*occasionally dry for a series of years*) (*f*)	600	6	—	3	40	8	(ii) B
Bunga	Tambo, 3 miles S.W. of Lake Tyers (*f*) ...	300	8	—	—	20	—	(iii)
Bungaa	Tanjil, Ninety-mile Beach (*b*)	1,000	11	—	—	20	—	(iii)
Buninjon	Ripon, 6 miles S.W. of Ararat (*f*)	430	1	20	—	60	—	—
Burn	Grenville, 10 miles N.E. of Colac (*s*)	130	—	60	—	35	—	(i) A
Burrumbeet (6) ...	Ripon, 10 miles W. of Ballarat (*f*)	5,200	4	30	3	—	6	(i) C
Calvert	Grenville, 5 miles N. of Colac (*s*)...	5,200	12	—	1	50	—	(i) C
Centalla	Karkarooc, 44 miles N.W. of Lake Tyrrell (*f*)	250	—	70	—	50	6	(ii) A
Carchap	Lowan, 20 miles N. of Mostyn (*f*)	220	—	50	—	40	10	(ii) A
Catcarrong ...	Villiers, near township of Winslow (*f*) ...	80	—	45	—	25	—	(i) C, A
Catherine ...	Polwarth, W. boundary of county, 13 miles from sea (*f*)	130	1	5	—	15	—	—
Centre	Lowan, 10 miles N.W. of Mostyn (*f*)	660	1	40	—	50	—	(ii) A
Charm	Tatchera, 10 miles N. of Kerang (*f*)	1,390	1	70	1	20	—	(iv)
Clear	Lowan, 17 miles N. of Mostyn (*f*)	300	—	70	—	50	10	(ii) A
Colac (7)	Polwarth, at Colac (*f*)	6,650	5	—	2	70	—	(i) B
Colongulac (8) ...	Hampden, 3 miles N. of Camperdown (*b*) ...	3,500	4	30	2	30	—	(i) B
Connewarre (9) ...	Grant, 5 miles S.E. of Geelong (*tidal*) ...	3,880	4	50	2	50	—	—
Cooper	Rodney, 9 miles E. of Runnymede (*f*)	2,400	3	30	1	30	10	(iv)
Coorong	Karkarooc, fed by Yarriambiak Creek (*f*) ...	2,000	2	—	1	60	8	(ii) A, B
Cope Cope ...	Kara Kara, 16 miles N.W. of St. Arnaud (*f*) ...	400	1	40	—	50	12	(ii) A
Coragulac ...	Grenville, 7 miles N.W. of Colac (*b*)	90	—	40	—	35	—	—
Corangamite (10)	Grenville (*s*)	57,700	18	—	8	—	10	(i) C
Corringle	Tambo, 2 miles from coast (*f*)	400	2	—	1	10	20	(iii)
Craven	Polwarth, 5 miles N.W. of Cape Otway (*tidal*)	200	1	—	—	30	—	—
Cullens	Tatchera, 8 miles N.W. of Kerang (*f*)	1,660	2	30	1	27	—	(iv)
Cundare	Grenville, 12 miles N. of Colac (*s*)	350	1	70	1	20	—	(i) A, C
Curlip	Croajingolong, fed by overflow of Snowy R. (*f*)	400	1	15	1	—	—	(iii)
Denison	Buln Buln, 28 miles N.E. of Alberton (*f*) ...	350	1	—	—	35	20	(iii)
Dock	Borung, 6 miles S.E. of Horsham (*f*)	370	1	20	—	50	—	(ii) A
Doling Doling ...	Dundas, 3 miles N.E. of Hamilton (*f*)	50	—	40	—	30	6	(i) A
Drung Drung or Taylor's...	Borung, 11 miles S.E. of Horsham (*f*)	750	2	40	—	60	17	(ii) A
Duck	Tatchera, 6 miles N.W. of Kerang (*f*)	870	2	20	—	70	6	(iv)
Durdidwarrah (Upper Stoney Ck. Reservoir)	Grant, reserved for town of Geelong, 25 miles N.W. (*f*)	—	—	—	—	—	60	—
Elingamite ...	Heytesbury, 11 m. S.W. of Camperdown (*f*)...	800	1	40	1	25	12	(i) B
Elizabeth	Tatchera, 5 miles W. of Kerang (*f*)	200	—	65	—	40	10	(iv)
Eyang	Hampden, 9 miles E. of Chatsworth (*f*) ...	180	—	70	—	45	—	(i) A, C
Furnell	Croajingolong, 8 m. N.W. of Cape Everard (*f*)	800	1	15	—	40	12	(iii)
Garry (11)	Moira, 10 miles N.W. of Shepparton (*f*) ...	1,700	2	40	1	—	—	—
Ghentghen ...	Ripon, 5 miles E. of Wickliffe (*s*)	40	—	30	—	15	—	(i) A
Gherang Gherang	Grant, 3 miles E. of Winchelsea (*f*)	250	—	75	—	40	—	(i) A
Gnarpurt	Hampden, at northern extremity of Lake Corangamite (*s*)	5,800	3	70	3	—	—	(i) A
Gnotuk (12) ...	Hampden, 2 miles W. of Camperdown (*s*) ...	600	1	65	1	5	103	(i) B
Goldsmith ...	Ripon, 7 miles S. of Beaufort (*f*)...	2,130	2	60	1	60	—	(i) C
Goulb'rn Weir (13)	Moira and Rodney (*f*)	4,500	3	20	1	30	42	—
Green	Borung, 7 miles S.E. of Horsham (*f*)	250	—	70	—	60	14	(ii) A
Hattah	Karkarooc, 42 miles N.E. of Lake Tyrrell (*f*)	150	—	40	—	35	14	(iv)
Hindmarsh (14) ...	Lowan, fed by Wimmera River (*f*)	30,000	12	70	5	50	13	(ii) B
Jollicum	Hampden, 4 miles S.W. of Streatham (*f*) ...	130	—	60	—	35	—	(ii) A
Kakydra	Tanjil, 7 miles E. of Sale (*b*)	452	1	—	—	70	—	(iii)
Kanagulk	Lowan, 6 miles N.E. of Mostyn	870	1	50	1	10	10	(ii) A
Kangaroo	Tatchera, 11 miles N.W. of Kerang (*f*)... ...	2,250	3	40	1	30	—	(iv)
Kariah	Hampden, 5 miles N.E. of Camperdown (*b*) ...	350	1	40	—	40	—	(i) A
Karnak	Lowan, 18 miles N.E. of Edenhope (*b*)... ...	300	—	70	—	60	—	(ii)

LAKES OF VICTORIA—(Continued).

Name.	Position.	Approx. Area. Acres.	Length. Miles.	Length. Chains.	Breadth. Miles.	Breadth. Chains.	Max. Depth.	Geological Characteristics and Probable Origin.
Karng (15)	Tanjil, 30 miles E. of Woods Point (*f*)	1	—	—	—	—	—	—
Keilambete (16) ...	Hampden, 15 miles W. of Camperdown (*b* ...	770	1	40	1	15	96	(i) B
Kemi Kemi ...	Lowan, 2 miles S. of Edenhope (*f*)	130	—	60	—	40	—	(ii) A
Kennedy	Villiers, 8 miles N.W. of Penshurst (*b*) ...	690	1	30	1	30	—	(i) A
Kerferd (17) ...	Bogong, Beechworth Water Supply (*f*) ...	100	—	55	—	28	—	—
King (18)	Tanjil, *near Bairnsdale*, 23 miles N.E. of Seacombe (*tidal*)...	22,500	9	—	9	—	65	(iii)
Konardin	Karkarooc, 44 miles N.W. of north shore of Lake Tyrrell (*f*)	300	1	—	—	40	14	(iv)
Koreetnung ...	Hampden, 6 miles N.E. of Camperdown (*s*) ...	560	1	30	1	10	—	(i) A
Kow (19)	Gunbower (*f*)	6,800	5	—	2	50	7	(iv)
Laanecoorie Weir (20)	Bendigo and Gladstone (*f*)...	1,620	3	40	—	40	37	—
Lalbert (21) ...	Tatchera, 31 miles W. of Kerang (*f*)	1,250	2	25	1	60	10	(ii) B
Leaghur	*Tatchera, 18 miles S.W. of Kerang (f)*	130	—	*50*	—	35	8	*(ii)* B
Learmonth (22) ...	Ripon, 11 miles N.W. of Ballarat (*f*)	1,200	1	60	1	40	—	(i) C
Linlithgow ...	Villiers, 8 miles N.W. of Penshurst (*b*) ...	2,450	2	70	1	70	20	(i)
Little	Tatchera, 10 miles S.W. of Kerang (*f*)	80	—	40	—	40	—	(iv)
Lockie	Karkarooc, 42 miles N.W. of Lake Tyrrell (*f*)	350	1	60	—	50	6	(iv)
Long	Tatchera, 8 miles S.E. of Castle Donnington(*f*)	500	1	40	—	42	21	(iv)
Lonsdale (23) ...	Borung, 7 miles S.W. of Glenorchy (*f*) ...	6,000	3	40	2	—	4	(ii) B
Lookout	Tatchera, 14 miles W. of Kerang	130	—	50	—	30	14	(iv)
Mallacoota (Inlet) (24)	Croajingolong, 12 m. W. of Cape Howe (*tidal*)	1,700	5	60	3	—	60	(iii)
Malmsbury (25) ...	Dalhousie and Talbot, reservoir for northern gold-fields' population, borough of Malmsbury (*f*)...	640	2	30	—	60	52	—
Mannaor	Tatchera, fed by overflow of Murray (*f*) ...	40	—	40	—	30	6	(iv)
Marmal	Gladstone, 12 miles N.E. of Charlton (*f*) ...	250	1	20	—	45	10	(ii) A, B
Marsh, The ...	Tatchera, 10 miles N.W. of Kerang (*f*)... ...	1,700	3	—	1	20	6	(iv)
Meering	Tatchera, 11 miles S.W. of Kerang (*f*)	500	1	50	—	50	10	(iv)
Melanydra ...	Tanjil, 6 miles E. of Sale (*b*)	153	—	50	—	50	—	(iii)
Middle	Tatchera, 4 miles N. of Kerang (*f*)	560	1	—	1	—	—	(iv)
Miga	Lowan, 20 miles N.W. of Mostyn (*f*)	230	—	60	—	45	—	(ii) A
Mitre	Lowan, 20 miles W. of Horsham (*s*)	1,280	1	60	1	50	12	(ii)
Modewarre ...	Grant, 6 miles E. of Winchelsea (*s*)	1,025	1	70	1	15	—	(i) C
Moodemere ...	Bogong, 3 miles W. of Rutherglen (*f*)	850	1	30	—	45	—	(iv)
Morea	Lowan, 13 miles N. of Edenhope (*f*)	180	—	55	—	45	—	(ii)
Mournpall ...	Karkarooc, 44 miles N.W. of Lake Tyrrell (*f*)	600	1	20	—	65	—	(iv)
Mundi	Follet, 1 mile E. of S. Aust. boundary line (*f*)	1,280	1	40	1	—	—	(ii)
Murdeduke ...	Grenville, 25 miles W. of Geelong (*s*)	2,800	3	40	2	40	—	(i) C
Murphy's	Tatchera (*f*)	560	1	40	—	60	—	(ii) A
Natimuk	Lowan, 14 miles W. of Horsham (*f*)	922	1	70	—	65	—	(ii) A, B
Omeo (26)	Benambra, 10 miles N.E. of Omeo (*f*)	1,966	3	—	1	10	—	—
Ondit	Grenville, 15 miles N. of Colac (*s*)	250	1	—	—	70	—	(i) A, C
Oundell	Hampden, 5 miles S.W. of Streatham (*f*) ...	180	—	55	—	45	—	(i) A
Paragalmir ...	Ripon, 6 miles E. of Wickliffe (*s*)	160	1	—	—	35	—	(i) A
Pelican	Tatchera, 2 miles W. of Kerang (*f*)	94	—	25	—	30	—	(ii) A
Pertobe	Villiers, town of Warrnambool (*tidal*) ...	50	—	40	—	15	—	—
Pine...	Borung, 8 miles S.E. of Horsham (*f*)	360	1	5	—	50	16	(ii) A
Pine Hut	Lowan, 22 miles N.W. of Mostyn	200	—	55	—	45	—	(ii) A
Powell	Karkarooc, 36 miles N. of Lake Tyrrell (*f*) ...	322	—	70	—	55	12	(iv)
Punpundhal ...	Hampden, W. of Lake Corangamite (*s*) ...	60	—	35	—	25	—	(i) A
Purgagoolah (27) (Mangan's Inlet)	Croajingolong, 18 m. W. of Cape Howe (*tidal*)	30	—	55	—	20	—	—
Purrumbete (28)...	Heytesbury, 4 miles S.E. of Camperdown (*f*)	1,450	1	70	1	50	—	(i) B
Racecourse ...	Tatchera, 10 miles N.W. of Kerang (*f*)... ...	196	—	50	—	40	—	(iv)
Reedy	Tatchera, 3 miles N. of Kerang (*f*)	550	1	10	—	70	—	(iv)
Reeve (29)	Buln Buln, 2 miles S.E. of Seacombe, on coast (*tidal*)	9,000	36	—	—	70	—	(iii)
Repose	Villiers, 7 miles S.E. of Dunkeld (*f*)	280	1	10	—	50	—	(i) A
Rosine	Grenville, 3 miles W. of Cressy (*s*)	380	1	10	—	70	—	(i) A, C
Round	Tatchera, 10 miles S.W. of Kerang (*f*)	35	—	54	—	34	—	(iv)
Salt	Weeah, 46 miles N.W. of Lake Albacutya (*s*)...	4,480	1	40	—	50	—	(ii) A
,, ...	Grenville, 9 miles N.E. of Colac (*s*)	870	1	65	1	30	—	(i) A
,, ...	Ripon, 6 miles N.E. of Streatham (*s*)	500	1	45	—	60	—	(i) A
,, ...	Ripon, 9 miles S. of Beaufort (*s*)...	180	—	60	—	45	—	(i) A
,, ...	Lowan, 12 miles N.W. of Mostyn (*s*)	500	1	10	—	70	—	(ii) A
,, ...	Lowan, 5 miles N.W. of Natimuk (*s*)	600	1	50	1	—	—	(ii) A
,, ...	Tatchera, 13 miles N.W. of Kerang (*s*)... ...	700	—	40	—	25	—	(ii) A
,, ...	Tatchera, 8 miles W. of Kerang (*s*)	100	—	55	—	30	—	(iv)
Sand Hill	Tatchera, 13 miles W. of Kerang (*s*)	160	—	60	—	50	12	(ii) A
Sea Lake	Karkarooc (*f*)	30	—	15	—	15	15	(ii) A
Spectacle (Great)	Tatchera, 10 miles S.W. of Kerang (*f*)	128	—	45	—	38	—	(iv)

LAKES OF VICTORIA—(Continued).

Name.	Position.	Approx. Area. Acres.	Length.		Breadth.		Max. Depth.	Geological Characteristics and Probable Origin.
			Miles.	Chains.	Miles.	Chains.		
Spectacle (Little)	Tatchera, 10 miles S.W. of Kerang (*f*)	43	—	25	—	20	—	(iv)
St. Mary's... ...	Lowan, 4 miles W. of Mt. Arapiles (*f*)	230	1	—	—	40	—	(ii) A
Swan	Mornington, in Phillip Island (*f*)	60	—	30	—	20	—	—
Sydenham (30) ...	Croajingolong, 8 m. E. of Cape Conran (*tidal*)	2,300	3	—	1	70	20	—
Tamboon (31) ...	Croajingolong, 8 m. W. of Cape Everard (*tidal*)	1,150	2	70	1	40	20	—
Tatutong	Hampden, W. of Lake Corangamite (*s*) ...	50	—	30	—	20	—	(i) A
Tchum (32) ...	Tatchera, near Birchip (*f*)	260	—	—	—	—	6	(ii) A
Terang	Hampden, 12 miles W. of Camperdown (*f*) ...	300	—	70	—	50	17	(i) B
Terang Pom ...	Hampden, 11 miles N.E. of Camperdown (*f*)...	500	1	70	—	70	—	(i) A
Tobacco	Tatchera, 10 miles S.W. of Kerang (*f*)	25	—	25	—	15	—	(iv)
Tooliorook ...	Hampden, 4 miles S.E. of Lismore (*b*)... ...	850	1	70	1	10	—	(i) A
Tower Hill ...	Villiers, 7 miles N.E. of Belfast (*f*)	850	1	30	—	50	—	(i) B
Turang-moroke...	Ripon, 9 miles E. of Wickliffe (*s*)	250	—	70	—	50	—	(i) A
Tyers (33)	Tambo, 22 miles west of mouth of Snowy River (*tidal*)	3,950	2	50	1	30	—	(iii)
Tyrrell (34) ...	Karkarooc, fed by overflow of Avoca River (*s*)	42,600	14	40	7	40	15	(iv)
Upper Coliban Reservoir (35) ...	Talbot and Dalhousie (*f*)	574	3	—	—	50	60	—
Victoria (36) ...	Tanjil, 21 miles E. of Sale (*tidal*)	28,500	15	40	3	70	25	(iii)
Wahpool	Karkarooc and Tatchera, 6 miles E. of Lake Tyrrell (*s*)	—	7	—	2	40	—	(iv)
Wallwalla ...	Millewa, 13 m. S.E. of intersection of S. Aust. boundary line by Murray River (*f*)... ...	600	1	40	1	—	12	(iv)
Wallace	Lowan, at Edenhope (*f*)	450	1	10	—	60	12	(ii) A
Wangoom ...	Villiers, 6 miles N.E. of Warrnambool (*f*) ...	200	—	55	—	45	—	(i) B
WarangaB'sin (37)	Rodney (*f*)	11,009	6	10	5	—	21	—
Wartook Res. (38)	Borung (*f*)	2,556	3	50	1	20	29	—
Wau Wauka ...	Croajingolong, near Cape Howe (*f*)	600	1	40	—	40	—	(iii)
Weerancanuck ...	Hampden, 7 miles N.E. of Camperdown (*s*) ...	1,280	2	40	1	15	—	(i) A
Weering	Grenville, 17 miles N. of Colac (*s*)	921	1	60	1	10	—	(i) A, C
Wellington (39) ...	Tanjil, 8 miles E. of Sale (*f*)	34,500	11	—	7	—	—	(iii)
Wendouree (40) ...	Grenville, at Ballarat (*f*)	500	1	20	—	75	8	(i) A
White	Lowan, 8 miles N.W. of Mostyn (*s*)	1,400	2	20	1	15	—	(ii) A
Wirraan	Hampden, 9 miles N. of Camperdown (*s*) ...	60	—	45	—	25	—	(i) A
Wooronook ...	Kara Kara, 10 miles W. of Charlton (*f*) ...	250	—	75	—	60	—	(ii) A
Wurdee Boluc ...	Grant, 5 miles S.E. of Winchelsea (*f*)	440	1	70	1	20	—	(i) A
Yallakar	Lowan, 7 miles N.E. of Edenhope (*f*)	870	1	60	—	50	—	(ii)
Yambuk (41) ...	Villiers, 10 miles W. of Belfast (*tidal*)... ...	200	—	50	—	30	—	—
Yando	Tatchera, 22 miles S.W. of Kerang (*f*)	200	—	60	—	40	—	(iv)
Yan Yean (42) ...	Evelyn, reservoir for supply of metropolis, 22 m. N.E. of Melbourne (*an artificial lake*) (*f*)	1,360	2	20	1	50	25	—
Yeeangmaria ...	Ripon, 10 miles E. of Wickliffe (*s*)	75	—	55	—	22	—	—
Yellwell	Karkarooc, 44 miles N.W. of Lake Tyrrell (*f*)	200	—	70	—	40	6	(iv)
Yerang	Karkarooc, 44 miles N.W. of Lake Tyrrell (*f*)	160	—	55	—	35	6	(iv)

NOTES.

(1) Practically dry for several years up to 1909, now receiving overflow from Lake Hindmarsh (1910). Height above sea level, 210 feet.

(2) Ornamental lake, contains English perch (brown and golden) and carp.

(3) 450 feet above sea level.

(4) Enclosed in a ring of hills, 520 feet above sea level. A remarkable feature about this lake is that, although separated from Lake Gnotuk (depth 103 feet) by less than half-a mile, its surface level is 140 feet higher, and the water, though brackish, is fit for stock, whilst Lake Gnotuk is quite salt. Lake Bullen Merri is supplied by underground springs, &c., and discharges into Lake Gnotuk. This explains the difference in salinity, one having a discharge and the other not. Both supply and discharge are underground.

(5) Now (1910) about 8 feet deep. Fairly flat basin. 438 feet above sea level.

(6) 1270 feet above sea level, occasionally dry, usually contains from 4 to 6 feet of water. English perch, carp and eels.

(7) 367 feet above sea level.

(8) 494 feet above sea level.

(9) Shallow. Barwon River runs through to coast at Barwon Head. Bar at entrance. Navigable by small crafts only. Contains mullet and bream (migratory).

(10) 380 feet above sea level.

(11) Contains English perch and eels.

(12) 380 feet above sea level. See note against Lake Bullen Merri.

(13) Artificial lake made for water supply purposes. Capacity 5,650,000,000 gallons. Masonry and concrete dam. Contains Murray cod, Murray perch (golden, silver and Macquarie) and black fish.

(14) This lake, now full (1910), dries up frequently. 277 feet above sea level.

(15) On Mount Wellington, caused by landslip.

(16) 400 feet above sea level.

(17) Artificial lake.

(18) Most important of the Gippsland lakes; average depth, 21 feet. Receives the waters of the Mitchell, Nicholson, and Tambo Rivers, all of which are navigable for some miles up stream. The Gippsland Lakes include Lakes Wellington, Victoria, King, and Reeve, and all inlets and channels. Except on eastern shore of Lake King, the borders are flat, with abrupt sandy rises, in places attaining a height in some cases of 150 feet. The entrance opposite Kalimna is an artificial one, and was opened in July, 1889. The old or natural inlet of the lakes, situated about two miles to the eastward, is now non-existent, having been filled up by drifting sands. A sand bar exists across the entrance, with a depth of about 14 feet at low water. This limits the navigability of the lakes to vessels of comparatively small tonnage. Range of tides at springs, about 3 feet. Numerous wharves and jetties abound on the shores of these lakes, the principal ones being at Bairnsdale and Sale. A regular service of lake steamers plies to and from these towns, and from Bairnsdale there is a coastal service to Melbourne.

(19) Timber weir, impounds 11,150,000,000 gallons of water.

(20) Artificial lake, impounds 3,812,000,000 gallons of water.

(21) Contains English perch and English trout.

(22) 1328 feet above sea level. Contains English perch and English trout.

(23) Water supply reservoir, impounds 12,380,000,000 gallons. Contains English perch, English trout, and Murray perch.

(24) Divided into two portions, called upper and lower lakes; connected by a narrow passage about one mile long. Sand bar at entrance to lakes, with 3 or 4 feet over it at low water. There is also an inner bar stretching from Captain's Point, over which there is not more than 2 feet at low water. Navigation of this entrance is extremely hazardous, and a good personal knowledge of the locality, combined with great caution, is necessary. A sinuous channel about 13 feet deep communicates with the strait connecting the upper and lower lakes. The strait is about 1000 feet wide, with deep water. Bold, rocky, timber-covered slopes characterise the shores of the lake and river banks. Mullet, skipjack, schnapper, bream, flathead, whiting, garfish, sea trout, and ludrick are found in this lake.

(25) Artificial water supply reservoir, impounds 20,856,000,000 gallons. Contains English perch and English trout.

(26) 2374 feet above sea level, now practically dry.

(27) Occasional shoals of mullet and bream.

(28) Crater 150 feet deep.

(29) One of the Gippsland Lakes. See remarks against Lake King. Contains bream, mullet, whiting, sea trout, sea perch, garfish and ludrick.

(30) Contains mullet, bream and sea perch.

(31) Contains mullet, bream and sea perch.

(32) For Mallee Water Supply, impounds 180,000,000 gallons.

(33) The entrance to Lake Tyers is generally barred across during dry seasons by a sand bank, but after heavy rains the bank is broken, forming one or two channels to the sea. This entrance is not fit for navigation. A settlement for the education and religious instruction of the aborigines is formed on the northern shore of the lake. Contains mullet, bream, sea perch and ludrick.

(34) Usually dry. Can hold from 10 to 15 feet of water. 118 feet above sea level.

(35) Artificial lake, impounds 4,100,000,000 cubic feet of water. Contains English perch and trout.

(36) One of the Gippsland Lakes, average depth about 18 feet. See general note against Lake King. Contains mullet, bream, sea perch and ludrick.

(37) Artificial water supply reservoir. Impounds 60,000,000,000 gallons. Contains English trout, Murray cod and Murray perch.

(38) Impounds 6,560,000,000 gallons. Contains English perch and trout.

(39) One of the Gippsland Lakes. Averages 8 feet in depth at low water. See general remarks against Lake King.

(40) Contains English perch, trout, carp and tench.

(41) Contains mullet, bream, sea perch and ludrick.

(42) Principal reservoir for Melbourne water supply. Impounds 6,400,000,000 gallons. Contains English perch, trout, carp and tench.

4. **Queensland.**—The tabular statement giving information regarding Queensland lakes has been furnished by the Survey Office of the Lands Department of Queensland. With regard to the lakes in the interior it may be noted that they are nearly all shallow and mostly waterless in dry seasons.

LAKES IN QUEENSLAND.

Name.	Geographical Position.			Approx. Area, Sq. M.	Length Miles.	Breadth Miles.
	Lat. S.	Long. W.	Locality.			
	° ′	° ′				
Numalla, fresh, not permanent (1)	28 43	144 19	20 miles N. of Hungerford	6¼	6	2
Wyarra, salt, not permanent (1)	28 42	144 14	23 „ N.W. „	12½	6	3
Bulloo or Berteela, fresh, permanent for about 2 years (1910) (2)	28 40	142 26	28 „ N.E. of Wompah	16	7	3½
Bullawarra, fresh (3)	27 53	143 35	16 „ N.W. of Thargomindah	1¾	1¾	1¼
Dartmouth (4)	26 5	145 20	46 „ E. of Adavale	25	7	5½
Cuddapau, fresh, not permanent (5)	25 2	141 27	77 „ S.W. of Mindorah	14	6	4
Moondah „ „ (6)	25 50	140 28	22 „ „ Beetoota	46	12	5
Nappanerica	25 53	139 4	18 „ W. of Birdsville	6¼	7½	1
Machattie, salt (7)	24 50	139 47	37 „ S.E. of Bedowrie	120	17	10
Koolwoo (8)	24 57	139 33	40 „ S. of Bedowrie	10	4	2½
Phillipi or Wickamunna, salt (9)	24 23	139 0	28 „ W. of Bedowrie	126	14	14
Galilee or Jochmus, fresh at N. end, salt S. end; dry in dry seasons (10)	22 24	145 47	56 „ N. of Aramac	80	19	10
Buchanan, salt, permanent (11)	21 34	145 54	112 „ S.W. Charters Towers	50	15	4½
Mueller, soda. A clay pan in dry seasons (12)	22 46	145 28	58 „ E. of Muttaburra	2	4	1
Barcoorah, fresh, permanent (13)	22 31	145 22	50 „ N.E. of Muttaburra	1	2	¾
Amaroo (14)	23 29	138 42	65 „ N.W. of Bedowrie	2	2	1
Cargoon, fresh, permanent (15)	20 8	144 51	64 „ N.E. of Hughenden	2½	2½	1½
Yamma Yamma or Mackillop, salt; dry in dry seasons (16)	26 15	144 25	30 „ N.E. of Haddon Corner	275	20	18
Walter Plains	18 21	145 14	50 „ S.W. of Cardwell	4	4	1
Eacham, fresh (17)	17 17	145 38	10 „ E. of Atherton	¾	¾	½
Barrine, fresh (17)	17 14½	145 39	12 „ N.E. „	¾	¾	½
Cooloolah, fresh (Noosa Lakes)	26 12	153 3	On the coast between Brisbane and Maryborough	1	1½	1
Como, salt (Noosa Lakes)	26 12	153 1	„ „ „	1½	2½	¾
Cootharaba, salt (18) (Noosa Lakes)	26 16	153 1	„ „ „	14¾	7	3½
Cooroibah, salt (Noosa Lakes)	26 21	153 2	„ „ „	2	2	1
Doonella, salt (Noosa Lakes)	26 24	153 2	„ „ „	½	1½	½
Weyba, salt (Noosa Lakes)	26 27	153 5	„ „ „	4	2½	1½

(1) Salt bush flats around lake. (2) Large tracts of polyguum swamp with sheets of water; enclosed by sand hills formed by strong winds. (3) Blue bush, yapunyah and mulga scrub. (4) Mulga scrub. (5) Cotton bush flats around lake. (6.) Cotton bush, salt bush, blue bush and cane grass. (7) Coolibah, beef wood, spinifex and deadfinish. (8) Coolibah, spinifex and deadfinish. (9) Gidya and coolibah. (10) Gidya, etc. (11) Gum and beef wood. (12) Porcupine grass surrounding the lake. (13) Desert country; naturally supplied by artesian water. (14) Gidya. (15) Box, ironbark and gum. (16) Cotton bush and saline herbs; clayey loam, putty soil full of holes and deep cracks when dry. (17) Tropical scrub; extinct crater. (18) Navigable for small craft.

5. **South Australia.**—The information in the tabular statement hereunder has been furnished by the Crown Lands Department of South Australia.

LAKES IN SOUTH AUSTRALIA.

Name.	Geographical Position of Centre.		Approx. Area Sq. Miles.	Length Miles (Approx.)	Breadth Miles. (Approx.)	Average Depth Water, Feet.	Height of Bed above or below Sea Level.
	Lat. S.	Long. W.					
	° ′	° ′					
Acraman, salt (1)	32 0	135 26	103	13	12	1 to 3	
Albert, fresh (2)	35 38	139 18	66	14	8	5 to 10	About sea level.
Alexandrina, fresh (3)	35 26	139 12	220	23	13	5 to 15	A few ft. below s.l.
Amadeus (N.T.), salt	24 47	130 57	340	76	12	Shallow	
Barmera, or Bonney on the Murray fresh (4)	34 13	140 27	6½	4	1½	2 to 10	26 ft. above.
Blanche, salt	29 14	139 40	215	25	10	Shallow	150 ft. „
Blue Lake (Mt. Gambier), fresh (5)	37 51	140 46	⅛	½	½	266	68 ft. above.
Bonney (S.E.), fresh	37 46	140 40	40	17	3	8 to 15	About sea level
Boolka, brackish (6)	30 2	141 0	2	2½	1	Shallow	
Bring, salt	30 17	133 2	3½	3½	1	„	
Cadibarrawirracanna, brackish (7)	28 51	135 30	85	20	6	„	

Name.	Geographical Position of Centre. Lat. S.	Long. W.	Approx. Area Sq. Miles.	Length Miles (Approx.)	Breadth Miles (Approx.)	Average Depth Water, Feet.	Height of Bed above or below Sea Level.
Cadnite, fresh	36 43	140 56	1	1	1	2 to 8	330 ft. above.
Callabonna, salt (1)	29 42	140 3	142	35	7½	Shallow	150 ,, ,, (approx.)
Cockatoo, fresh (12)	36 46	140 34	½	½	½		
Coongie, fresh	27 12	140 13	6	4	3	Shallow	
Coogiecooginna, fresh (8)... ...	27 38	139 34	6	7	1	Uncert'n	
Campbell, fresh (9)	30 52	136 36	1	1	1	0 to 6	
Coorong (coastal lagoon) brack. (10)	36 0	139 30	94	80	2½	3 to 10	About sea level
Conway, fresh (6)...	28 16	135 34	30	11	4	Shallow	
De Burgh (N.T.), fresh (7) ...	18 52	135 27	100*	13	9	,,	
Dutton, salt	31 47	137 8	22	7	6	,,	
Eliza, salt	37 14	139 51	16½	6	4	4 to 8	10 ft. below.
Etamunbanie, fresh	26 16	139 43	20	6	4	Shallow	
Everard, salt (1)	31 30	135 0	310	32	15	,,	
Eyre (North), salt (11)	28 30	137 30	2970	90	40	1 to 4	39 ft. below.
Eyre (South), salt (11)	29 18	137 28	460	38	16	1 to 4	39 ,, ,,
Frome, salt (11)	30 44	139 48	930	60	28	1 to 4	160 ft. above.
Frome (S.E.), fresh	37 33	140 9	4¼	4	2	4 to 10	About sea level.
Gairdner, salt (1)	31 30	130 0	1840	96	30	Shallow	
George, fresh	37 58	140 0	19½	9	3	6 to 12	6 ft. above.
Gilles, salt	32 50	136 45	70	30	8	Shallow	
Goyder, brackish	27 0	140 11	17	9	4	,,	
Greenly, salt	34 20	135 26	8¾	4	2¾	,,	Sightly above.
Gregory, salt (1)	29 0	139 0	113	16	9	,,	130 ft. above.
Hamilton, salt	34 0	135 18	9	7	1½	2 to 6	Slightly above.
Hanson, salt	31 0	136 15	24	13	4	Shallow	
Harris, salt	31 4	135 15	115	20	10	,,	
Hart, salt...	31 9	136 24	60	12	7	,,	
Harry, brackish (7)	29 24	138 18	12	7	2½	,,	
Hawdon, fresh	37 8	139 55	53½	16	5	4 to 8	18 ft. above.
Hope, fresh	28 24	139 18	13	8	3	2 to 8	
Howitt, fresh (7)	27 38	138 42	24	10	5	Shallow	About sea level.
Kalamurra, fresh	28 0	138 5	36	9	5	,,	,,
Kittakittaooloo, fresh	28 4	138 12	33	13	5	,,	,,
Killapanninna, fresh	28 37	138 46	1	2	1	Variable	Slightly below.
Koolkootinnie, fresh	28 0	138 0	36	25	4	Shallow	
Kopperamanna, fresh	28 37	138 41	1	2	1	Variable	Slightly below.
Leake, fresh (5)	37 37	140 35	¼	½	¼	33	318 ft. above.
Macfarlane, salt	32 0	136 44	150	37	15	Shallow	
Massacre, fresh (12)	27 23	140 5	3	2½	2	No rec'rd	
McKinlay, fresh	27 25	139 43	2	3	1	2 to 6	
Marroopootanie, brackish ...	26 54	140 7	6	5	2	Shallow	
Nash (N.T.), fresh (13)	20 59	137 57	1	6	½	Deep	
Newland, salt (14)...	33 24	134 53	15	11	1½	Shallow	Slightly above.
Noolyeana, salt	27 55	136 39	20	6	6	,,	
Pantoowarinna, salt	27 28	137 47	20	14	2	,,	
Pathraootara, fresh	27 24	138 14	7	5	3	Uncert'n	
Peera Peera Poolana, brackish ...	26 42	137 42	150	40	8	Shallow	
Perigundi, brackish	27 47	139 24	2	2½	1	1 to 4	
Phibbs, salt	29 33	137 10	6	4	2	Shallow	
Phillipson, fresh (15)	29 28	134 27	3	2	2	,,	
Poolowanna, salt...	26 33	137 32	45	25	2½	,,	
Poolyeruninna, salt	27 0	137 58	20	5	5	,,	
Peer Mudla Yeppa, fresh... ...	27 35	137 37	18	9	3	,,	
Robe, salt	37 12	139 47	1½	1½	1	Verydeep	Surface 2 ft. below.
Short, salt	26 10	139 48	5	4	2	Shallow	
Sir Richard or Lipson, fresh (12)...	27 1	140 23	8	5	3½	No rec'rd	
St. Clair, salt	37 20	139 54	7½	4	3	3 to 10	Surface 5 ft. below.
Strangways, fresh (12)	27 2	140 0	2½	2½	2	No rec'rd	
Sylvester (N.T.), fresh (7)... ...	18 50	135 38	100*	15	9	Shallow	
Tankamarinna, salt	29 0	138 23	5	5	2	,,	
Thomas, salt	26 5	137 58	22	10	4	,,	
Torrens, salt (1)	31 0	138 0	2230	120	40	,,	90 ft. to 112 ft. above.
Uloowaranie, fresh	26 24	139 28	24	11	3	Doubtful	
Wancoocha, salt	28 31	140 10	3	5	1	Shallow	
Wangary, fresh (1)	34 33	135 30	1	1⅔	1½	,,	Slightly above.
Warandirinna, salt (7)	27 28	138 0	73	28	5	,,	
Warrakalanna, salt (7)	28 11	139 18	8	3½	3	,,	
Weatherstone, fresh (16)	30 17	138 8	2	2	1	,,	About 130 ft. above.
Windabout, salt (7)	31 20	137 6	21	13	4	,,	
Woods (N.T.), overflow of Newcastle Waters, fresh (6) ...	17 50	133 10	†	‡	‡	1 to 20	
Yaninee, salt	33 0	135 15	7	4	3	Shallow	
Yandiya, fresh (8)	28 33	138 44	1	1½	1	,,	About sea level
Younghusband, salt	30 50	136 6	30	12	4	,,	

* *In wet seasons.* † *Sometimes covers hundreds of sq. miles.* ‡ Uncertain.

(1) Partly dry in summer. (2) Navigable for boats of 50 tons. (3) Navigable for river boats of 200 tons; bed uneven. (4) Highest flood 60 feet above sea level. (5) Volcanic. (6) Occasionally dry. (7) Sometimes dry. (8) Overflow of Cooper's Creek. (9) Not permanent. (10) Partly navigable. (11) Fresh during floods, occasionally dry. (12) Permanent. (13) Part of Herbert River. (14) Partly dry in summer; contains fresh springs. (15) Occasionally dry; salt when low. (16) Dry in summer.

6. **Western Australia.**—Strictly speaking there are in Western Australia only a few lakes of small size, scattered along the coast, west of the Darling Range. The so-called lakes of the interior are merely immense clay-pans or salt marshes, covered with a few inches of water after heavy rains. The accompanying schedule, prepared from information supplied by the Lands Department of Western Australia, gives the whole of the available information in regard to the lakes of this State.

LAKES OF WESTERN AUSTRALIA.

Lake.	Greatest Length.	Greatest Breadth.	Approximate Area.	Geographical Position.	
				Latitude S.	Longitude E.
	Miles	Miles		° ′	° ′
Waukarlycarly (salt)	16	1¼	17 sq. m.	21 20	122 50
Dora (salt)	25	5	87 ,,	22 0	123 0
Blanche	33	2½	68 ,,	22 30	123 5
Winifred	10⅓	1½	15 ,,	22 35	123 32
Disappointment	45	2¼	100 ,,	23 40	123 0
Burnside (fresh)	6¼	3½	23 ,,	25 28	123 10
Buchanan (fresh)	7	5	28 ,,	25 31	123 10
Kelsall	2	⅝	1 ,,	25 35	123 10
Augusta	4½	2⅝	11 ,,	25 45	122 5
Clearey (brackish)	1½	½	1 ,,	25 42	123 10
King	3½	3	11 ,,	25 40	120 0
Gregory	6	2	12 ,,	25 40	119 55
Nabberu (chain of lakes)	60	—	— ,,	25 40	120 30
Teague	6	2½	15 ,,	25 50	120 55
Auld	7½	5	37 ,,	22 28	123 48
Nell	5	1½	6 ,,	22 32	123 43
Tobin	20	7½	150 ,,	21 50	125 50
Macdonald	20	12½	250 ,,	23 30	128 30
Hopkins	15	5	75 ,,	24 15	128 45
Christopher	6¼	1¼	9 ,,	24 50	127 40
Salt Lake	65	25	900 ,,	24 0	113 50
Rudall	7½	3½	25 ,,	25 58	122 18
Carnegie	50	2½	125 ,,	26 1	122 32
Dorothea	12½	3½	40 ,,	26 15	123 12
Bedford	17	1¼	18 ,,	26 5	123 16
Wells	46	6	140 ,,	26 42	123 20
Throssell	20	3	50 ,,	27 38	124 8
Lakes S.W. Throssell	—	—	1½ ,,	27 46	123 58
Salt Lake N. of Lake Carey	12½	2	23 ,,	28 18	121 55
Darlot	11	4	39 ,,	27 40	121 12
Way	26	2½	61 ,,	26 48	120 15
Maitland	25	10	225 ,,	27 0	121 10
Breaden	15	1¾	25 ,,	25 55	125 35
Seabrook	15	7	72 ,,	31 0	119 40
Lefroy	30	9	173 ,,	31 15	121 45
Goongarrie	11	6	47 ,,	30 0	121 10
Lakes, W. Goongarrie (salt)	11	4	37 ,,	30 5	121 2
Cowan	52	11	400 ,,	31 55	121 45
Yindarlgooda	9	9	47 ,,	30 45	121 52
Le Page	17	5	30 ,,	30 35	122 10
Roe	4	⅛	2 ,,	30 40	122 42
Lake E. Yindarlgooda	7	3	21 ,,	30 45	122 10
Raeside	133	2	170 ,,	29 20	120 20
Salt Lake (salt)	73	15	920 ,,	24 0	113 40
Austin	43	6	320 ,,	27 40	118 0
Muir	7	2¼	15 ,,	34 29	116 41
Wagin	⅝	⅝	250 acres	33 19	117 21
Goondaring	1¼	1⅛	1 sq. m.	33 17	117 30
Parkeyerring	2⅔	1	1¼ ,,	33 21	117 21
Quarbing	1	¾	352 acres	33 24	117 19
Norring	2¼	1¼	2⅛ sq. m.	33 26	117 17
Little Norring	1¼	1	512 acres	33 25	117 18
Flagstaff	1¼	1	524 ,,	33 31	117 15
Queerearrup	1¾	1¼	1⅓ sq. m.	33 31	117 13
Charlie	1¼	1	580 acres	33 31	117 11
Salt Lake	1⅛	1	1½ sq. m.	33 22	117 22
Murdalmurrin	⅝	⅜	64 acres	33 22	117 25
Lime	⅞	½	224 ,,	33 24	117 22
Dumbleyung	7	3	20 sq. m.	33 20	117 40
Taarlbin	6	—	2 ,,	33 0	117 33
Grace	19	1	59 ,,	33 10	118 28
Pingrup	2	1	2 ,,	33 26	118 30
Chinocup	6	2½	11 ,,	33 30	118 28
Lake N. Grace	6	1	4 ,,	33 0	118 36
Condinin	2¼	2¾	4¾ ,,	32 20	118 0
Lake, S.E. Condinin	2	1¾	2 ,,	32 30	118 10
Gillen	—	—	11 ,,	26 10	124 35

LAKES OF WESTERN AUSTRALIA—(Continued).

Lake.	Greatest Length.	Greatest Breadth.	Approximate Area.	Geographical Position.	
				Latitude S.	Longitude E.
	Miles	Miles		° ′	° ′
Yeo	20	5	90 sq. m.	28 0	124 30
Baker (salt)	7½	3½	22 ,,	26 55	126 10
Rason	30	7¾	220 ,,	28 40	124 30
Lakes N. Eucla (salt)	—	—	190 ,,	29 10	128 30
Monger	80	—	150 ,,	29 20	117 10
Moore	60	—	449 ,,	29 30	117 40
Wellhamby	7½	5	37 ,,	29 10	116 30
Yarra Yarra	16	5	51 ,,	29 44	115 48
Neakarling or Hinds	3	1½	4 ,,	30 45	116 30
Cowcowing	16	3	45 ,,	31 0	117 10
Ninan	5	2	9 ,,	31 0	118 22
Dalaroo	1¾	1	1 ,,	30 55	116 40
Gundoralcarral	1	¾	¾ ,,	30 37	115 56
Nullewa	½	⅜	100 acres	30 37	115 57
Burrillgabby	2½	2	4 sq. m.	29 7	116 12
Pinjarrega	1¾	½	430 acres	29 2	116 21
Eganu	1	½	275 ,,	30 4	115 8
Karrakin	¼	¼	70 ,,	30 0	115 6
Dowerin	3¼	1	3 sq. m.	31 4	115 30
Koomberkine	13/16	¾	400 acres	31 0	117 4
Brown	—	—	2½ sq. m.	30 56	117 0
Bidaminna	1½	⅝	350 acres	31 8	115 33
Mason	25	1½	42 sq. m.	27 35	120 40
Barlee	70	8	550 ,,	29 5	119 30
Giles	25	8¾	179 ,,	29 40	119 48
Ballard	70	10	220 ,,	29 24	120 50
Lake E. Ballard	8½	4	30 ,,	29 40	121 25
Carey	30	11	350 sq. m.	29 0	122 20
Deborah	22	5	46 ,,	30 50	119 5
Lakes N. Deborah	—	—	6 ,,	30 25	119 0
Preston	17¼	¾	13 ,,	33 0	115 42
Martin Tank	1¾	¼	300 acres	32 50	115 42
Clifton	12	¼	7½ sq. m.	32 48	115 42
Big Lake	1½	⅜	500 acres	32 42	115 42
Mears	1	⅛	400 ,,	32 14	117 20
Jandakot	1½	⅛	500 ,,	32 10	115 56
Jilbup	¾	⅛	250 ,,	32 10	115 48
Cooloongup	2	⅛	650 ,,	32 20	115 46
Walyungup	2¾	1	1100 ,,	32 21	115 46
Richmond	¾	⅛	110 ,,	32 19	115 43
Munster	1	¼	140 ,,	32 8	115 46
Walliabup	1	¼	256 ,,	32 6	115 48
Ewlyamartup	¾	⅛	250 ,,	33 42	117 44
Shaster	3½	1¼	4 sq. m.	33 52	120 43
Spencer	3¼	1¾	5 ,,	33 50	121 43
Warden	2	1½	2½ ,,	33 50	121 44
Bungidup	1½	⅛	428 acres	33 50	121 56
Gaze	2	2	3 sq. m.	33 46	121 25
Pabelup	3	⅛	800 acres	34 6	119 25
Milyunup	2½	1½	3 sq. m.	34 12	117 40
Munrillup	2	1	1¾ ,,	34 14	117 41
Tom South	⅛	⅛	130 acres	34 15	117 38
Barracup	¼	¼	½ sq. m.	34 10	117 48
Racecourse	1½	¼	1 ,,	34 8	117 40
Baligup	1½	1½	1½ ,,	34 14	117 48
Clabburn	⅛	¼	80 acres	34 8	116 50
Toolbrunup	3/20	⅛	100 ,,	34 5	117 48
Warburton	⅛	⅛	236 ,,	34 48	118 18
Comorup	¼	⅛	204 ,,	34 49	118 15
Nukennullup	⅛	⅛	180 ,,	34 23	117 17
Poorrarecup Lagoon	1½	1	1 sq. m.	34 24	117 14
Nuniup	⅛	⅛	150 acres	34 24	117 24
Dowerin Lakes	—	—	500 ,,	31 16	117 5
Matilda	⅛	⅛	100 ,,	34 25	117 35
Loch Ellen	7/40	3/40	8 ,,	34 24	117 36
Torditgurrup	3	1¾	2½ sq. m.	34 31	116 43
Myalgelup	1	¼	300 acres	34 33	116 44
Byenup	2	1½	2 sq. m.	34 29	116 44
Lake N.E. Albany (fresh)	1½	¼	384 acres	35 0	117 46
,, ,, (brackish)	1	⅛	440 ,,	35 0	117 46
Corimup	⅛	⅛	300 ,,	34 29	116 44
Nunnarup (fresh)	⅛	⅛	64 ,,	34 22	116 45
Jasper	2	1	1¾ sq. m.	34 24	115 41
Quitjup	7/8	⅛	200 acres	34 24	115 36
Nalyerin	7/16	¼	70 ,,	32 50	116 23
Salt Lake, N. Barlee	54	12	500 sq. m.	28 30	119 40
,, N.E. ,,	24	5	120 ,,	28 25	120 30
Johnston Lakes	—	—	225 ,,	32 20	120 45
Dundas	35	7½	190 ,,	32 30	122 0

LAKES OF WESTERN AUSTRALIA—(Continued).

Lake.	Greatest Length.	Greatest Breadth.	Approximate Area.	Geographical Position.	
				Latitude S.	Longitude E.
	Miles	Miles		° ′	° ′
Carmondy	1¼	1	1 sq. m.	32 37	119 20
Hurlstone	3	2½	5 ,,	32 40	119 30
Varley	3½	1½	5 ,,	32 42	119 28
O'Connor	3½	1½	5 ,,	32 28	119 8
Hutt Lagoon	25	3	10 ,,	28 8	114 16
Pinjar	5½	1½	7½ ,,	31 40	115 48
Neerabub	2½	7/16	500 acres	31 42	115 44
Yonderup	⅞	¼	83 ,,	31 32	115 42
Yanchep	4	1	1½ sq. m.	31 31	115 42
Carabooda	1½	5/16	1 ,,	31 38	115 44
Nowergup	⅞	⅜	¾ ,,	31 39	115 44
Coogee	¼	⅛	300 acres	31 36	115 42
Mindaree	1	¼	100 ,,	31 36	115 44
Wilgarup	¼	⅛	20 ,,	31 34	115 42
Beonaddy	½	⅛	40 ,,	31 35	115 41
Pindinny	9/16	⅛	40 ,,	31 35	115 41
Banban	¼	⅛	105 ,,	31 26	115 53
Nambung	5/16	⅛	70 ,,	31 26	115 53
Mungala	5/16	¼	38 ,,	31 27	115 53
Catambo	⅜	9/40	51 ,,	31 30	115 56
Josephine	9/40	1/16	9 ,,	33 6	115 35
Nomans	1	¾	420 ,,	33 0	117 30
Lukin	7/16	7/16	120 ,,	33 0	117 30
Bokan	⅜	⅜	90 ,,	33 0	117 31
Billy	⅜	⅜	80 ,,	33 0	117 31
Ibis	⅜	3/16	40 ,,	33 0	117 30
White	1½	⅞	500 ,,	33 0	117 28
Yeticup	½	⅛	150 ,,	34 15	116 23
Codarup	7/16	¼	64 ,,	34 17	116 20
Oaljalup	⅜	5/16	60 ,,	34 17	116 20
Nonalling	1	⅛	185 ,,	32 32	117 37
Whitewater	13/16	⅜	294 ,,	32 32	117 38
Lake, South (fresh)	11/16	⅛	153 ,,	32 33	117 38
Yealering (fresh)	⅝	9/16	172 ,,	32 36	117 37
Barnes	⅝	7/16	185 ,,	34 45	117 39
Jerdacuttup Lakes	—	—	4½ sq. m.	33 50	120 18
Salt Lakes near Port Culver (salt) ...	—	—	34 ,,	33 10	124 0
Barragoon	1	⅜	166 acres	31 6	115 38
Jundalup	3	⅝	2 sq. m.	31 45	115 47
Jandabup	1½	1	1½ ,,	31 45	115 51
Marginiup	13/16	⅝	¾ ,,	31 44	115 49
Gnangara	1	⅝	288 acres	31 47	115 52
Herdsman	1⅜	1¼	1⅜ sq. m.	31 54	115 48
Monger	1	½	340 acres	31 55	115 50

7. **Tasmania.**—(i.) *General.* The tabular statement given below on the authority of the Tasmanian Lands Department shews particulars of the principal lakes in Tasmania; there are, however, a large number of other lakes of smaller dimensions. Those shewn are situated near the middle of Tasmania and towards the south-east end of a basaltic tableland, which stretches away from the district of Bothwell north-westerly to Mount Bischoff. The lake district is confined to a radius of about 30 miles, and commands an elevation ranging from 2700 feet at Lake Sorell to 3800 feet above sea level at the Great Lake. The lakes form the source of all the more important rivers (with the exception of the Tamar) in the island, viz.:—the Mersey, Forth, Leven, Pieman, King, Gordon and Derwent rivers. The lakes are all freshwater and are becoming well stocked with English and Californian trout; they form natural breeding grounds for swan and wild duck of various kinds. None of the lakes are of crater formation.

(ii.) *Names, Positions, and Special Features of Tasmanian Lakes.* The subjoined statement gives particulars of the principal lakes in Tasmania. With the exception of Lake St. Clair, whose greatest depth is 550 feet, the Tasmanian lakes are shallow, ranging from 6 to about 20 feet in depth.

PRINCIPAL LAKES IN TASMANIA.

Name.	Area in Acres.	Length. Miles.	Breadth. Miles.	Special Remarks. (See Footnote.)
Great Lake	28,400	12	7	(1)
St. Clair	9,500	$8\frac{3}{4}$	$2\frac{3}{4}$	(2)
Echo	7,400	$6\frac{1}{2}$	$3\frac{1}{4}$	—
Arthur	9,000	4	3	—
Woods	2,500	3	$1\frac{3}{4}$	—
Sorell	12,200	5	6	(3)
Crescent	4,000	$3\frac{1}{2}$	$2\frac{1}{2}$	(3)

(1). The Great Lake, which is a favoured resort of tourists, is accessible by vehicle from the railway stations at Apsley, Parattah, and Tunbridge, and is distant 48 miles from the two first-named places, and 41½ miles from the last-named.

(2). Lake St. Clair, from which the River Derwent takes its rise, is about 120 miles from Hobart by road, and 80 miles from the Macquarie Plains railway station. It stretches along the eastern base of Mount Olympus, and is fringed by a dense growth of mountain foliage.

(3). Lakes Sorell and Crescent lie along the routes to Great Lake, being 24 miles from Parattah and 13½ miles from Tunbridge.

§ 3. The Fauna of Australia.

1. **Introduction.**—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.

1. **Introduction.**—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 similiar 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.

§ 5. Seismology in Australia.

1. **Introduction.**—The following brief notes regarding the present position of Seismology in Australia have been compiled from data furnished by the Government Astronomer of Victoria (P. Baracchi, Esquire) and the Director of the private observatory attached to Riverview College (Revd. E. Pigot, S.J.), Sydney.

2. **Seismological Installations at State Observatories.**—(i.) *Introductory.* At the present time no State organised service exists in Australia to undertake the work of obtaining earthquake records from localities outside the capitals. According to the latest report of the Committee on Seismology, however, it would not be difficult to recruit a number of voluntary observers in each State, to report seismic phenomena in accordance with a uniform plan. These observers need not necessarily be supplied with any special instrumental equipment.

(ii.) *Sydney Observatory.*—The records at this institution are obtained by means of a Milne seismograph. During the year 1907, 96 tremors were experienced, of which 68 were under 1 mm. amplitude, and in 1908, 82 tremors were recorded, of which 60 were less than 1 mm. amplitude. More than 70 per cent. of the total disturbances recorded were, therefore, only thickenings of the light line.

(iii.) *Melbourne Observatory.*—This observatory possesses a Milne horizontal pendulum, which is located in an underground room in the main building, and records photographically. The average period of the boom ranges from 16″ to 17″, the time scale being 60 minutes per hour, and the angular value of an amplitude of 1 mm. on the records is 0.4″. As is the case with the Sydney Observatory, all seismograms have been measured, classified, and arranged in appropriate records.

(iv.) *Adelaide Observatory.*—A Milne horizontal pendulum seismograph was erected at this Observatory in 1908. The seismograph, which is of the latest pattern, has been set up with the boom in the meridian, the free end of the boom being to the north.

(v.) *Perth Observatory.*—The seismograph at this institution was erected in 1901, and is of the Milne horizontal pendulum type. It is mounted on brick pillars with a marble table-top, the pendulum pointing due north. The pillars rest on a concrete floor about 8 feet underground and 200 feet above sea level. Observations are regularly arranged and classified, and the results sent every six months to the British Association.

(vi.) *Riverview College Observatory, Sydney.*—The seismological cellar (half underground) is situated in a secluded portion of the College grounds remote from any artificial source of vibration. There are three seismometers, each mounted on massive concrete piers with rock foundations. Of the two Wiechert instruments, No. 1 is a 1000 Kilo horizontal seismometer, with astatic pendulum, and E.W. and N.S. Components; and No. 2 is an 80 Kilo vertical seismometer. These were installed early in 1909. A third instrument of the Wiechert pattern was to be erected early in 1910. The Mainka instrument is a horizontal seismometer, with bifilar conical pendulum, and E.W. and N.S. components. The Observatory publishes monthly bulletins giving full records of earth movements.

3. **Publication of Records.**—The Secretary of the Seismological Committee of the British Association collects and publishes the seismic records obtained at observatories in every part of the world (including Australia), and an International Seismological Association also deals with similar records.

4. **Seismic Disturbances in Australia.**—The local earth tremors recorded in Australia have, so far, been of a very minor character, and at no time has there been an earthquake shock of sufficient intensity to cause loss of life or extensive damage to property.

§ 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 86, shews the geographical distribution of the more important geological systems and formations.

§ 7. Climate and Meteorology 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 3, pp. 79, 80). Space will not permit of the inclusion of this matter in the present issue.

2. **Creation of the Commonwealth Bureau of Meteorology.**—By Chapter 1, Part 5, Section 51, sub-section viii. of the Commonwealth Constitution it is enacted that "Parliament shall, subject to this constitution, have powers to make laws for the peace, order, and good government of the Commonwealth with respect to, *inter alia*, meteorological observations." The Meteorological Act of 1906 was assented to on the 28th August, 1906, and enacts that—The Commonwealth Meteorologist may, subject to the regulations and to the directions of the Minister, be charged with any of the following duties:—

(*a*) The taking and recording of meteorological observations.
(*b*) The forecasting of weather.
(*c*) The issue of storm warnings.
(*d*) The display of weather and flood signals.
(*e*) The display of frost and cold wave signals.
(*f*) The distribution of meteorological information.
(*g*) Such other duties as are prescribed to give effect to the provisions of this Act.

The Governor-General may enter into an arrangement with the Governor of any State in respect of all or any of the following matters:—

(*a*) The transfer to the Commonwealth, on such terms as are agreed upon, of any observatory and the instruments, books, registers, records, and documents used or kept in connection therewith.
(*b*) The taking and recording of meteorological observations by State officers.
(*c*) The interchange of meteorological information between the Commonwealth and State authorities.
(*d*) Any matters incidental to any of the matters above specified or desirable or convenient to be arranged or provided for for the purpose of efficiently and economically carrying out this Act.

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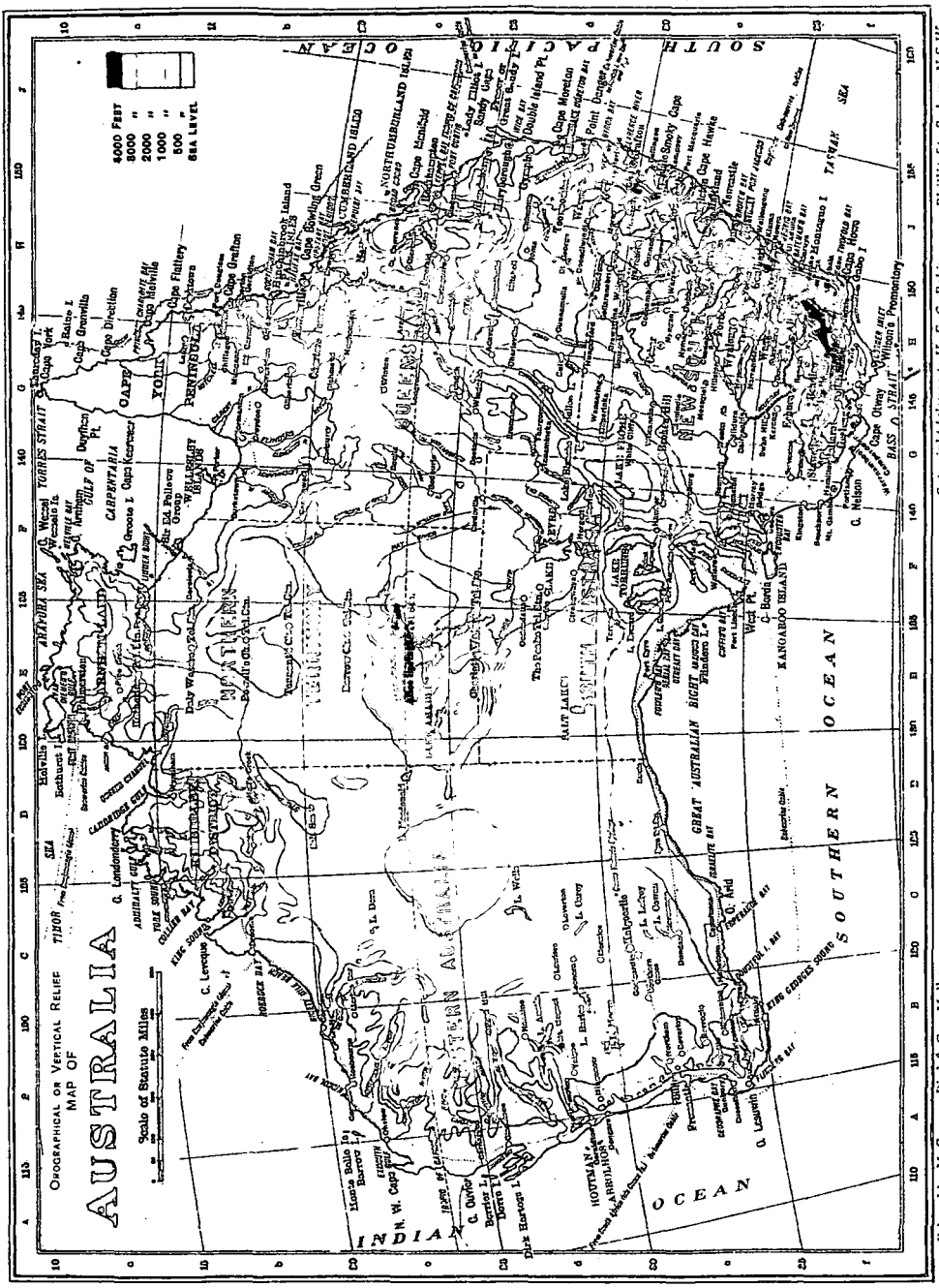
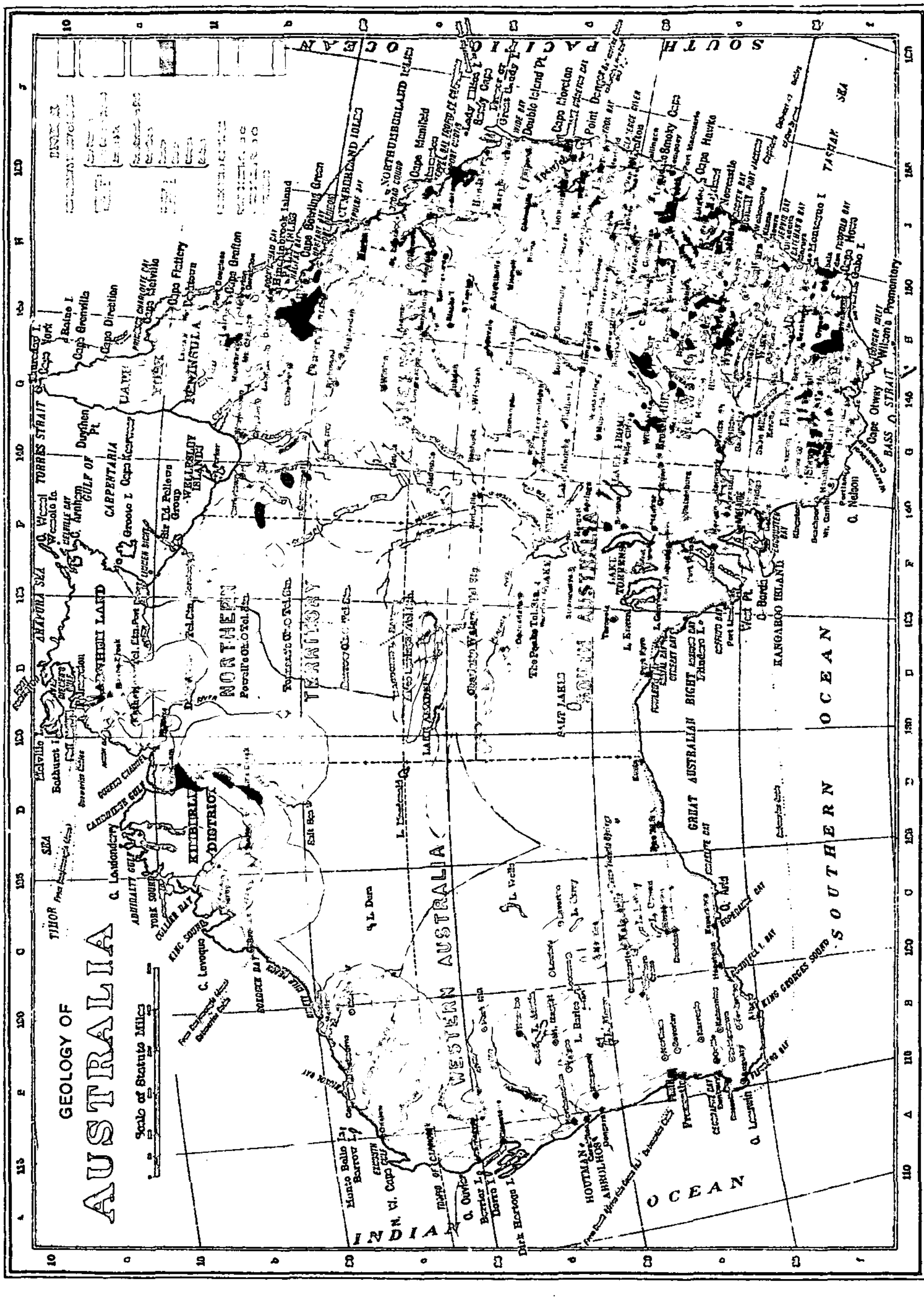
1. Prepared from data supplied by the Commonwealth Meteorologist, H. A. Hunt, Esquire F.R.M.S.



Printed by McCarron, Bird & Co., Melbourne.



The Governor-General may enter into any arrangement with the Governments of other countries or any of them for the interchange of meteorological information and any matter incidental thereto between such Governments and the Commonwealth.

The Governor-General may make regulations prescribing all matters necessary or desirable to be prescribed for carrying out or giving effect to this Act.

H. A. Hunt, Esquire, F.R.M.S., was appointed Commonwealth Meteorologist, and entered upon his duties on the 1st January, 1907.

3. **Meteorological Conference.**— Under the presidency of the Commonwealth Meteorologist, a conference of meteorologists was held in the Conference-room of the Bureau of Census and Statistics during the period from the 20th to the 23rd May, 1907, when the following questions were discussed, viz.:—

(i.) The range of practical meteorological observation to be at once undertaken.
(ii.) The expansion of meteorological work to be undertaken in the future.
(iii.) The extent of purely scientific investigations, the undertaking of which is desirable in the interests of meteorology.
(iv.) Meteorological records, reports, and publications.
(v.) Maritime meteorology.
(vi.) The relation of river observation to flood forecasting.
(vii.) The co-operation of the Commonwealth and States Departments.

4. **Organisation of Meteorological Bureau.**—The Central Bureau premises are situated at the corner of Victoria and Drummond Streets, Carlton, Melbourne. Observations are carried on at this site, and also within the Royal Society's grounds, which afford a better exposure for the instruments. Divisional offices are also maintained in the capitals of each of the other States. The central Bureau is divided into five sub-departments, each being under the immediate supervision of assistants, whose duties are distributed as follows:—

Weather predictions, storm warnings, summaries of current weather, and management of the Central Bureau.

Divisional Bureaux and observing stations.

Climatological work and records of the Commonwealth.

Daily observations, entry of same into ledgers, reduction tables for various elements, distribution and collection of information with respect to the maritime branch of the service.

Instrumental stock, standardising and satisfactory working of all instruments before distribution to the observing stations throughout the Commonwealth.

The five assistants have been drawn from the different States, where they held leading positions in the meteorological services prior to the advent of federal control. They now constitute a daily forecast board, presided over by the Commonwealth Meteorologist. The observations made at the chief meteorological stations are telegraphed to the Central Bureau, where they are plotted on charts and discussed by the Board. The results of its deliberations are then wired to the divisional Bureaux, where they are amplified or modified in the light of the latest local indications, and then distributed to the settled districts of the respective States.

5. **Publications, etc.**—The following have been issued daily, viz.:—(i.) Weather charts. (ii.) Rainfall maps. (iii.) Bulletins, Victorian and Interstate, shewing pressure, temperature, wind, rain, cloud extent, and weather.

The Bulletins of Climatology are as follow:—(*a*) Bulletin No. 1.—A general discussion of the climate and meteorology of Australia, illustrated by one map and diagrams.

(*b*) Bulletin No. 2.—A discussion of the rainfall over Australia during the ten years (1897-1906) compared with the normal, illustrated by one map.

Bulletin 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.

Bulletin No. 4.—A discussion of the monthly and seasonal rainfall over Australia, illustrated by one map and diagram.

Bulletin No. 5.—An investigation into the possibility of forecasting the approximate winter rainfall for Northern Victoria, illustrated by two diagrams.

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. It is proposed to publish in an annual volume of meteorological statistics, complete rainfall and other climatological data.

6. **General Description of Australia.**—In the general description of Australia, page 53, it is pointed out that a considerable portion (0.530) of three States of the Australian Commonwealth is north of the tropic of Capricorn, that is to say, within the States of Queensland, the Northern Territory and Western Australia, 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 1.509). 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 luxuriousness 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.

7. **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.,

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 boundary between South and Western Australia, viz., the 129th meridian of east longitude; (*b*) between divisions II. and III., starting at the Gulf of Carpentaria, along the Norman River to Normanton, thence a straight line to Wilcannia on the Darling River, New South Wales; (*c*) between divisions II. and IV., from Wilcannia along the Darling River to its junction with the Murray; (*d*) between divisions II. and V., from the junction of the Darling and Murray Rivers, along the latter to Encounter Bay; (*e*) between divisions III. and IV., starting at Wilcannia, along the Darling, Barwon, and Dumaresq Rivers to the Great Dividing Range, and along that range and along the watershed between the Clarence and Richmond Rivers to Evans Head on the east coast of Australia; (*f*) between divisions IV. and V., from the junction of the Darling and Murray Rivers along the latter to its junction with the Murrumbidgee, along the Murrumbidgee to the Tumut River, and along the Tumut River to Tumut, thence a straight line to Cape Howe; (*g*) division V. includes Tasmania.

The populations included within these boundaries on 30th June, 1907, may be taken approximately as follows:—

Division	I.	II.	III.	IV.	V.
Population	260,000	481,000	537,000	1,369,000	1,511,000

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	Port 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 ...	863	32	18	148	35
Melbourne ...	91	37	50	144	59	Laverton ...	1530	28	40	122	23
Hobart	160	42	53	147	20	Coolgardie ...	1402	30	57	121	10

8. **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 Port Darwin, for example, the difference in the means for the hottest and coldest months is only 8.7°, 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. It will suffice here to briefly refer to special features.

(i.) *Perth.* Meteorological observations were taken in the Perth Botanical Gardens as far back as 1876, but since the conditions surrounding the instruments and the situation of the station relative to Perth cannot be regarded as quite satisfactory, the more exact climate history of Perth did not properly commence until 1897, when the present Observatory was established. During the period 1897 to 1909, the mean annual shade temperature of Perth was 64°, about a degree higher than that for Sydney and Adelaide, over 5° higher than that for Melbourne, and 10° above that for Hobart, but, on the other hand, 5° below that for Brisbane. The average temperature for the month of January is 73.6°, and for July 55.0°.

The extreme maximum shade record of 107.9° was registered in December, 1904, and the lowest minimum shade temperature was 35.3°, in August, 1908.

(ii.) *Adelaide.* In Adelaide the climate is drier and more sunny than in the other capitals, and, consequently, radiation is less hindered. The extremes of heat are consequently somewhat more marked, especially in the summer months. The mean shade temperature for January is 74.2°, and February 73.9°, and that of July 51.5°. Records of the temperature having reached 100° exist for each of the six summer months from October to March, and of having exceeded 110° exist for each of those months with the exception of March and October. The highest record of shade temperature in Adelaide is 116.3°, registered in January, 1858, and the lowest 32.0°, a range of 84.3°. The freezing point has only once been reached by the shade temperature thermometers, notwithstanding the fact that records have been kept for fifty-two years. Frosts have, however, occurred on the grass (four feet below the shade thermometers) at various times between the beginning of April and the end of November.

(iii.) *Brisbane.* In Brisbane the monthly mean shade temperature ranges from 77.2° in January to 58.0° in July, a difference of 19.2°. The extremes have varied from 108.9° in January to 36.1° in July, viz., through a range of 72.8°.

(iv.) *Sydney.* In Sydney the highest monthly mean is 71.6°, recorded in January, while the lowest, again in July, is 52.3°, giving a range of 19.3°.

The extremes of shade temperature recorded at Sydney over a period of half a century are 108.5° in January, 1896, and 35.9° in July, 1890, *i.e.*, a range of 72.6°.

(v.) *Melbourne.* In Melbourne the January mean shade temperature averages 67.4°, and that of July 48.5°, the highest reading ever recorded being 111.2° in January, 1862, and the lowest 27.0° in July, 1869.

(vi.) *Hobart.* The mean temperature for the hottest month at Hobart is 62.0° in January, and that of the coldest 45.8°, in July, the highest reading ever recorded being 105.2° in December, 1897, and the lowest 27.7°, nearly a degree higher than the lowest experienced in Melbourne.

(vii.) *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.

(viii.) *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 for each for the entire year. In the diagram (on page 103) 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).

9. **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 nine representative places the variations of humidity are shewn on the graph on page 103, which gives results based upon daily observations of the greatest and least humidity. 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.

(i.) *Perth.* At Perth the mean annual humidity at 9 a.m. is 63; the greatest monthly mean is 83, and is in June, and the lowest 45, in January.

(ii.) *Adelaide.* At Adelaide the mean annual humidity is only 56; the mean monthly humidity has been as low as 33 in January and December, and as high as 87 in July.

(iii.) *Brisbane.* In Brisbane the mean annual humidity is 68; the lowest monthly mean recorded is 47, and is in September, and the highest 85 in the months of March and May.

(iv.) *Sydney.* In Sydney the mean annual humidity is 73; the greatest monthly average, which occurred in May, 1889, the wettest month on record during the last forty years, was 90, while the lowest monthly mean, 55, occurred in the month of October, 1867.

(v.) *Melbourne.* The mean annual humidity derived from the 9 a.m. 3 p.m. and 9 p.m. observations in Melbourne is 71; the greatest monthly average 88, in June and July, 1888, and the lowest 49, in December, 1908.

(vi.) *Hobart.* Hobart's mean annual humidity is 71, the highest 92, in June, and the lowest 51, in February.

From the above results, it is seen that, in respect of relative humidity, Sydney has the first place, while Hobart, Melbourne, Brisbane, Perth, and Adelaide follow in the order stated, Adelaide being the driest. The graphs on page 103 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.

10. **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 following records, which have been obtained from either jacketed tanks sunk into the ground, or in the case of Laverton (W.A.) from a jacketed vessel (8 inches in diameter) exposed on the surface.

The average total evaporation at Sydney is 37.42 inches; at Melbourne, 38.40 inches; at Adelaide, 54.63 inches; and at Perth, 65.87 inches, these results being based respectively upon 46, 37, 39, and 10 years' observations. For Brisbane the result is 85.37 inches, based upon 8 years' observations only, and determined by means of Piché's tube evaporimeter.

In the interior of New South Wales the annual evaporation is as high as 84 inches; in Central Australia at Alice Springs the average for 19 years is 97.44 inches; at Coolgardie, Western Australia, the mean for eleven years is 86.43 inches, and at Laverton, in the same State, the yearly amount derived from the last 4 years is 145.32 inches, or over 12 feet.

(i.) *Monthly Evaporation Curves.* The curves shewing the mean monthly evaporation in various parts of the Commonwealth will disclose how characteristically different are the amounts for the several months in different localities. The evaporation for characteristic places is shewn on diagram shewing also rainfalls (see page 104).

(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.

11. **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.

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

(i.) *Factors determining Distribution and Intensity of Rainfall.* The distribution and intensity of rainfall in the interior of the continent, and also to some extent in the areas already mentioned, are governed by the seasonal peculiarities of three distinct atmospheric control systems, the most important of which is, undoubtedly, the anti-cyclonic stream. This stream, which girdles the earth and embraces approximately the region between 15° and 40° south latitude, breaks up into vast elliptically-shaped bodies of circulating atmosphere, measuring frequently 3000 miles in their major and 2000 miles in their minor axes. In passing over Australia from west to east, these great bodies of circulating air cause moist-laden winds to sweep across the continent from the surrounding oceans. The front-circulation brings in winds from the Southern Ocean, and the rear-circulation those from the equatorial seas.

The rain-invoking agent second in order of importance because of its reliability is the well-known "V-shaped depression." The sphere of operation of this latter disturbance is ordinarily the southern half of the continent, although occasionally it may extend its influence to tropical latitudes. The western half of this type of disturbance, with a southerly wind circulation, is the portion from which rain is most frequently to be expected, but occasionally good falls of rain, attended with electrical manifestations, are liberated from the warm eastern portion.

The third agent associated with the production of rain is the tropical depression more popularly known as the "monsoonal depression." This disturbance may be in active evidence for a succession of seasons, and then be conspicuously absent for a number of years, thus raising the question whether, after all, it can be regarded as in any way a distinctive feature of Australian meteorology.

When these disturbances are actively operative in the production of rain, the effect on the country generally, and the economic results for the succeeding season, are very pronounced. The interior of the continent becomes transformed. The plains, which ordinarily have so profound an effect on the heat winds of the summer, are deluged with rain, and respond immediately with an astonishingly luxurious growth of grass and herbage. The air is both tempered in heat, and loses its dryness for considerable periods after their visitations.

The distribution of rain by monsoonal disturbances is, however, very capricious in comparison with that precipitated by the southern "depressions." During some seasons the whole of the northern half of the continent will benefit to a fairly uniform degree, at another time some special region will be favoured. A remarkable example of this peculiarity occurred in 1902, for when monsoonal rains were copiously falling over the major portion of Western Australia, the eastern half of the continent was suffering from severe drought conditions.

During other seasons, tongue-shaped regions extending southwards from the northern shores of the continent will be particularly favoured in regard to rain. These regions may extend to the interior of Western Australia, and simultaneously others may occur in the Central Territory, in Western Queensland, and in the interior of New South Wales.

It is thus obvious that different parts of the continent are mainly dependent upon forms of atmospheric disturbances for what may be called their fundamental rains, and since there is a seasonal tendency for a particular class of storms to predominate, it rarely happens that any year passes in which the rains are universally good. Again, the condition of drought can hardly affect the whole of the continent at the same time. Nevertheless a more than ordinarily fortunate condition in one part of the continent ordinarily implies drought conditions in another, or *vice-versâ*. Thus in New South Wales, monsoonal rains, so beneficial to its north-western districts, rarely extend during the same season to coastal areas, or to Southern Riverina. For this reason it may happen occasionally that sheep may with advantage be sent 500 or 600 miles from the coast for feed and water. Should the southern or antarctic low-pressures be the predominating influence, the country to the south of the Murrumbidgee River is benefit-

ing at the expense of the remainder of the State. A good coastal season ordinarily depends upon an anticyclonic control; when such exists, the country west of the tablelands usually wants water.

A good season for Australia as a whole is dependent upon many circumstances. Not only must the main rain-giving storms be well represented, but other favourable conditions must also coexist. The general rate of translation of the atmosphere across the continent is a factor of the utmost importance. Another is the latitude the cyclones and anti-cyclones are moving in, and, further, the daily or periodic surgings of high and low pressures to and from the equator are also factors of considerable moment.

(ii.) *Time of Rainfall.* Monsoonal rains affect the northern parts of the continent in the summer months, and may continue with diminishing energy for nearly six months of the year. As they penetrate into higher latitudes the period of action is delayed, but is not shortened, though the quantities of the fall materially lessen. Antarctic rains are experienced during the winter months of the year, the resultant quantities being reliable and consistently regular. The heaviest totals from this source are precipitated on the west coast of Tasmania. Thus at Mount Lyell the total for one year exceeded 140 inches, and even the average is 115.93 inches.

Anticyclonic rains occur at all times of the year, but more markedly from March to September. They benefit particularly the southern area of the continent, and are responsible for many of the heaviest rainfalls and floods on the coastal districts of New South Wales.

(iii.) *Wettest and Driest Regions.* The wettest known place in Australia is Geraldton, on the north-east coast of Queensland, where the average rainfall for 23 years is no less than 147.78 inches, the maximum yearly total being 211.24 inches and the minimum 69.87 inches. The difference of range between these extremes is 141.37 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 107, shewing the areas subject to average annual rainfalls lying between certain limits. The areas so defined 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	79,629	nil	126,390	309,196	153,226	417,896	nil	1,086,337
10—20 ,,	118,685	36,241	251,150	57,025	181,298	397,416	nil	1,041,815
20—30 ,,	76,217	38,794	175,390	13,257	88,505	109,481	4,242	505,886
30—40 ,,	24,685	8,072	67,310	370	16,765	37,498	7,397	162,097
Over 40 ,,	11,156	4,777	50,260	222	83,826	13,629	14,576	178,446
Total area ...	310,372	87,884	670,500	380,070	523,620	975,920	26,215	2,974,581

Referring first to the southern capitals, it may be noted that the average at Melbourne from 66 years' records is 26.15 inches; the maximum 44.25, and minimum 15.61; the range therefore is 28.64 inches. At Adelaide the average determined from seventy years' totals is 21.10, the maximum 30.87, the minimum 13.43, and the range therefore 17.44 inches. At Hobart 23.36 inches is the average annual rainfall, 40.67 is the highest total for one year, 13.43 is the lowest; thus 27.24 inches is the extreme range. The average for Perth is 33.44 inches, 46.73 being the maximum and 20.48 inches the minimum; the range is therefore 26.25 inches. These figures appear to constitute an exception to the general rule, but it should be mentioned as a possible explanation that records have there been taken only since 1876, whereas the records at the other cities date from 1840 or thereabouts.

Continuing the comparison of rainfall figures, Sydney's average annual total is 48.28 inches, its maximum 82.81 in 1860, and minimum 21.48 in 1849, thus the range is 61.33 inches. At Brisbane the disparities are greater still. There the average is 46.94 inches —a trifle lower than that of Sydney—the annual maximum was 88.26 inches in 1893, the minimum 16.17 inches in 1902, and the range therefore 62.09 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. Port 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. 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.

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 82	137	...	31.16	...	...	23.60	...	...
3	...	...	...	17.19	104	...	51.67	...	...	62.78	168	...	21.54	...	...	13.43	...	...
4	...	...	...	16.88	136	...	63.20	...	...	70.67	157	...	30.74	...	...	26.25	...	...
5	...	...	...	18.83	125	...	39.99	...	...	62.03	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.)	42.80	142	...	30.18	...	...	14.46	...	...
8	...	...	...	19.74	114	21.07	42.59	...	...	59.17	137	58.33	33.15	...	28.22	23.62	...	19.24
9	...	...	...	25.44	110	(9 yr.)	...	...	...	21.48	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	...	...	...	...	35.14	142	...	...	...	...	17.98	...	...
2	...	...	...	27.44	118	...	...	...	...	43.78	145	...	...	...	...	23.62	...	...
3	...	...	...	27.08	128	...	...	...	...	46.11	130	...	...	...	...	14.52	...	...
4	...	....	...	15.35	105	...	...	...	...	29.28	136	...	...	...	...	30.54	...	...
5	...	...	...	23.15	124	...	...	...	...	52.85	138	...	28.21	...	...	18.25	...	...
6	...	...	...	24.93	118	...	...	...	...	43.31	116	...	29.76	134	...	22.73	151	...
7	...	...	...	22.15	105	...	...	...	...	50.95	135	...	28.90	138	...	17.20	113	...
8	...	...	...	21.55	107	23.75	43.00	...	...	39.60	139	40.74	26.01	158	...	33.04	129	22.59
9	...	...	...	14.85	95	...	35.00	...	...	42.06	128	...	21.82	156	...	23.31	...	...
1860	...	...	...	19.67	119	...	54.63	144	...	82.81	182	...	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	...	23.98	111	...	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	187	...	27.40	144	...	28.11	...	...
5	...	...	...	15 51	108	...	24.11	52	...	36.29	128	...	15.94	119	...	23.07	...	...
6	...	...	...	20.11	116	...	51.18	142	...	36.81	149	...	22.41	107	...	23.55	...	...
7	...	...	...	19.05	112	...	61.04	112	...	59.68	126	...	25.79	133	...	22.27	...	...
8	...	...	...	19.99	113	19.85	35.98	110	47.55	43.05	127	50.02	18.27	120	24.47	18.08	...	25.00
9	...	...	...	14.74	117	...	54.39	114	...	48.19	134	...	24.58	129	...	23.87	...	...
1870	...	...	...	23 84	119	...	79.06	154	...	64.22	178	...	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	161	...	32.52	136	...	31.76	160	...
3	...	...	...	21.00	139	...	62.02	138	...	73.40	176	...	25.61	134	...	23.43	157	...
4	...	...	...	17:23	127	...	38.71	135	...	63.60	173	...	28.10	134	...	21.09	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	54.02	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	...	...	...	...
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	189	...	32.39	153	...	24.21	174	...
8	27.83	117	33.29	14 55	131	19.30	33.08	143	45.93	23.01	132	42.95	19.42	123	24.66	18.45	151	23.65
9	39.96	123	...	30.87	143	...	49.36	155	...	57.16	186	...	27.14	125	...	30.80	180	...
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	...	...	...	...
3	40.12	145	...	21.49	129	...	88.26	147	...	49.90	208	...	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	...	19.93	119	...
6	31 50	103	...	15 17	121	...	44.97	121	...	42.40	157	...	25.16	124	...	20.88	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	149	51.12	15.61	102	23.61	20.41	164	24.23
9	32.40	107	...	18.84	119	...	38.85	141	...	55.90	172	...	28.87	116	...	20.68	170	(9 yr.)
1900	36.61	124	...	21.68	133	...	34.41	110	...	66.54	170	...	25.09	139	...	19.14	135	...
1	36.75	122	...	18.01	124	...	38.48	110	...	40.10	151	...	27.45	113	...	23.66	147	...
2	27.06	93	...	16.02	123	...	16.17	87	...	43.07	176	...	23.08	102	...	21.92	151	...
3	35.69	140	...	25.47	134	...	49.27	136	...	38.62	169	...	28.43	130	...	25.86	139	...
4	34.35	125	...	20.31	117	...	33.23	124	...	45.93	155	...	29.72	128	...	22.41	139	...
5	34.61	116	...	22.28	131	...	36.76	108	...	35.03	144	...	25.64	129	...	32.09	168	...
6	32.37	121	...	26.51	127	...	42.84	125	...	31.89	159	...	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	168	43.41	17.72	130	25.36	16.50	149	23.15
9	39.11	107	...	27.69	138	...	34.07	121	...	32.27	181	...	25.86	171	...	27.29	170	...
Aver.			33.44			21.10			46.94			48.28			26.15			23.36
No.of Yrs.			(34)			(70)			(60)			(70)			(66)			(65)

12. **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 1908 INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Albion Park ...	8 Feb., 1895	10.00	Leconfield... ...	9 Mar., 1893	14.53
Albury	14 „ 1898	10.70	Liverpool	23 Feb., 1874	10.39
Alme Dorrigo ...	22 Jan., 1893	10.27	Mackeville* ...	23 Feb., 1908	10.00
Anthony	28 Mar., 1887	17.14	Madden's Creek ...	2 „ „	10.36
„	15 Jan., 1890	13.13	Maitland W. ...	9 Mar., 1893	14.79
Arnold Grove ...	28 May, 1889	11.13	Major's Creek ...	14 Feb., 1898	12.32
„ „ ...	20 Mar., 1892	10.08	Mittagong... ...	6 Mar., 1893	11.71
Araluen	14 Feb., 1898	10.51	Morpeth	9 „ „	21.52
„	15 „ „	13.36	Mount Kembla ...	14 Feb., 1898	10.25
Billambil	14 Mar., 1894	12.94	„ „ ...	2 Feb., 1908	10.27
Bowral	6 „ 1893	11.94	Myra Vale ...	14 „ 1898	10.00
Bowraville... ...	22 June, 1898	11.50	Nambucca Heads ...	3 Apr., 1905	10.62
Broger's Creek ...	14 Feb., „	20.05	Nepean Tunnel ...	14 Feb., 1898	12.30
Bulli Mountain ...	19 Mar., 1894	10.45	Newcastle... ...	19 Mar., 1871	11.17
„ „ ...	13 Feb., 1898	17.14	„	9 „ 1893	11.14
Burwood	28 May, 1889	11.75	„	24 Feb., 1908	10.02
Camden	11 July, 1904	10.90	Nowra	11 July, 1904	11.50
Camden Haven ...	22 Jan., 1895	12.23	Parramatta ...	28 May, 1889	11.94
Canley Vale ...	28 May, 1889	10.06	„	20 Mar., 1892	11.01
„ „ ...	20 Mar., 1892	10.85	Port Macquarie ...	9 Nov., 1887	10.76
Castle Hill... ...	28 May, 1889	13.49	Port Stephens ...	9 Feb., 1889	10.15
Cockle Creek ...	23 Feb., 1908	10.45	Prospect	28 May, „	12.37
Colombo Lyttleton ...	5 Mar., 1893	12.17	Raymond Terrace ...	28 Sep., 1903	10.32
Condong	27 „ 1887	18.66	Richmond ...	28 May, 1889	12.18
„	15 Jan., 1890	11.50	Robertson... ...	14 Feb., 1898	10.00
Cookville	1 Apr., 1892	11.31	„	10 July, 1904	10.50
Coramba	11 June, 1893	10.83	Rooty Hill ...	27 May, 1889	11.85
Cordeaux River ...	26 Feb., 1873	10.98	Rylstone	28 „ „	10.26
„ „ ...	3 „ 1890	11.51	Seven Oaks ...	22 June, 1898	11.06
„ „ ...	14 Feb., 1898	22.58	Springwood ...	7 Mar., 1894	10.55
„ „ ...	31 Aug., 1906	10.31	Taree	28 Feb., 1892	12.24
Cudgen	15 Mar., 1894	10.23	Terara	26 „ 1873	12.57
Dapto West ...	14 Feb., 1898	12.05	Tomago	9 Mar., 1893	13.76
Darkes' Forest ...	8 „ 1895	11.10	Tongarra	9 July, 1904	11.10
Dunheved	28 May, 1889	12.40	Tongarra Farm ...	14 Feb., 1898	15.12
Eden	4 „ 1875	10.52	Towamba	5 Mar., 1893	20.00
Fernmount ...	2 Feb., 1890	10.36	Tweed Heads ...	14 Jan., 1890	10.53
„	2 June, 1903	11.29	„ „ ...	14 Mar., 1894	11.40
Goorangoola ...	9 Mar., 1893	10.34	Trial Bay	9 „ 1893	11.13
Guy Fawkes ...	2 June, 1903	11.30	Wollongong ...	26 Feb., 1873	11.00
Hercynia	28 May, 1889	11.85	„ ...	5 Apr., 1882	10.00
Holy Flat	12 Mar., 1887	12.00	Woolgoolga ...	11 June, 1893	10.83
„ „	28 Feb., 1892	12.24	Yellow Rock ...	14 Feb., 1898	11.69
Jamberoo	14 „ 1898	10.92	South Head		
Kareela	20 Oct., 1902	11.73	(near Sydney)...	29 Apr., 1841	20.12
Kempsey	10 Mar., 1893	10.34	„ „ ...	16 Oct., 1844	20.41

* 6.50 inches fell in 2 hours.

HEAVY RAINFALLS, QUEENSLAND, UP TO 1896 INCLUSIVE.

Ayr	20 Sep., 1890	14.58	Bowen Park ...	16 Feb., 1893	10.38
„	25 Mar., 1891	10.19	Brisbane	21 Jan., 1887	18.31
„	26 Jan., 1896	10.50	Bromby Park (Bowen)	14 Feb., 1893	13.28
Beenleigh	21 „ 1887	11.30	„ „ ...	20 Jan., 1894	11.20
Bloomsbury ...	14 Feb., 1893	17.40	Bulimba (Brisbane)...	16 Feb., 1893	10.40
„ ...	27 Jan., 1896	10.52	Bundaberg ...	31 Jan., 1893	10.15
Bowen	13 Feb., 1893	14.65	Burketown ...	15 „ 1891	13.58
„	20 Jan., 1894	11.11	Bustard Head ...	18 Feb., 1888	10.14

HEAVY RAINFALLS, QUEENSLAND—Continued.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Bustard Head ...	30 Jan., 1893	11.85	Lytton	13 Mar., 1892	10.60
Caboolture... ...	21 „ 1887	10.00	„	16 Feb., 1893	11.74
Cairns	11 Feb., 1889	14.74	Mackay	17 „ 1888	10.10
„	21 Apr., „	12.40	„	15 „ 1893	10.46
„	5 „ 1891	14.08	Macnade Mill (Townsville) ...	28 Mar., 1891	10.61
„	19 Jan., 1892	10.56	„	15 „ 1893	10.50
Caloundra	21 „ 1887	10.50	„	18 Jan., 1894	12.56
Cape Grafton ...	5 Mar., 1896	13.37	„	17 Apr., „	14.26
Cardwell	18 „ 1887	10.15	Marlborough ...	17 Feb., 1888	14.24
„	30 Dec., 1889	12.00	„ ...	29 Jan., 1896	10.84
„	2 Jan., 1890	10.06	Mein	4 Apr., 1895	10.50
„	23 Mar., „	12.00	Mooloolah... ...	13 Mar., 1892	11.53
Clare	26 Jan., 1896	15.30	„	2 Feb., 1893	29.11
Collaroy	30 „ „	14.25	„	9 June, „	11.50
Cooran	1 Feb., 1893	13.62	Mount Perry ...	24 Feb., 1887	10.00
„	9 June, „	10.12	Mundoolun ...	21 Jan., „	17.95
Cooroy	9 „ „	13.60	Musgrave	6 Apr., 1894	13.71
Cressbrook... ...	16 Feb., „	10.65	Nanango	9 June, 1893	10.00
Crohamhurst (Blackall Range)	31 Jan., „	10.78	Nerang	15 „ 1892	12.35
„ „ ...	2 Feb., „	35.71	Netley(Rockhampton)	29 Jan., 1896	11.77
Crohamhurst ...	9 June, „	13.31	North Pine ...	21 „ 1887	11.60
Cryna (Beaudesert) ...	21 Jan., 1887	14.00	„ „ ...	16 Feb., 1893	14.97
Donaldson... ...	27 „ 1891	11.29	Palmwoods ...	4 „ „	12.30
Dungeness... ...	16 Mar., 1893	22.17	Pittsworth ...	11 Mar., 1890	14.68
„	19 Jan., 1894	11.84	Port Douglas ...	5 „ 1887	13.00
„	17 Apr., „	14.00	„ „ ...	12 Feb., 1888	10.00
Eddington(Cloncurry)	23 Jan., 1891	10.33	„ „ ...	20 Jan., 1892	11.50
Emu Park... ...	31 „ 1893	10.00	„ „ ...	23 Feb., 1894	10.25
Esk	21 „ 1887	10.70	„ „ ...	7 Apr., „	10.00
Fassifern	21 „ „	10.20	Ravenswood ...	24 Mar., 1890	17.00
Geraldton	11 Feb., 1889	17.13	„ ...	27 Jan., 1896	10.52
„	31 Dec., „	12.45	Redcliffe	21 „ 1887	14.00
„	25 Jan., 1892	11.10	„	16 Feb., 1893	17.35
„	6 Apr., 1894	16.02	Rockhampton ...	17 „ 1888	10.82
„	3 Mar., 1896	11.42	„	29 Jan., 1896	10.53
Gladstone	18 Feb., 1888	12.37	Sandgate	21 „ 1887	10.50
„	31 Jan., 1893	14.62	„	16 Feb., 1893	14.03
Glen Broughton ...	5 Apr., 1894	18.50	St. Helena ...	16 „ „	11.20
Gold Creek Reservoir	16 Feb., 1893	11.16	St. Helens (Mackay)	24 „ 1888	12.00
Goodna	21 Jan., 1887	11.00	St. Lawrence ...	17 „ „	12.10
Goondi Mill(Gerald'n)	20 „ 1892	11.10	„ „ ...	30 Jan., 1896	15.00
„ „ ...	6 Apr., 1894	15.69	Tabragalba ...	21 „ 1887	10.00
Haughton Valley ...	26 Jan., 1896	18.10	TambourineMountain	17 July, 1889	10.91
Holmwood(Woodford)	2 Feb., 1893	16.19	The Hollow (Mackay)	23 Feb., 1888	15.12
Ingham	18 Jan., 1894	12.60	„ „ ...	? Mar., 1891	10.39
„	7 Apr., „	10.10	Tooloombah ...	29 Jan., 1896	11.70
Inkerman	21 Sep., 1890	12.93	Townsville ...	24 „ 1892	19.20
Inneshowen (Johnstone River)	30 Dec., 1889	14.01	Woodford... ...	2 Feb., 1893	14.93
Inskip Point ...	13 Mar., 1892	10.65	Woodlands (Yeppoon)	10 „ 1889	10.00
Kamerunga (Cairns)...	20 Jan., „	13.61	„ „	26 Jan., 1890	10.22
„ „ ...	23 Feb., 1894	10.10	„ „	25 Mar., „	14.25
Kamerunga ...	6 Apr., „	14.04	„ „	31 Jan., 1893	23.07
„ ...	5 „ 1895	12.31	„ „	30 „ 1896	11.91
„ ...	5 Mar., 1896	11.81	„ „	9 Feb., „	13.97
Lake Nash... ...	10 Jan., 1895	10.02	Yandina	1 „ 1893	20.08
Landsborough ...	2 Feb., 1893	25.15	„	9 June, „	12.70
„ ...	9 June, „	12.80	Yeppoon	31 Jan., „	20.05
Lytton	21 Jan., 1887	12.85	„	30 „ 1896	11.02

HEAVY RAINFALLS, WESTERN AUSTRALIA, UP TO 1909 INCLUSIVE.

Name of Town or Locality.	Date.	Amnt.	Name of Town or Locality.	Date.	Amnt.
		ins.			ins.
Balla Balla ...	20 Mar., 1899	6.00	Obagama	17 Feb., 1896	6.30
„ „ ...	21 „ 1899	14.40	„	18 „ „	7.22
Boodaril	3 Jan., 1894	10.03	Point Torment ...	17 Dec., 1906	11.86
„	4 „ „	5.22	Point Cloates ...	20 Jan., 1909	10.87
„	21 Mar., 1899	14.53	Port Hedland ...	7 Feb., 1901	3.56
„	6 Feb., 1901	1.91	„	8 „ „	9.55
„	7 „ „	9.16	Roebourne... ...	3 Apr., 1898	11.44
Bamboo Creek ...	22 Mar., 1899	10.10	"	6 Mar., 1900	10.32
Carlton	11 Jan., 1903	10.64	Tambrey	6 „ „	11.00
Cossack	3 Apr., 1898	12.82	„	3 „ 1903	10.46
„	15 „ 1900	6.89	Thangoo	17-19 Feb.'96	24.18
„	16 „ „	13.23	„	28 Dec., 1898	11.15
Croydon	3 Mar., 1903	12.00	Whim Creek ...	2 Apr., 1898	7.08
Cocos Island ...	29 Nov., „	14.38	„	3 „ „	29.41
„ „ ...	26 Dec., 1907	8.00	„	20 Mar., 1899	8.89
„ „ ...	27 „ „	2.65	„	21 „ „	18.17
„ „ ...	8 July, 1908	10.21	„	6 „ 1900	10.03
„ „ ...	9 „ „	2.75	„	3 „ 1903	10.44
„ „ ...	23 „ „	2.40	Wyndham... ...	27 Jan., 1890	11.60
„ „ ...	24 „ „	7.00	„	11 „ 1903	9.98
„ „ ...	25 „ „	3.85	„	12 „ „	6.64
Derby	29 Dec., 1898	13.09	„	13 „ „	4.20
„	30 „ „	7.14	Yeeda	28 Dec., 1898	8.42
Kerdiadary ...	7 Feb., 1901	12.00	„	29 „ „	6.88
Millstream ...	5 Mar., 1900	10.00	„	30 „ „	6.12
Obagama	16 Feb., 1896	3.95			

HEAVY RAINFALLS, SOUTH AUSTRALIA, UP TO 1909 INCLUSIVE.

Borroloola... ...	14 Mar., 1899	14.00	Pine Creek ...	8 Jan., 1897	10.35
Lake Nash ...	21 „ 1901	10.25	Port Darwin ...	7 „ „	11.67

13. **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.

14. **Hail.**—Hail falls throughout Australia most frequently along the southern shores of the continent, and in 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 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.

15. **Barometric Pressures.**—The mean annual barometric pressure in Australia varies from 29.88 inches on the north coast to 30.06 inches over the central and southern parts of the continent. In January the mean pressure ranges from 29.76 inches in the northern and central areas to 29.94 and 29.95 inches in the southern. The July mean pressure ranges from 29.97 inches at Port Darwin to 30.18 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 105.

16. **Wind.**—(i.) *Trade Winds.* The two distinctive wind currents in Australia are, as previously stated, the south-east and westerly trade winds. As the belt of the earth's atmosphere in which they blow apparently follows the sun's ecliptic path north and south of the equator, so the area of the continent affected by these winds varies at different seasons of the year. During the summer months the anticyclonic belt travels in very high latitudes, thereby bringing the south-east trade winds as far south as 30° south latitude. The westerly trade winds are forced a considerable distance to the south of Australia, and are very rarely in evidence in the hot months. When the sun passes to the north of the equator, the south-east trade winds follow it, and only operate to the north of the tropics for the greater part of the winter. The westerly winds, by the same force, are brought into lower latitudes during the same period of the year. They sweep across the southern areas of the continent from the Leeuwin to Cape Howe, and during some seasons are remarkably persistent and strong. They occasionally penetrate to almost tropical latitudes, and though usually cold and dusty inland, are of the greatest service to the country, for being rain-bearing winds, moisture is by their agency precipitated over vast areas in the south of the continent.

(ii.) *Land and Sea Breezes.* The prevailing winds second in order of importance are the land and sea breezes. These generally blow at right angles to the coast-line in their early stages, but are deflected to the north and south in the middle and later periods of the blows.

On the east coast the sea breezes which come in from the north-east, when in full force, frequently reach the velocity of a gale during the afternoon in the summer months, the maximum hourly velocity, ordinarily attained about 3 p.m., not unfrequently attaining a rate of 35 to 40 miles per hour. This wind, although strong, is usually shallow in depth, and does not ordinarily penetrate more than 9 or 12 miles inland.

The land breezes on the east coast blow out from a south-westerly direction during the night.

On the western shores of the continent the directions are reversed. The sea breezes come in from the south-west, and the land breezes blow out from the north-east.

(iii.) *Inland Winds.* Inland, the direction of the prevailing winds is largely regulated by the seasonal changes of pressure, so disposed as to cause the winds to radiate spirally outwards from the centre of the continent during the winter months, and to circulate spirally from the seaboard to the centre of Australia during the summer months.

(iv.) *Prevailing Direction at the State Capitals.* In *Perth*, southerly is the prevailing direction for November to February inclusive, and north-north-easterly for the mid-winter months.

In *Adelaide* the summer winds are from the south-west and south, and in the winter from north-east to north.

In *Brisbane*, south-east winds are in evidence all the year round, but more especially during the months January, February, March and April.

In *Sydney* from May to September the prevailing direction is westerly, and for the remaining seven months north-easterly.

Melbourne winter winds are from north-west to north-east, and those of the summer from south-west to south-east.

At *Hobart* the prevailing direction for the year is from north-west.

Over the greater part of Australia January is the most windy month, *i.e.*, is the month when the winds are strongest on the average, though the most violent wind storms occur at other times during the year, the time varying with the latitude.

17. **Cyclones and Storms.**—(i.) *General.* 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 before reaching New Caledonia.

Anemometrical records for these storms do not exist, but the fact that towns visited by them have been greatly damaged indicates that the velocity must be very great. Fortunately the area covered by these storms is very small when compared with the southern cyclones, and the region affected during an individual visitation is very limited. The heaviest blows are experienced to the west of the vortex with south-east to south-west winds.

(ii.) *Severe Cyclones.* 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 the 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.

Cyclones occasionally develop from incipient monsoonal low-pressures in the interior of the continent. Their formation is apparently materially assisted by the advancing high-pressures to the west of them, for they seldom or never appear without this accompaniment. The velocity and duration of the resultant gales, too, have a distinct relation to the magnitude of pressure in the anticyclones. Evidence of excess of high pressures on such occasions indicates severe gales in the cyclones, and in the case of moderate pressures, moderate gales.

These cyclones do not attain their severest phases until they reach the seaboard. The most violent winds occur in the south-western quadrant, with south-west to south-east winds. The area affected on the coast-line is not usually very great. During the visitation of one of these storms, about 500 miles in diameter, in July, 1903, a strip of

land, only 80 miles in extent, was affected. But so severe was the gale within this region that steamers of from 8000 to 10,000 tons, leaving Port Jackson, were buffeted and tossed about like corks by the turbulent sea. Notwithstanding this, vessels 200 miles to the east lay becalmed and had no indication of the violent atmospheric upheaval relatively so near.

Though storms of this type may occur at any time of the year, they are more frequent during the months of August and September. The velocity of the wind has on one occasion reached the rate of 120 miles per hour.

(iii.) *Southerly Bursters.* The "Southerly Burster" is a characteristic feature of the eastern part of Australia. It is a cool, or cold, wind peculiar to the coastal districts of New South Wales, south of latitude 30°. In a modified form, however, it also appears in the interior of that State, in Victoria, and the western districts of Queensland.

The "Southerly Bursters" invariably follow periods of hot weather, and are a great relief to the population settled over the favoured areas. They occur in all months from August to May inclusive, but most frequently in November. The preceding winds in the early and late summer months are from a north-westerly, and in the midsummer months from a north-easterly direction. A rise in the barometer always takes place before their advent, but no relation has been established between the time this rise begins and the moment of the arrival of the wind itself, neither is there any apparent connection between the velocity of the wind and the rate of gradient of the barometric rise, notwithstanding that records of nearly fifteen hundred "Bursters," extending over a period of forty years, have been analysed with a view of ascertaining if such a connection could be established. All that can be said is that, should the rise be sharp and rapid, the life of the blow will be short, while a slow and gradual one indicates a long and steady blow from the south, after the initial "Burster" has passed. "Southerly Bursters" are usually first noted on the extreme south coast, and travel northward at a rate of 20 miles an hour. The rate of translation has ordinarily no definite relation to the velocity attained by the wind itself.

"Bursters" frequently occur simultaneously at several places along the seaboard, and occasionally they have been known to progress down the coast from north to south. While they may arrive at any time during the day or night, the interval between sundown and midnight is that in which they ordinarily occur.

This type of storm is usually associated with "V"-shaped depressions, but occasionally a condition of relatively high barometric pressures in Victoria will induce their occurrence. It is most frequent during seasons of sporadic rains, and very rare during good years in the interior. In the summer of 1890, the year of the great Darling River flood, only sixteen visitations occurred, and even these were of a very mild character. The series of good years in the interior of Australia, since 1903, has been remarkable for the small annual number of "southerly bursters."

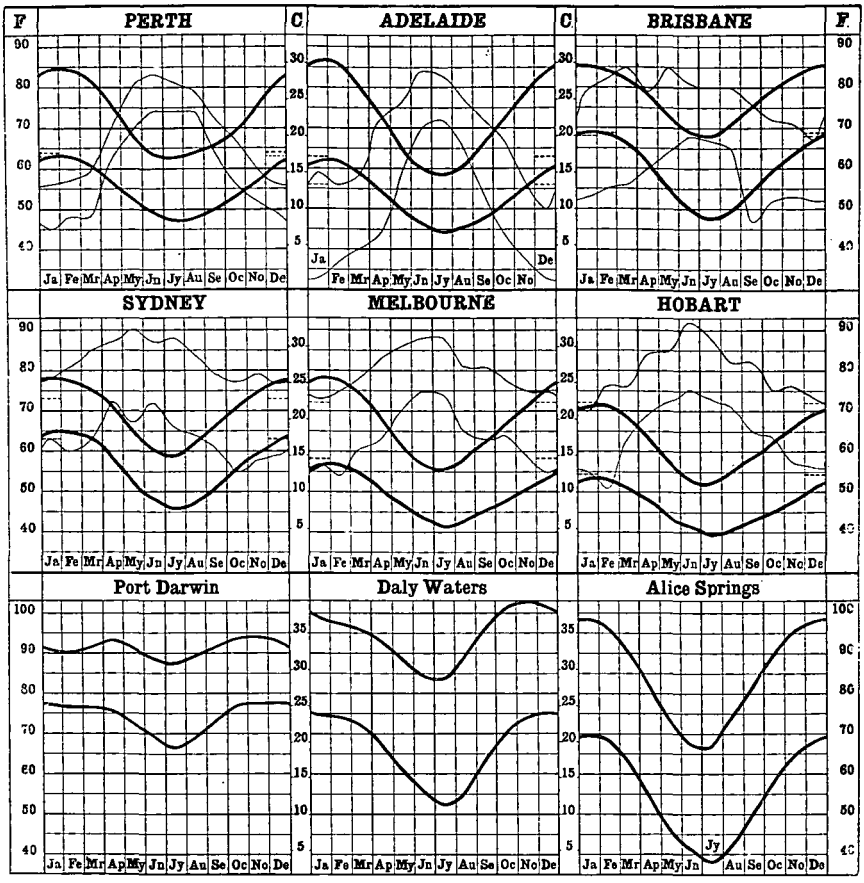
The greatest number ever experienced in a single summer was sixty-two, the average being thirty-two.

In the months of December and January they are usually short lived, and two may occur within the twenty-four hours. In the early and late summer months the intervening periods of warm weather are longer, and the winds are longer sustained, the energy being supplied from the more pronounced high pressures prevailing at these seasons of the year. The velocity varies from a rate of a few miles an hour to over 80 miles per hour, the maximum puffs occurring about an hour after the arrival of the burster. During recent years there has been a falling-off both in their number and strength, the reason for which is not yet understood, but it is suspected that the gradual extension of the agricultural and pastoral industries to the interior of the country may be one of the causes of the change.

Winds of a like character, and possibly derived from similar atmospheric actions and conditions, are—

In Europe—"The Bora," a sharp, cold north-east wind, which blows from the Croatian and Illyrian Mountains along the coast of Dalmatia from Trieste southward;

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 Port Darwin, Daly Waters, and Alice Springs.

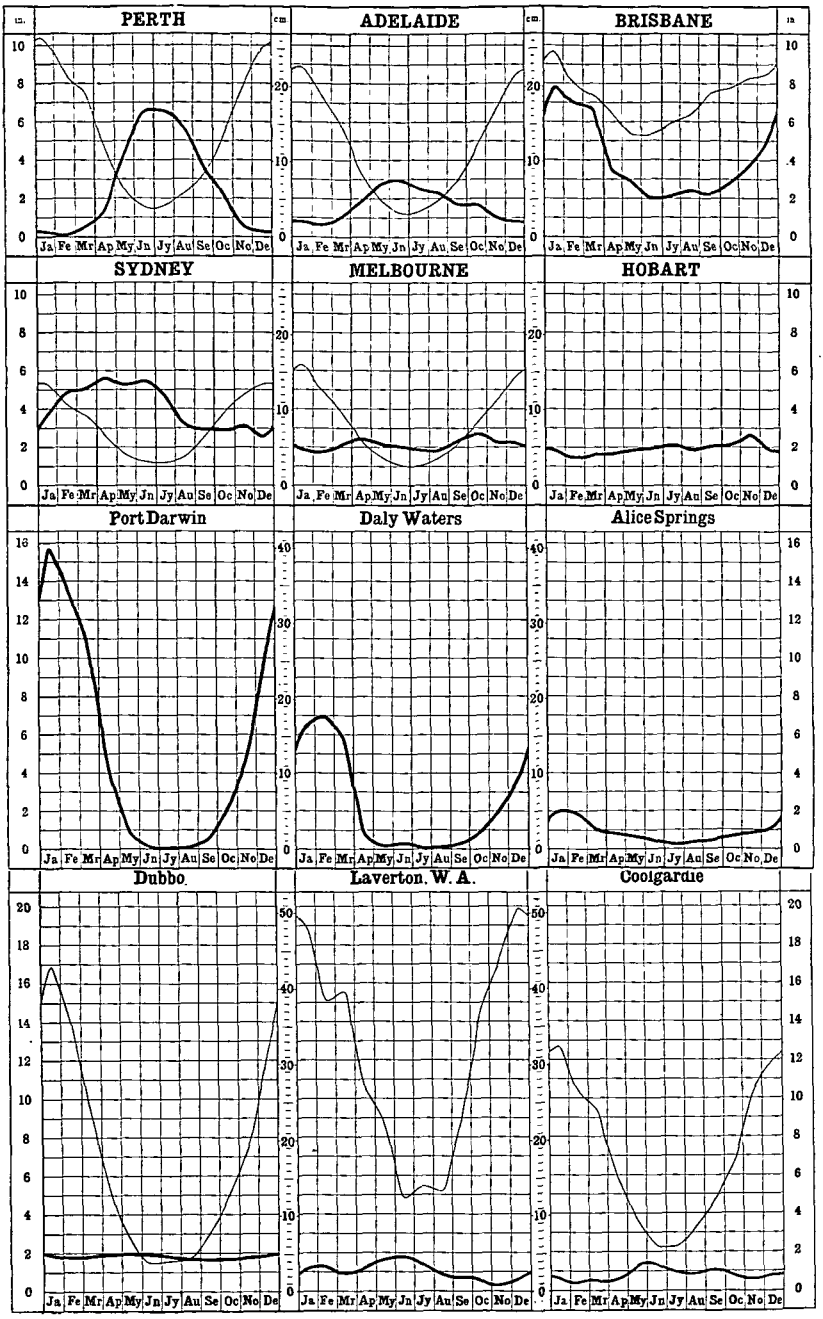
For the thin lines the degree numbers represent relative humidities, or the actual percentages of actual saturation on the total for the respective temperatures.

In both cases the upper 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.

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 mean of the greatest humidities, say on 31st March, is about 64 and the mean of the least humidities 55; in other words, at Perth, the degree of saturation of the atmosphere by aqueous vapour ranges on 31st March between 64 % and 55 %.

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



(For Explanation see next page.)

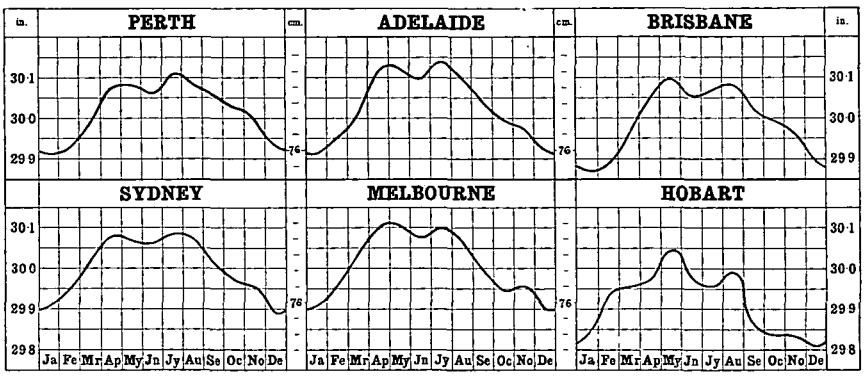
EXPLANATION OF THE GRAPHS OF RAINFALL AND EVAPORATION.—On the preceding graphs thick lines denote rainfall and thin lines evaporation, and shew the fluctuation of the mean rate of fall *per month* throughout the year. The results, plotted from the Climatological Tables hereinafter, are shewn in inches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

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 17 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 ...	33.44	65.87	Port Darwin ...	61.49	—
Adelaide ...	20.54	54.63	Daly Waters ...	26.81	—
Brisbane ...	48.06	85.37	Alice Springs...	10.89	97.44
Sydney ...	47.97	42.09	Dubbo ...	22.43	81.03
Melbourne ...	25.42	38.35	Laverton, W.A.	10.28	—
Hobart ...	23.36	—	Coolgardie ...	9.08	86.43

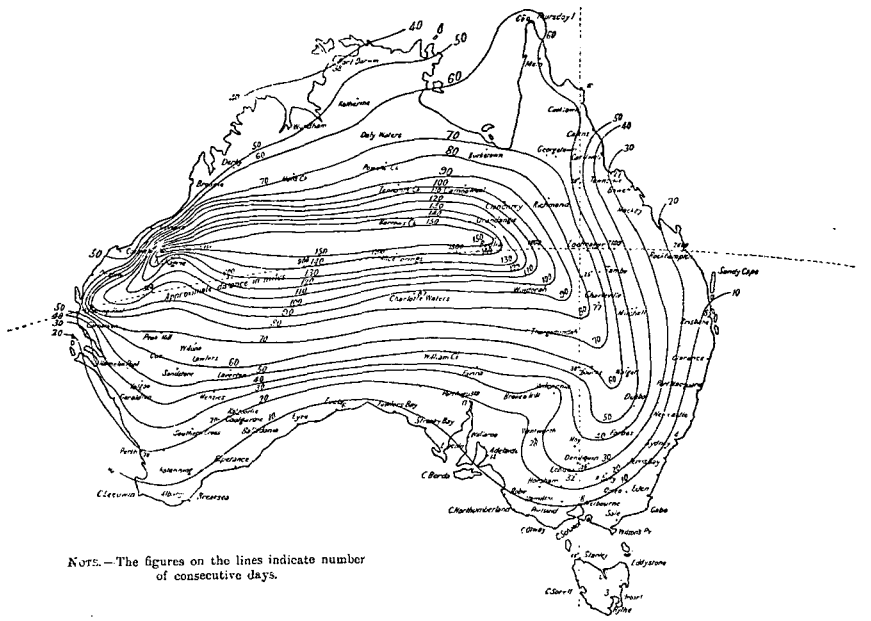
GRAPHS SHEWING ANNUAL FLUCTUATIONS OF MEAN BAROMETRIC PRESSURE FOR THE CAPITALS OF THE COMMONWEALTH OF AUSTRALIA.



EXPLANATION OF THE GRAPHS OF BAROMETRIC PRESSURE.—On the above graphs the lines representing the yearly fluctuation of barometric pressure at the capital cities are means for long periods, and are plotted from the Climatological Tables given hereinafter. The pressures are shewn in inches on about 2⅔ 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.

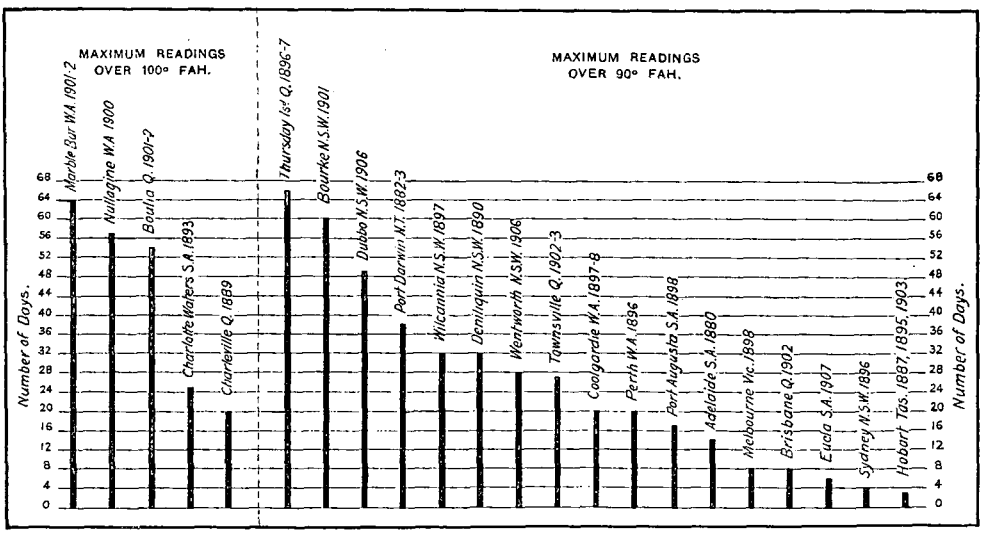
INTERPRETATION OF THE BAROMETRIC GRAPHS.—Taking the Brisbane graph for purposes of illustration, it will be seen that the mean pressure on 1st January is about 29.93 inches, and there are maxima in the middle of May and August of about 30.15 and 30.14 respectively. The double maxima appear clearly on each graph.

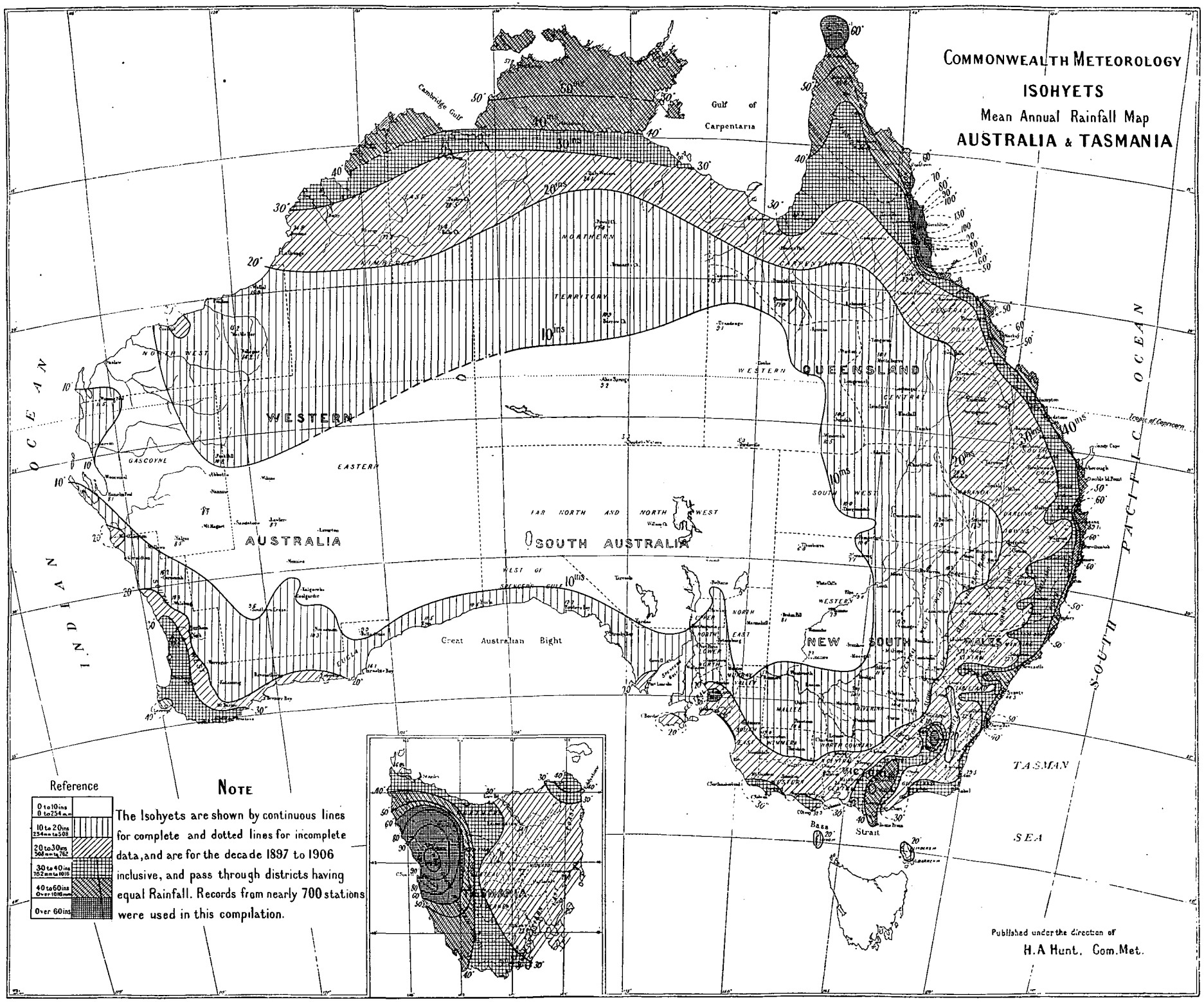
Chart indicating the area affected and period of duration of the Longest Heat Waves when the Maximum Temperature for consecutive 24 hours reached or exceeded 90° Fah.



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

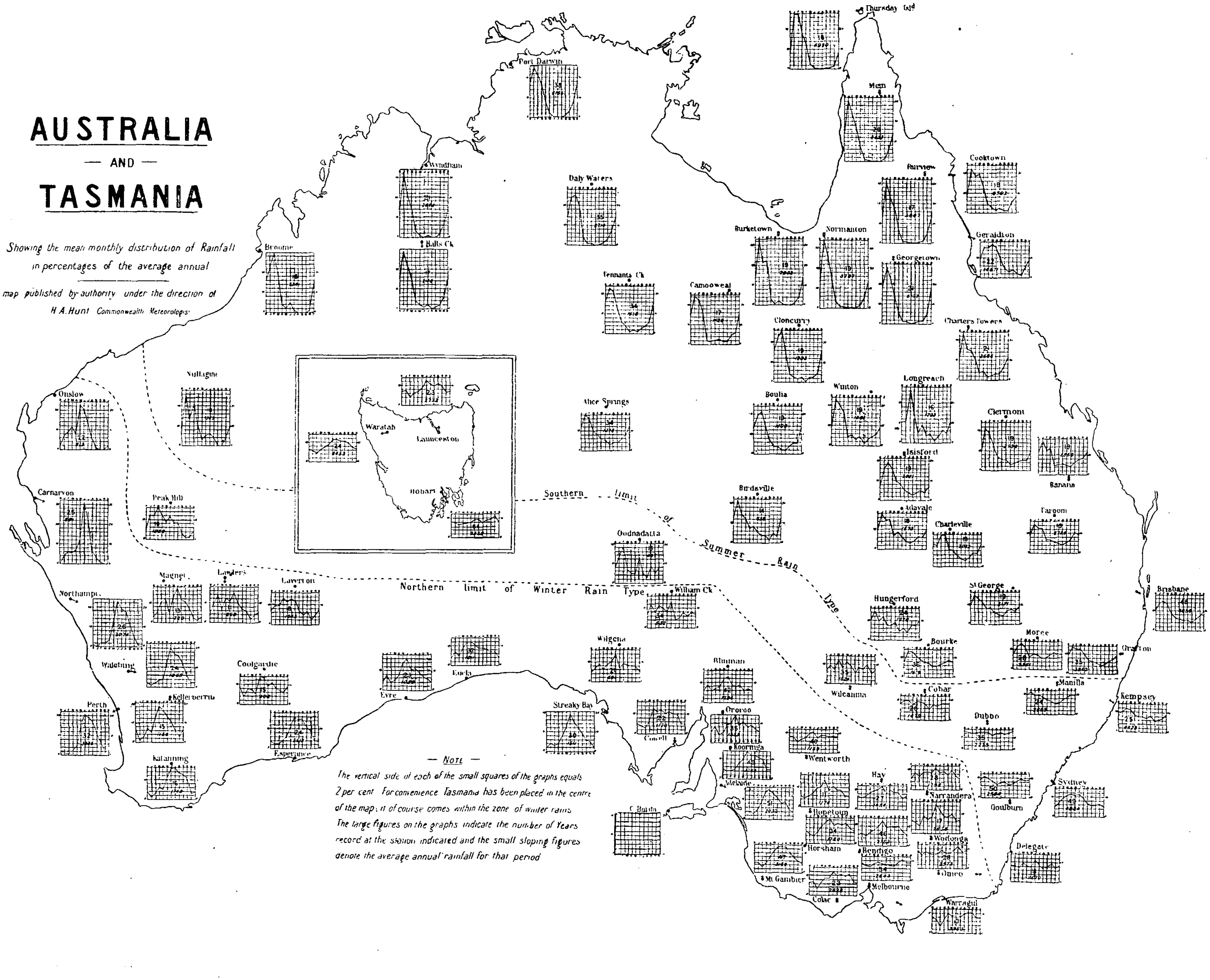
Diagram showing the greatest number of consecutive days on which the Temperature in the shade was over 100° and also over 90° at the places indicated.





RAINFALL OF AUSTRALIA.

The above map has been prepared from a chart shewing the isohyets (curves of equal mean annual rainfall) for every 10 inches for Australia, and compiled from the most recent information.


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

and the "Mistral," a violent northerly wind which blows from France to the Gulf of Lyons.

In North America, the "Northers" of Texas have similar characteristics, and in South America "The Pampero," a cold and strong southerly wind which blows over the Pampas of Argentina, is almost identical with the "Southerly Bursters." The "Tehuantepec" winds that blow on the Pacific side of Central America are also very similar.

All parts of Australia are subject during the summer months to hot, desiccating winds, of two kinds. The most common and general class are associated with low-pressure isobars. The more rare and local hot winds are caused by the heating of descending air on the lee-side of mountains. In Victoria the former class are known as "Brick Fielders," a name originally applied to the "Southerly Bursters" in Sydney, because of the dust they raised from the brickfields to the south of the city. When the goldfields were discovered in Victoria the miners hailing from Sydney gave the name to the dusty winds from the opposite quarter.

The hot winds on the south-eastern littoral are analogous to the "Chinook" winds which blow at the eastern foot of the Rocky Mountains; to the "Fœhn" winds of the Alpine Valleys; and to the "North-Westers" of the Canterbury Plains in the Middle Island of New Zealand.

18. **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.

It is pointed out by Abercromby,[1] as shewing the influence of irrigation on climate, that "Before the Suez Canal was made, the desert through which it is cut was said to be rainless; now since the Bitter Lakes have been filled up with water, rain falls on an average eight days in the year at Ismailia." And in the United States, General A. W. Greely[2] says, concerning "Heat Waves," "It seems possible that the frequency and intensity of such visitations have diminished on the Pacific coast, since Tennant's record of hot days (classing as such those on which the temperature rose to 80° or above, at San Francisco) indicates that their annual number has very materially diminished since 1859. For seven years prior to 1859 such days averaged thirteen yearly, and since that time, up to 1871, the average yearly number is but four. The immense quantity of land placed under irrigation and the vast increase in vegetation are obvious reasons why there should be some diminution in this respect."

(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

1. "Seas and Skies," Hon. Ralph Abercromby. 8vo, London, 1888, p. 30.
2. "American Weather." 8vo, London, 1888, p. 253.

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. According to Dr. Hann, observations have been made in India and Germany which support the idea that the destruction of trees has had a most deteriorating effect upon the climate.[1] In the Cordilleras, clouds with rain falling from them can be seen hanging over forests, while over contiguous lands covered with shrubs or used for agriculture the sky is blue and the sun is shining.

In America the influence of forests on the rainfall is still debated, but in Europe authorities contend that forests encourage frequent rainfalls. Hann states that a surface which keeps the air moist and cool, and from which there is as great an evaporation as takes place from extended forests, must have a tendency to increase the amount and frequency of precipitation, as contrasted with an open country which is dry, but over which conditions are otherwise similar.

Obviously the settlement of this very important question is difficult. Observations would have to be taken, with different treatments of the land, over very extended periods. 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. Curtis, in a paper read before the Meteorological Congress in 1893, sets forth important evidence of the ill-effects on orchard and wheat country of the felling of trees for the timber trade.

In Michigan, where half a century ago peach trees flourished and were rarely injured by cold, the crops have now nearly disappeared, owing to the removal by timbermen of the shelter afforded by the forests. In Northern Kansas, too, from the same cause, the growing of peaches has been largely abandoned. Many of the South Californian citrus fruit-growers protect their orchards from the destructive effects of wind by the judicious planting of eucalyptus and other trees.

It is the rapid rate of evaporation (says Dr. Fernow), 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.[2]

19. **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 :—

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1. "Climatology," p. 194.

2. See A. Woeikof, Petermann's Mittheilungen, 1885; and W. M. Fulton and A. N. Salisbury, "Convention of U.S.A. Weather Bureau Officials, 1898."

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 ...	...	26.40	...	...	62.9	37.1	93.9	5.8	63.6	35.0
Athens	...	...	...	...	...	...	106.0	...	...	...
Berlin	115	22.88	30.04	14.25	64.7	32.2	98.6	—13.0	66.0	30.0
Berne	1,880	46.00	...	...	...	...	97.2	—22.0	63.0	27.0
Bombay	37	73.99	...	...	83.0	75.2	98.5	55.9	84.6	74.5
Brussels	177	28.66	41.27	17.77	...	...	...	...	...	...
Budapest... ...	512	24.80	35.27	12.91	...	...	...	...	...	...
Buenos Ayres ...	72	36.82	80.73	21.53	73.2	51.5	103.1	25.9	74.2	50.5
Calcutta	18	63.30	...	...	85.1	66.9	108.2	44.2	85.7	65.2
Capetown ...	40	25.50	36.72	17.71	68.1	54.7	102.0	34.0	68.8	53.9
Chicago	836	33.28	45.80	24.40	70.0	26.1	103.0	23.0	72.4	23.7
Christiania ...	82	22.51	...	...	61.0	24.5	93.0	—21.1	62.6	23.9
Colombo	42	88.27	...	...	81.4	79.2	100.0	64.0	82.1	79.0
Constantinople ...	...	28.75	42.74	14.78	74.0	43.5	103.6	13.0	75.7	42.0
Copenhagen ...	43	22.06	28.78	14.02	60.5	31.9	90.5	— 9.7	61.9	31.4
Dublin	47	27.86	35.57	20.47	58.9	42.0	87.2	13.3	63.5	32.8
Edinburgh ...	230	26.50	38.94	17.60	59.0	38.4	88.0	0.0	58.0	37.0
Genoa	157	51.29	108.22	28.21	...	...	...	...	...	...
Hong Kong ...	110	84.43	119.71	45.83	81.3	60.3	88.8	50.5	81.8	58.0
Johannesburg ...	5,925	30.64	43.39	21.66	65.0	51.5	94.0	23.3	66.8	40.6
Lisbon	312	29.18	52.79	17.32	69.6	51.3	94.1	32.5	...	...
London	159	24.12	35.54	16.38	61.3	39.3	97.1	4.0	62.7	38.6
Madras	22	49.02	88.66	18.45	87.6	75.9	112.4	57.3	88.7	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	21.15	43.04	10.56	70.4	45.4	100.4	11.5	72.2	44.3
Moscow	587	21.50	29.56	13.74	63.5	...	...	...	68.0	12.0
Naples	489	33.60	50.43	16.02	76.1	49.3	104.0	23.0	77.2	48.2
New York ...	146	44.63	37.60	24.30	71.4	31.8	97.0	—28.0	73.5	30.2
Ottawa	294	33.19	38.05	25.25	66.7	15.0	98.3	—31.6	68.7	12.6
Paris	165	21.92	29.56	16.44	63.5	37.1	101.1	...	...	...
Pekin	...	24.40	...	...	...	...	...	...	79.2	23.6
Quebec	296	...	...	...	63.0	14.0	...	...	66.0	9.4
Rome	164	33.58	57.95	20.71	74.0	46.6	100.4	19.6	76.5	45.7
San Francisco ...	189	22.77	38.82	9.31	58.6	50.6	100.0	29.0	61.0	50.0
Shanghai ...	...	...	...	...	77.4	39.4	79.7	37.4	82.7	37.7
Singapore ...	12	92.70	123.24	65.56	...	...	93.0	...	...	...
Stockholm ...	144	17.92	25.46	11.78	59.6	37.1	91.8	—22.0	63.0	24.5
St. Petersburg ...	33	19.86	29.33	12.13	61.0	19.0	87.4	—30.3	64.0	17.1
Tokyo	69	58.00	...	...	74.1	38.6	98.0	15.0	77.4	36.6
Vienna	663	24.50	33.90	16.50	65.7	30.4	97.7	— 8.0	67.1	28.0
Vladivostock ...	100	12.60	...	...	...	...	...	...	69.5	5.0
Washington ...	132	43.50	61.30	30.60	74.7	34.5	104.0	—15.0	77.0	33.0
FEDERAL CAPITAL SITE.										
Canberra (Dist.) Queanbeyan ...	2,000 to 2,900	22.63	40.29	10.42	* 67.5	† 41.8	104.0	11.1	68.4	39.7
THE STATE CAPITALS.										
Perth	197	33.44	46.73	20.48	* 72.7	† 55.7	107.9	35.3	73.8	55.0
Adelaide	140	20.54	30.87	13.43	73.1	52.9	116.3	32.0	74.2	51.5
Brisbane	137	48.06	88.26	16.17	76.6	59.4	108.9	36.1	77.2	58.0
Sydney	146	47.97	82.81	23.01	70.9	53.8	108.5	35.9	71.6	52.2
Melbourne ...	91	25.42	36.42	15.61	66.4	49.9	111.2	27.0	67.4	48.5
Hobart	160	23.36	40.67	13.43	61.3	46.9	105.2	27.7	62.0	45.7

* Mean of the three hottest months. † Mean of the three coldest months.

20. **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. Min. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. Readings	Wind. Greatest Number of Miles in one day.	Wind. Mean Hourly Pressure. (lbs.)	Wind. Total Miles.	Wind. Prevailing Direction.	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	25	12	12	12	12	11	12	13	13
January	29.912	797 27/98	0.73	11,627	S	10.35	1.2	2.6	16.3
February	29.926	650 6/08	0.68	10 086	S S E	8.71	1 3	2.7	14.0
March	29.992	601 17/99	0.56	10,164	S S E	7.60	0.9	3.2	14.2
April	30.074	955 25/00	0.45	8,795	S E	4.74	0.7	4.4	8.9
May	30.080	698 5/05	0.37	8,219	E N E	2.63	2.3	5.3	6.7
June	30.061	836 21/00	0.40	8,308	N N E	1.64	2.0	5.9	4.4
July	30.108	919 11/99	0.39	8,468	N N E	1.64	2.2	5.3	7.0
August	30.086	966 15 03	0.44	8,988	S W	2.32	1.7	5.2	6.8
September	30.059	864 11/05	0.48	9,065	S W	3.29	1.8	5.4	7.0
October	30.028	6-6 15/98	0.57	10,264	S S W	5.23	1.2	5.4	6.6
November	29.998	719 7/05	0.63	10.436	S	7.69	0.8	3.8	9.7
December	29.933	672 31/98	0.69	11,342	S	10.02	1.4	2.9	14.3
Year Totals	—	—	—	—	—	65.87	17.6	—	115.9
Year Averages	30.021	—	0.53	9,647	S	—	—	4.3	—
Year Extremes	—	966 15/8/03	—	—	—	—	—	—	—

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	13	13	13	13	13	13	12	11	—
January	84.2	62.9	73.6	107.0 16/97	50.6 25/01	56.4	171.1 4/04	42.4 25/02	—
February	84.6	63.1	73.8	106.8 6/98	47.7 1/02	59.1	169.0 4/99	41.2 1/02	—
March	81.4	60.6	71.0	104.3 6, 7/06	45.8 8/03	58.5	161.6 †	36.7 8/03	—
April	75.7	56.6	66.2	98.0 5 06	42.4 2/01	55.6	152.0 11/01	35.0 2/01	—
May	68.7	52.5	60.6	90.4 2/07	39.9 *	50.5	138.8 15/02	31.9 18/99	—
June	63.6	49.0	56.3	77.1 9/09	36.9 14/98	40.2	131.0 5/04	30.2 14/98	—
July	62.7	47.3	55.0	73.8 24/99	36.4 19/06	37.4	131.0 31/98	2 .2 29/08	—
August	63.9	48.1	56.0	80.4 30/02	35.3 31/08	45.1	134.1 ‡	29.9 31/08	—
September	65.8	50.1	57.9	86.4 28/00	39.0 18/00	47.4	144.8 19/02	33.2 15/99	—
October	69.1	53.0	61.0	93.4 17/06	41.2 10/03	52.2	152.6 30/01	34.6 6/98	—
November	74.7	56.1	65.6	100.9 27/01	42.0 1/04	58.9	161.5 17/03	36.6 3/07	—
December	81.2	60.7	70.9	107.9 20/04	48.5 16/07	59.4	168.3 20/04	40.9 21/08	—
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	29.2 29/7/08	—

* 17 and 18, 1899. † 1/99 and 1/09. ‡ 29/1898 and 18/1902.

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	13	13	13	34	34	34	34	34	—	13
January	52	56	45	0.33	2	2.17 1879	nil *	1.74 28/79	—	2.0
February	53	63	48	0.33	2	2.30 1883	nil †	0.90 10/83	—	1.9
March	55	62	48	0.76	4	4.50 1896	nil ‡	1.53 17/76	—	3.4
April	64	70	54	1.66	7	4.97 1882	0.05 ‖	2.62 30/04	—	8.0
May	73	81	63	4.97	14	12.13 1879	0.98 1903	2.80 20/79	—	11.6
June	78	83	74	6.67	16	12.11 1890	2.16 1877	2.65 16/00	—	11.6
July	78	81	72	6.24	16	10.90 1902	2.42 1876	3.00 4/91	—	12.5
August	75	79	68	5.73	17	10.33 1882	0.46 1902	2.79 7/03	—	10.2
September	69	76	64	3.32	14	7.72 1903	0.69 1877	1.73 23/09	—	7.8
October	64	67	56	2.08	12	7.87 1890	0.49 1892	1.26 3/99	—	4.5
November	56	61	52	0.78	6	2.12 1880	nil 1891	1.11 30/03	—	3.7
December	51	56	46	0.57	4	3.05 1888	nil 1886	1.72 1/88	—	2.8
Year Totals	—	—	—	33.44	114	—	—	—	—	79.6
Year Averages	63	—	—	—	—	—	—	—	—	—
Year Extremes	—	83	45	—	—	12.13 5/79	nil §	3.00 4/7/91	—	—

* 1888, 1894, and 1897. † 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.	No. of Clear Days.
No. of yrs. over which observation extends	53	32	32	32	32	40	38	42	28
January	29.914	758 19.99	0.37	8,232	S W & S	8.99	2.3	3.5	7.6
February	29.952	691 22/96	0.31	7,007	S W & S	7.36	2 0	3.4	7.1
March	30.039	592 12/85	0.26	5,908	S W to S E	5.83	2.2	4.0	6.6
April	30.116	773 10·96	0.24	6,389	S W & S†	3.41	1.7	5.0	3.7
May	30.124	760 9/80	0.21	6,282	N E to N	2.00	1.8	5.7	1.7
June	30.097	750 12/78	0.27	6,779	N E to N	1.23	2.1	6.2	1.2
July	30.137	674 25/82	0.25	6,818	N E to N	1.30	1.5	5.8	1.3
August	30.099	773 31/97	0.29	7,351	N E to N‡	1.85	2.2	5.7	1.9
September	30.041	720 2/87	0.33	7,513	N E & S W‖	2.85	2.4	5.2	2.6
October	29.994	768 28/98	0.36	8,202	S W & N E‖	4.77	3.5	4.9	3.7
November	29 974	677 2/04	0.36	7,848	W S W to S	6.58	3.9	4.5	5.5
December	29.922	675 12/91	0.36	8.194	W S W to S	8.46	2.8	3.8	7.1
Year Totals	—	—	—	—	—	54.63	28.4	—	50.0
Year Averages	30.034	—	0.30	7,294	S W	—	—	4.8	—
Year Extremes	—	773 *	—	—	—	—	—	—	—

* 1/04/96; 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	53	53	53	53	53	53	32	49	36
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	70.9
February	86.1	61.9	73.9	113.6 12/99	46.4 13/05	67.2	170.5 10/00	36.7 24/78	70.8
March	80.9	58.9	69.9	108.0 12/61	44.8 —/57	63.2	174.0 17/83	33.8 27/90	68.2
April	73.3	54.7	64.0	98.0 10/66	39.6 15/59	58.4	155.0 1/83	30.3 27/08	64.0
May	65.3	50.0	57.7	88.3 5/66	36.9 †	51.4	148.2 12/79	25.9 10/91	59.0
June	60.1	46.6	53.4	76.0 23/65	32.5 27/76	43.5	138.8 18/79	24.5 20/79	54 6
July	58.6	44.3	51.5	74.0 11/06	32.0 24/08	42.0	134.5 26/90	25.0 17/90	52 2
August	61.8	45.7	53.8	82.0 25/62	32.3 17/59	49.7	140.0 31/92	23.5 ,7/88	53.2
September	66.2	47.7	57.0	90.7 23/82	32.7 4/58	58.0	160.5 23/82	26.2 15/08	56.4
October	72.5	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	55.3	67.1	113.5 21/65	40.8 2/09	72.7	166.9 20/78	31.5 2/09	65.3
December	83.6	58.9	71.2	114.2 14/76	43.0 ‡	71.2	175.7 7/99	32 5 4/84	68.7
Year Averages	72.9	53.1	63.0	—	—	—	—	—	62.0
Year Extremes	—	—	—	116.3 26/1/58	32.0 24/7/08	84.3	180.0 18/1/82	23.5 .7/8/88	—

* Taken at Lighthouse at entrance to Port River. † 26/1895; 24/1904. ‡ 16/1861; 4/1906.

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	42	42	42	53	53	53	53	53	—	38
January	42	59	33	0.83	5	3.28 1870	nil *	2.30 2/89	—	3
February	44	56	37	0.58	3	3.10 1858	nil †	1.81 5/90	—	5
March	49	58	40	1.09	7	4.60 1878	nil ‡	3.50 5/78	—	10
April	59	72	44	1.86	9	5.65 1889	0.09 1888	3.15 5/60	—	13
May	70	76	58	2.79	14	7.75 1875	0.20 1891	2.47 5/75	—	15
June	78	84	70	3.01	17	6.02 1887	0.42 1886	1.45 25/84	—	15
July	78	87	72	2.56	17	5.38 1865	0.36 1899	1.75 10/65	—	17
August	72	77	65	2.39	17	5.59 1909	0.68 1860	1.44 31/03	—	16
September	63	72	54	1.76	14	3.67 1877	0.45 1896	1.42 25/93	—	15
October	54	67	44	1.79	12	3.83 1870	0.31 1888	2.24 16/08	—	11
November	48	57	38	1.05	7	2.76 1909	0.04 1885	1.88 28/58	—	6
December	43	50	33	0.83	6	3.98 1861	nil 1904	1.32 2/61	—	4
Year Totals	—	—	—	20.54	128	—	—	—	—	130
Year Averages	56	—	—	—	—	—	—	—	—	—
Year Extremes	—	87	33	—	—	7.75 5/75	nil §	3.50 5/3/78	—	—

* 1878, 1906. † 1860, etc. ‡ 1859, etc. § January, February, March, and December, various years.

CLIMATOLOGICAL DATA FOR BRISBANE, QUEENSLAND.

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

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

Month.	Bar. corrected to 32° F. Mn. Sea Level and Standard Gravity from 9 a.m. and 3 p.m. Readings	Wind. Greatest Number of Miles in one day.	Wind. Mean Hourly Pressure. (lbs.)	Wind. Total Miles.	Wind. Prevailing Direction.	Mean Amount of Evaporation.	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	23	—	—	—	23	8	—	23	—
January	29.871	—	—	—	E	9.16	—	6.2	—
February	29 889	—	—	—	S E	7.72	—	6.2	—
March	29.955	—	—	—	S	7.12	—	6.0	—
April	30 046	—	—	—	S	6.43	—	5.2	—
May	30 095	—	—	—	S	5.50	—	4.9	—
June	30 055	—	—	—	S & W	5.15	—	4.2	—
July	30.066	—	—	—	S & W	5.77	—	3.8	—
August	30.081	—	—	—	S & S W	6.35	—	3.9	—
September ...	30 024	—	—	—	S	7.39	—	3.9	—
October	29 994	—	—	—	N & N E	8.09	—	4.5	—
November	29.960	—	—	—	N E & E	8.11	—	5.2	—
December	29.893	—	—	—	N E & E	8.58	—	5.7	—
Year — Totals ...	—	—	—	—	—	85.37	—	—	—
Year — Averages ..	29.994	—	—	—	S'ly to E'ly	—	—	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	23	23	23	23		23		23	23		23		—
January	85.4	68.9	77.2	108.9	14/02	58.8	4/93	50.1	162.7	26/89	49.9	4/93	—
February	84.4	68.6	76.5	101.9	11/04	58.7	*	43.2	162.7	3/08	49.3	9/89	—
March	82.2	66.5	74.4	96.8	16/88	55.6	30/95	41.2	160.0	1/87	46.0	28/02	—
April	78.7	61.5	70.1	95.2	†	48.6	17/00	46.6	150.1	1/08	37.0	17/00	—
May	73.3	55.3	64.3	88.8	18/97	41.3	24/99	47.5	140.8	4/88	29.8	8/97	—
June	69.1	50.5	59.8	81.5	6/06	36.3	29/08	45.2	133.9	6/06	25.4	23/88	—
July	68.1	47.8	58.0	83.4	28/98	36.1	‡	47.3	134.4	29/89	23.9	11/90	—
August	71.1	49.8	60.5	87.5	28/07	37.4	6/87	50.1	140.7	30/88	27.1	9/99	—
September	75.5	54.6	65.1	90.2	20/04	40.7	1/96	49.5	155.5	26/03	30.4	1/89	—
October	79.9	59.8	69.9	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	85.1	67.3	76.2	105.9	26/93	57.0	16/90	48.9	159.5	23/89	49.1	3/94	—
Year — Averages ...	78.0	59.5	68.8	—		—		—	—		—		—
Year — Extremes ...	—	—	—	108.9	14/1/02	26.1	‖	72.8	162.7	¶	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. ¶ 20/1/89 and 3/2/08.

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	23	23	23	50	50	50		50		50		—	—
January	65	79	53	6.57	14	27.72	1895	1.23	1889	18.31	21/87	—	—
February	69	82	55	7.05	14	40.39	1893	0.77	1904	8.36	16/93	—	—
March	72	85	56	6.50	16	21.36	1890	0 63	1903	11.18	14/08	—	—
April	72	79	60	3.98	13	14.26	1892	0.05	1897	3 93	20/92	—	—
May	75	85	64	3.05	10	11.82	1903	0.47	1902	4.26	31/03	—	—
June	74	81	68	2.72	8	11.03	1893	0.02	1895	6.01	9/93	—	—
July	73	80	67	2.39	8	8.46	1889	0 04	1894	3.54	16/89	—	—
August	71	80	65	2.48	7	11.80	1887	0.24	1896	4.89	12/87	—	—
September	65	76	47	2.02	8	4.80	1890	0.10	1907	2.46	2/94	—	—
October	61	72	52	2.80	10	6.26	1892	0.14	1900	1.95	20/89	—	—
November	59	71	53	3.65	10	8.78	1889	1.07	1906	2.57	17/95	—	—
December	61	67	52	4.84	12	11.52	1895	0.55	1900	5.26	7/05	—	—
Year — Totals ...	—	—	—	48.05	130	—		—		—		—	—
Year — Averages ...	68	—	—	—	—	—		—		—		—	—
Year — Extremes ...	—	85	47	—	—	40.39	2/1893	0.02	6/1895	18.31	21/1/87	—	—

— signifies no record kept.

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. Mean Sea Level and Standard Gravity from 24 hrly 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	51	43	43	43	51	50	46	48	46
January	29.904	721 1/71	0.38	8,322	N E	5.73	4.8	5.9	1.9
February	29 947	871 12/69	0.35	7,233	N E	4.35	4.0	6.2	1.2
March	30 022	943 20/70	0.26	6,904	N E	3.76	4.1	5.7	1.7
April	30 078	803 6/82	0.24	6,369	N E	2.62	4.2	5.1	2.5
May	30 067	758 6/98	0.23	6,489	W	1.81	3.7	4.9	3.2
June	30 063	712 7/00	0.31	7,272	W	1.43	2.4	4.8	3.4
July	30.084	930 17/79	0.29	7,378	W	1.56	2.6	4.3	4.2
August	30.075	756 22/72	0.28	7,152	W	2.09	3.5	4.1	4.6
September	30 013	964 6/74	0.32	7,382	W	3.08	4.2	4.4	3.5
October	29.971	926 4/72	0.35	8,000	N E	4.39	5.1	5.0	2.2
November	29.954	720 13/68	0.36	7,845	N E	5.21	5.6	5.6	1.5
December	29.890	938 3/84	0.36	8,204	N E	6.06	5.6	5.6	1.8
Year Totals	—	—	—	—	—	42.09	49.8	—	31.7
Year Averages	30.006	—	0.31	7,379	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 min. 3 ft. below surface*
No. of yrs. over which observation extends	51	51	51	51	51	51	51	51	49
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	71.0	101.0 19/66	49.3 28/63	51.7	162.1 15/98	43.4 25/91	71.9
March	75.4	63.0	69.3	102.6 3/69	48.8 14/86	53.8	172.3 4/89	42.3 13/93	71.0
April	70.9	58.2	64.6	89.0 4.09	44.6 27/64	44.4	144.1 10/77	38.0 13/92	68.3
May	64.9	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	45.6	52.3	74.9 17/71	35.9 12/90	39.0	144.3 15/98	24.0 4/93	57.2
August	62.2	47.5	54.8	82.0 31/84	36.8 3/72	45.2	149.0 30/78	27.7 30/95	57.5
September	66.3	51.3	58.8	91.1 24/07	40.8 18/64	50.3	142.2 12/78	30.1 17/05	60.2
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	66.9	102.7 21/78	45.8 1/05	56.5	158.5 28/99	38.8 1/05	66.9
December	77.2	62.8	70.0	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	—	—	—	—	—	65.1
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	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	51	51	51	51	51	51	51	51	50	50
January	70	78	60	3.41	14.1	10.49 1883	0.42 1888	3.75 22/63	0.002	1.1
February	73	81	60	4.71	14.1	18.56 1873	0.34 1902	8.90 25/73	0.003	1.4
March	75	85	63	5.09	15.1	18.70 1870	0 42 1876	5.66 25/90	0.007	2.9
April	78	87	64	5.32	13.4	21.49 1861	0.06 1868	7.52 29/60	0.022	6.3
May	76	90	66	5.05	15.7	20.87 1889	0.21 1885	8.36 28/89	0.030	7.3
June	79	89	72	5.31	12.9	16.30 1885	0.19 1901	5.17 16/84	0.022	5.3
July	77	88	66	4.54	12.2	13.21 1900	0 12 1862	5.72 28/08	0.024	6.8
August	74	84	64	3.27	11.6	14.89 1889	0.04 1885	5.33 2/60	0.021	5.7
September	70	79	61	2.92	12.2	14.05 1879	0.08 1862	5.69 10/79	0.008	3.4
October	68	77	55	2.84	12.7	10.81 1902	0.21 1867	6.37 13/02	0.004	1.6
November	68	79	58	2.99	12.6	9.88 1865	0.20 1867	4.23 19 00	0.006	2.7
December	68	77	59	2.48	12.8	7.80 1870	0.45 1876	2.75 1/88	0.002	1.0
Year Totals	—	—	—	47.99	158.7	—	—	—	0.151	45.5
Year Averages	73	—	—	—	—	—	—	—	—	—
Year Extremes	—	90	55	—	—	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. 91 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. and 9 p.m.	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	52	43	43	43	43	38	—	52	—
January	29.911	583 10/97	0.29	7,345	S W, S E	6.31	—	5.1	—
February	29.962	566 8/68	0.28	6,441	S W, S E	4.98	—	5.1	—
March	30 038	677 9/81	0.22	6,398	S W, S E	3.84	—	5.5	—
April	30.100	597 7/68	0.19	5,719	S W, N W	2.31	—	5.9	—
May	30.105	693 12/65	0.19	5,958	N W, N E	1.48	—	6.5	—
June	30.076	761 13/76	0.24	6,461	N W, N E	1.10	—	6.7	—
July	30.100	755 8/74	0.23	6,482	N W, N E	1.06	—	6.3	—
August	30.065	637 14/75	0.26	6,882	N W, N E	1.47	—	6.3	—
September ...	29.998	617 11/72	0.29	7,108	N W, S W	2.26	—	6.1	—
October	29.943	699 5/66	0.29	7,377	S W, N W	3.27	—	6.0	—
November ...	29 953	734 13/66	0.29	7,083	S W, S E	4.50	—	5.9	—
December ...	29.900	655 1/75	0.30	7,503	S W, S E	5.77	—	5.5	—
Year { Totals ...	—	—	—	—	—	38.35	—	—	—
Year { Averages ...	30.013	—	0.26	6,730	S W, N W	—	—	5.9	—
Year { Extremes ...	—	899 5/10/66	—	—	—	—	—	—	—

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	54	54	54	54	54	54	51	49	—
January	78.3	56.6	67.4	111.2 14/62	42.0 28/85	69.2	178.5 14/62	30.2 28/85	—
February	77.7	56.6	67.2	109.5 7/01	40.3 9/65	69.2	167.5 15/70	30.9 6/91	—
March	74.9	54.5	64.7	105.5 2/93	37.1 17/84	68.4	164.5 1/68	28.9 *	—
April	68.5	50.6	59.6	94.0 6/65	34.8 24/88	59.2	152.0 8/61	25.0 23/97	—
May	61.4	46.6	54.0	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	40.1	129.0 11/61	20.4 17/95	—
July	55.4	41.5	48.5	68.4 24/78	27.0 21/69	41.4	125.8 27/80	20.5 12/03	—
August	58.7	43.1	50.9	77.0 20/85	28.3 11/63	48.7	137.4 29/69	21.3 14/02	—
September ...	62.4	45.4	53.9	82.3 30/07	31.1 16/08	49.8	142.1 20/67	24.7 13/07	—
October	67.0	48.1	57.5	96.1 30/85	32.1 3/71	64.0	154.3 28/68	25.9 3/71	—
November ...	71.4	51.0	61.2	105.7 27/94	36.5 2/96	69.2	159.6 20/65	24.6 2/96	—
December ...	75.4	53.7	64.5	110.7 15/76	40.0 4/70	70.7	170.3 20/69	33.2 1/04	—
Year { Averages ...	67.3	49.3	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.			Rainfall.					Dew.	
	Mean 9a.3p.9p.	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	52	52	52	54	54	54	54	51	—	—
January	64	73	52	1.90	7	5.68 1904	0.04 1878	2.97 9/97	—	—
February	65	75	54	1.72	7	6.24 1904	0.03 1870	2.14 7/04	—	—
March	68	78	59	2.11	8	6.36 1874	0.18 1859	3.05 15/78	—	—
April	72	83	63	2.37	10	6.71 1901	0.33 1908	4.50 22/86	—	—
May	79	86	70	2.13	12	4.31 1862	0.45 1901	1.85 7/91	—	—
June	80	88	75	2.11	14	4.51 1859	0.73 1877	1.74 21/04	—	—
July	80	88	74	1.84	13	7.02 1891	0.57 1902	2.71 12/91	—	—
August	75	81	65	1.84	14	3.59 1909	0.48 1903	1.87 17/81	—	—
September ...	72	81	63	2.30	14	5.87 1870	0.52 1907	2.62 12/80	—	—
October	70	79	63	2.66	13	7.61 1869	0.57 1895	3.00 17/69	—	—
November ...	67	75	53	2.21	10	5.05 1881	0.25 1895	2.57 16/76	—	—
December ...	64	75	49	2.25	9	7.18 1863	0.11 1904	2.62 28/07	—	—
Year { Totals ...	—	—	—	25.44	—	—	—	—	—	—
Year { Averages ...	71	—	—	—	131	—	—	—	—	—
Year { Extremes ...	—	88	49	—	—	7.61 10/1869	0.03 2/1870	4.50 22/4/86	—	—

— 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. Min. Sea Level and Gravity from 9 a.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	15	—	25	—	25	—	—	26	—
January ...	29.840	—	0 51	—	S E, N W	—	—	6.7	—
February ...	29.939	—	0.51	—	N W, S E	—	—	5.4	—
March ...	29.956	—	0.47	—	N W, S E	—	—	5.2	—
April ...	29 975	—	0.43	—	N W, S E	—	—	6.5	—
May ...	30.044	—	0.47	—	N W	—	—	6.8	—
June ...	29 976	—	0.43	—	N W	—	—	6.6	—
July ...	29.955	—	0.47	—	N W	—	—	6.6	—
August ...	29 994	—	0.51	—	N W	—	—	6.0	—
September ...	29 867	—	0.63	—	N W, S E	—	—	5.2	—
October ...	29 833	—	0.63	—	N W, S E	—	—	5.2	—
November ...	29 833	—	0.63	—	N W, S E	—	—	5.9	—
December ...	29.806	—	0.60	—	N W, S E	—	—	5.9	—
Year Totals ...	—	—	—	—	—	—	—	—	—
Year Averages ...	29.915	—	0.51	—	N W, S E	—	—	6.0	—
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	26	26	26	26		26		26	24		22*a*		—
January ...	70.9	53.1	62.0	105.0	1/00	40.3	2/06	64.7	160.0	‡	30.6	1897	—
February ...	71.1	52.9	62.0	104.4	12/99	39.0	20/87	65.4	165.0	24/98	28.3	1887	—
March ...	68.0	50.5	59.3	97.5	7/91	36.0	31/05	61.5	147.5	1/06	27.5	30/02	—
April ...	62.8	47.7	55.2	82.4	6/88	33.3	24/88	49.1	138.5	12/05	25.0	1886	—
May ...	57.6	43.5	50.6	75.3	3/88	29.2	20/02	46.1	128.0	1889	20.0	19/02	—
June ...	52.9	41.4	47.2	69.2	1/07	29.5	26/02	39.7	122.0	12/94	21.0	6/87	—
July ...	52.1	39.4	45.8	65.4	15/98	27.7	11/95	37.7	118.7	19/96	18.7	16/86	—
August ...	55.0	41.0	48.0	71.5	17/02	30.5	4/97	41.0	129.0	1887	20.1	1909	—
September ...	58.5	42.8	50.7	79.5	*	31.0	16/97	48.5	134.0	7/94	22.7	1886	—
October ...	62 6	45.3	54.0	86.0	29/07	32 0	12/89	54.0	146.0	1885	23.8	§	—
November ...	66.3	48.1	57.2	98.0	23/88	37.0	†	61.0	151.8	7/09	26.0	1/08	—
December ...	69.1	50.8	60.0	105.2	30/97	38.0	3/06	67.2	156.0	18/05	27.2	1886	—
Year Averages ...	62.2	46.3	54.3	—		—		—	—		—		—
Year Extremes ...	—	—	—	105.2	30/12/97	27.7	11/7/95	77.5	165.0	24/2/98	18.7	16/7/86	—

a Records only continuous since 1893.

* 30/91 and 17/97. † 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	15	15	15	65	52	65		65		27		—	—
January ...	63	72	55	1 85	9	5.91	1893	0.03	1841	2.59	30/05	—	—
February ...	64	76	51	1.50	8	9.15	1854	0.07	1847	1.60	22/03	—	—
March ...	68	76	62	1 62	9	7.60	1851	0.02	1843	1.45	1/83	—	—
April ...	74	84	65	1 80	10	6.50	1909	0.07	1904	5.02	20/09	—	—
May ...	78	85	68	1.81	12	6.37	1905	0.10	1843	1.62	31/05	—	—
June ...	82	92	75	2.19	13	8.15	1889	0.22	1852	4.11	14/89	—	—
July ...	80	88	73	2.13	13	5.98	1849	0.30	1850	1.56	8/94	—	—
August ...	79	82	71	1.81	12	10.16	1858	0.23	1854	2.28	13/90	—	—
September ...	74	82	65	2 07	14	7.14	1844	0.39	1847	1.57	24/85	—	—
October ...	68	75*	60	2 16	14	6.67	1906	0.26	1850	2.58	4/06	—	—
November ...	63	76	55	2.55	12	8.92	1849	0.16	1868	3.70	30/85	—	—
December ...	60	73	51	1.87	10	9.00	1875	0.11	1842	2.27	27/07	—	—
Year Totals ...	—	—	—	23.36	136	—		—		—		—	—
Year Averages ...	71	—	—	—	—	—		—		—		—	—
Year Extremes ...	—	92	51	—	—	10.16	8/1858	0.02	3/1843	5.02	20/4/09	—	—

— Signifies no record kept.