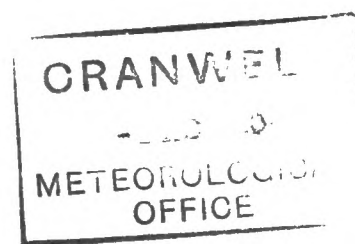


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The Distribution of Mean Annual Maxima and Minima of Temperature over the Globe

By

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THE DISTRIBUTION OF MEAN ANNUAL MAXIMA AND MINIMA OF TEMPERATURE OVER THE GLOBE

I—INTRODUCTION

The "Mean Annual Maximum Temperature" is the average of the highest temperatures reached in each of a number of years. For example, at Greenwich we have the following data of the highest temperature (in °F.) recorded in each of the years 1910 to 1921:—

1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
82	100	90	87	92	87	84	93	90	88	87	94

The average of these twelve figures, 89°F., is the mean annual maximum for Greenwich for the period 1910 to 1921. The mean annual minimum is obtained in a similar way.

These mean annual extremes are useful climatological elements, which possess several advantages over the so-called "absolute" extremes which are more often adopted in this country. In the first place, the mean extremes for different periods are more nearly comparable than the absolute extremes. Thus the highest temperature recorded at Greenwich during the six years 1910 to 1915 is 100°F., that during the six years 1916 to 1921 is only 94°F., but the mean annual maxima for the two periods of six years (89.7° F. and 89.3°F. respectively) differ by less than a degree. Secondly, while the highest and lowest recorded extremes are valuable as giving an indication of what may possibly occur, and therefore of what has to be guarded against, the mean extremes give an idea of what is likely to occur, roughly speaking, one year in two. Thirdly, it is possible that at some stations the highest recorded maximum or the lowest recorded minimum is erroneous, due to a faulty reading, but when spread over a number of years the effect of such an error becomes minimised.

Most of the data for the present investigation were extracted from the volumes of the Réseau Mondial for the years 1910 to 1921 inclusive, and the stations, with their latitudes, longitudes and heights, the number of years of observations, and the mean and extreme maxima and minima, are given on pp. 5–10. The arrangement is by ten-degree zones of latitude, as in the Réseau Mondial. No station was accepted which included less than six years' data, and the majority include ten or more years. When the data were plotted it was found that there were several large gaps, which were filled in as far as possible from various other sources.

Most of the information is derived from observations of self-registering maximum and minimum thermometers, but it must be remarked that a number of stations in Norway, Russia and Siberia did not possess maximum thermometers, and at these the highest of the readings at fixed hours, generally a reading at 13h. or 14h. has been taken as the maximum. This is probably one or two degrees below the true maximum. In plotting the data no correction was made for the height of the station above mean sea level. The variation of the mean annual maxima and minima with height was investigated at several localities (western United States of America, India, Switzerland) where a suitable distribution of stations existed, but no regular decrease with height was found, similar to that which exists in mean temperatures, so that it seemed best to leave the figures uncorrected. The maps of mean annual maximum and mean annual minimum temperature are shown in Figures 1 and 2, isotherms being drawn for each step of 10°F. The data are all for land stations, but include a number of islands, and isotherms have been sketched in over the sea to show the distribution among these islands, but must not be taken as indicating the mean maximum and minimum air temperature to be expected on board ships in the open ocean, which would in general be less extreme.

2—MEAN ANNUAL MAXIMA

The mean annual maxima range from 46°F. at the South Orkneys and just below 50° at Jan Mayen to 125° at Insalah in the Sahara, a range of 79°F. The distribution, however, shows comparatively little respect for latitude, many of the higher figures occurring outside the tropics. Areas exceeding 100°F. are found (1) in the central United States, (2) the central Argentine and southern Brazil, (3) a small area in central Spain, (4) a large area in northern Africa, Arabia, Iraq, northern India and south-eastern Asia, (5) southern and south-eastern Africa, and (6) the greater part of Australia. In the latter area the independence of latitude is shown by the fact that the mean annual maximum is lower at Darwin on the north coast than at Perth in the south-west. At oceanic islands near the equator the figures lie between 90 and 95°F., about the same as for southern and central Europe.

In drawing the isotherms one was almost able to forget that no correction had been applied for height above mean sea level, for the figures fitted together remarkably well. The chief exceptions were some low figures at very high stations in the Andes, and means below 90°F. on the equatorial plateau of Africa and at Himalayan stations.

3—MEAN ANNUAL MINIMA

The mean annual minima show a much greater range than the mean annual maxima, from -78°F. at Verkhoiansk in north-eastern Siberia to 72°F. at Seychelles in the Indian Ocean and at Sandakan in North Borneo. Whereas in the maxima the continentality effect completely dominated the variation with latitude, in the minima the latitude effect is quite as important as the continentality. Means below -50°F. occur in the interior of northern North America and over the whole of northern Siberia, and below 0°F. over more than half of North America and Asia, the whole of north-eastern Europe and also at the South Orkneys. Isotherms of 30°F. are found across Mexico and Florida, the Mediterranean and southern Asia, in the central Sahara, the Argentine (where the course of the isotherms is especially interesting), a large part of South Africa and the interior of Australia. The equatorial islands in the Indian and Pacific Oceans just exceed 70°F., but in the Atlantic this figure is not quite reached; there is also an isotherm of 70°F. in equatorial Brazil.

4—THE MEANS OF THE VARIOUS LATITUDES

In order to bring out the comparative unimportance of latitude in the mean annual maxima compared with the mean annual minima, Table I. was constructed to show the averages of the mean annual maxima and minima at stations in each ten-degree zone, omitting all those which exceed 5,000 feet in height.

TABLE I—AVERAGE MEAN ANNUAL MAXIMA AND MINIMA BY ZONES

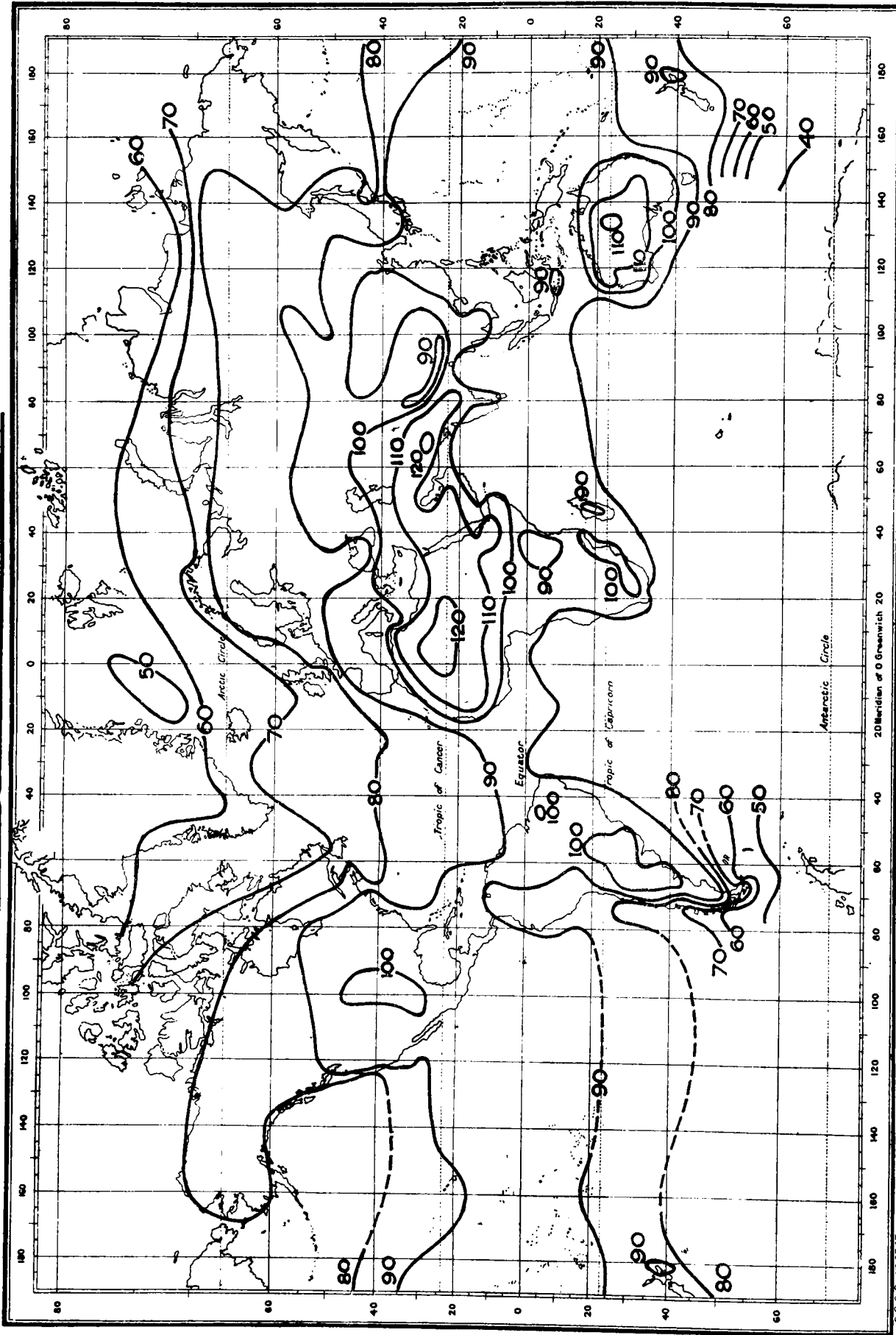
Lat. °N. . .	80-70	70-60	60-50	50-40	40-30	30-20	20-10	10-0
Mean max. . .	67	79	87	92	98	102	99	97
Mean min. . .	-14	-29	-24	-3	27	45	59	65
Lat. °S. . .	0-10	10-20	20-30	30-40	40-50	50-60	60-70	
Mean max. . .	92	96	101	98	86	70	(46)	
Mean min. . .	66	51	37	34	27	20	(-26)	

The zone 60-70°S. is represented only by the South Orkneys. The maxima are highest in the two anticyclonic belts 30-20°N. and 20-30°S., while the minima are highest on the equator. The range decreases from 111°F. in the continental zone 60-50°N. to only 26°F. in 0-10°S., but it is very much smaller in the southern hemisphere than in the northern, chiefly owing to the higher minima.

In general it will be seen that the phenomena associated with mean annual maxima and minima of temperature resemble those associated with the mean daily maxima and minima, but on a greater scale.

Plate I

Mean Annual Maximum, 1910-1921.

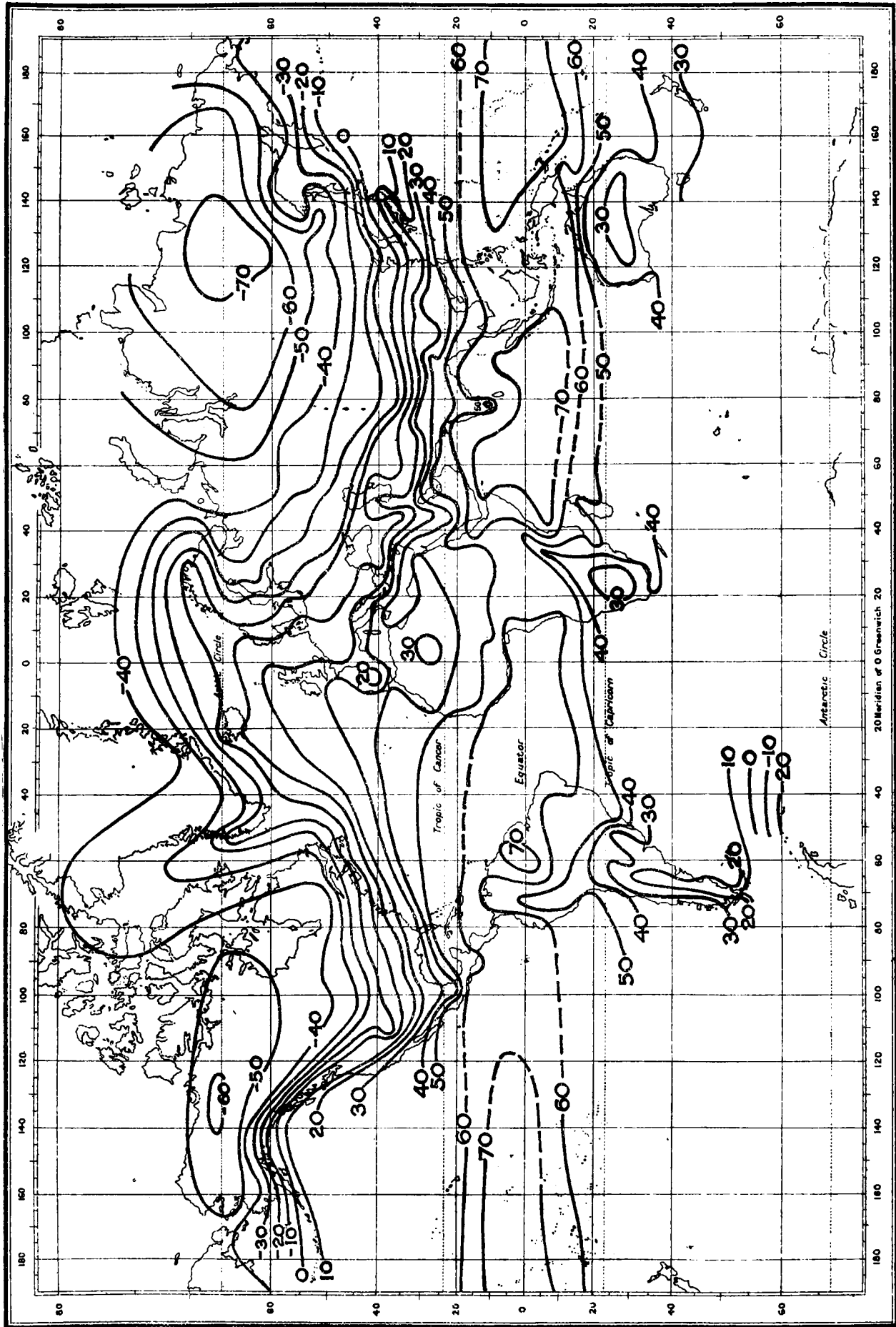


656 S. W. 3747.
A. 1944-75. 3747. 67. 1/26.

Wells & Sons Photo-Litho

Plate II

Mean Annual Minimum, 1910-1921.



Station.	Lat. N.	Long.	Ht. Ft.	Annual Maxima.			Annual Minima.		
				Mean. °F.	Extreme °F.	No. of yrs.	Mean. °F.	Extreme °F.	No. of yrs.
Zone 80°-70° N.									
Upernivik	72 47	W. 56 7	62	62	64	10	-32	-37	10
Spitsbergen	78 2	E. 14 14	37	53	58	10	-44	-57	10
Gjesvaer	71 6	25 22	21	78	85	12	+ 5	+ 1	12
Mehavn	71 1	27 47	21	75	83	11	1	- 5	12
Vardo	70 22	E. 31 8	33	66	69	12	+ 2	- 4	12
Zone 70°-60° N.									
Nome	64 30	W. 165 24	22	73	79	11	-36	-47	11
Candle	65 55	161 57	8	81	85	7	-49	-60	6
Tanana	65 10	152 6	220	86	89	11	-57	-68	11
Rampart	65 30	150 15	400	91	97	8	-57	-66	8
Valdez	61 7	146 16	27	75	82	11	-13	-24	11
Eagle	64 46	141 12	833	89	93	11	-58	-67	11
Dawson	64 4	139 29	1076	87	92	10	-54	-63	10
Carcross	60 11	134 34	2172	80	88	10	-44	-67	10
Ft. Good Hope	66 15	128 31	214	88	95	7	-61	-69	7
Ft. Simpson	61 52	121 35	195	89	95	9	-51	-62	10
Hay River	60 51	115 57	528	86	91	12	-53	-60	12
Jacobshavn	69 13	51 2	41	64	68	11	-31	-42	10
Godthaab	64 11	51 43	30	65	70	6	- 6	-14	12
Angmagalik	65 37	37 33	104	69	77	10	-17	-26	10
Stykkisholm	65 5	22 46	37	66	71	12	+ 3	-21	12
Vestmanna	63 26	20 15	25	67	72	12	9	- 5	12
Grimsey	66 33	17 58	72	66	75	12	0	-23	10
Berufjord	64 40	14 19	59	68	73	12	4	-14	12
Thorshavn	62 3	6 45	86	63	70	12	16	+ 8	12
Lerwick	60 9	1 8	59	63	69	10	23	16	10
Bergen	60 24	E. 5 19	146	79	86	12	16	7	12
Christiansund	63 7	7 45	58	76	83	10	+16	+ 9	10
Trondhjem	63 26	10 25	130	83	91	12	0	-11	12
Bodo	67 17	14 24	73	76	83	12	+ 5	- 4	12
Haparanda	65 50	24 9	30	84	90	12	-26	-36	12
Helsingfors	60 10	24 57	38	82	88	12	-12	-23	12
Kuopio	62 54	27 40	296	85	93	12	-27	-38	12
Kola	68 53	33 1	22	82	86	11	-33	-45	11
Petrozavodsk	61 47	34 23	128	83	93	7	-	-	-
Archangelsk	64 34	40 31	21	85	92	12	-33	-38	12
Mezen	65 50	44 16	49	86	90	7	-37	-45	7
Oust Tsylma	65 25	52 18	223	86	91	11	-47	-61	11
Tcherdyn	60 24	56 31	581	89	96	8	-	-	-
Berezov	63 56	65 4	131	83	85	7	-50	-57	9
Sourgout	61 15	73 24	131	87	90	9	-56	-67	10
Doudinka	69 23	86 4	66	77	83	11	-59	-70	8
Touroukhansk	65 47	87 57	148	85	88	6	-65	-77	6
Iakoutsk	62 1	129 43	354	86	92	8	-71	-78	7
Verkhoiansk	67 33	E. 133 23	328	87	94	9	-78	-83	11
Zone 60°-50° N.									
Dutch Harbour	53 55	W. 166 30	50	72	79	10	+10	+ 6	10
Kodiak	57 46	152 22	20	75	80	7	0	- 9	8
Sitka	57 3	135 19	90	77	80	11	7	- 4	11
Prince Rupert	54 18	130 18	170	80	86	11	+ 6	- 6	11
Barkerville	53 2	121 35	4180	78	84	12	-29	-42	12
Kamloops	50 42	120 29	1263	98	102	12	-17	-31	12
Calgary	51 2	114 2	3428	92	97	12	-33	-44	12
Ft. Chipewyan	58 42	111 10	715	85	89	9	-50	-60	10
Prince Albert	53 10	105 38	1450	90	95	12	-47	-58	12
Qu' Appelle	50 30	103 47	2116	94	102	12	-43	-50	12
Minnedosa	50 15	99 50	1690	95	103	12	-41	-45	12
Berens River	52 18	97 23	709	93	100	8	-44	-52	11
Port Nelson	57 4	92 36	49	89	91	7	-47	-52	9
Fort Hope	51 33	87 49	853	91	95	8	-43	-49	8
Moose Factory	51 14	80 30	30	91	96	11	-45	-54	12
Fort George	53 50	79 5	320	85	90	6	-46	-50	6
Mistassini Post	50 15	73 55	1257	86	91	7	-50	-56	7
Natashquan	50 8	61 48	20	76	78	7	-29	-39	7
Belle Isle	51 53	55 23	436	63	68	6	-26	-31	6
Valentia	51 56	10 15	45	75	81	12	+27	+24	12
Aberdeen	57 10	W. 2 6	88	75	83	12	20	7	12
Greenwich	51 28	0 0	152	89	100	12	20	16	12
Uccle (Brussels)	50 48	E. 4 22	328	90	98	11	13	+ 2	11
De Bilt	52 6	5 11	10	89	96	12	12	- 4	12
Hamburg	53 33	9 58	85	86	92	12	15	+ 2	12
Copenhagen	55 41	12 36	16	79	84	12	17	3	12

Station.	Lat. N.	Long.	Ht.	Annual Maxima.			Annual Minima.		
				Mean.	Extreme	No. of yrs.	Mean.	Extreme	No. of yrs.
Zone 60°-50° N.—(contd.).									
Potsdam	52 23	13 4	279	92	96	12	+ 7	-10	12
Uppsala	59 51	17 38	79	86	92	12	- 7	-15	12
Warsaw	52 13	21 1	436	89	99	12	+ 2	- 9	12
Dorpat	58 23	26 43	244	88	92	12	-15	-22	12
Leningrad	59 56	30 16	16	86	91	12	-18	-26	12
Kiev	50 27	30 30	600	89	94	11	- 7	-20	12
Moscow	55 50	37 33	548	89	98	12	-23	-33	12
Saratov	51 33	45 57	400	97	102	8	-17	-20	8
Kazan	55 47	49 8	262	95	103	12	-25	-31	12
Orenburg	51 45	55 6	358	98	102	12	-30	-38	12
Perm	58 1	56 16	535	90	96	12	-35	-47	12
Ekaterinburg	56 50	60 38	922	90	95	12	-32	-45	12
Tobolsk	58 12	68 14	354	89	94	8	-37	-44	10
Akmolinsk	51 12	71 23	1138	93	97	7	-33	-44	8
Omsk	55 13	73 22	354	92	98	7	—	—	—
Barnaoul	53 20	83 48	531	90	98	9	-44	-56	8
Tomsk	56 30	84 58	400	87	92	10	-45	-61	9
Minousinsk	53 43	91 41	817	91	94	11	-42	-54	7
Eneseisk	58 27	92 10	254	87	93	10	-59	-70	10
Irkutsk	52 16	104 19	1532	86	93	11	-43	-58	10
Kirensk	57 47	108 7	863	90	96	7	-60	-69	6
Tchita	52 2	113 30	2211	90	93	9	-47	-54	7
Nertchinskii Zavod	51 19	119 37	2054	90	97	8	-48	-52	7
Tygan Ourkan	54 5	124 46	1243	88	95	12	-50	-59	12
Blagoveshchensk	50 16	127 30	466	91	98	9	-37	-50	9
Paikanskii Sklad	50 11	130 7	476	86	89	8	-51	-57	9
Nikolavsk-sur-Amour	53 8	140 45	70	82	88	10	-41	-51	9
Petropavlovsk	52 53	E. 158 43	286	75	81	8	-13	-29	11
Zone 50°-40° N.									
Victoria, B.C.	48 24	W. 123 19	230	85	91	12	+20	+13	12
Portland, Or.	45 32	122 41	153	96	100	12	+20	+ 3	12
Macleod	49 44	113 24	3127	96	102	12	-36	-47	12
Helena	46 34	112 4	4111	95	99	12	-23	-32	12
Salt Lake City	40 46	111 54	4360	98	101	12	+ 5	- 2	12
Cheyenne	41 8	104 48	6089	91	95	12	-16	-28	12
North Platte	41 8	100 45	2818	101	106	12	-19	-25	12
Bismarck	46 47	100 38	1676	101	108	12	-34	-45	12
Winnipeg	49 53	97 7	761	95	99	12	-37	-42	12
Duluth	46 47	92 6	1132	91	97	12	-28	-36	12
Port Arthur	48 27	89 12	643	91	97	12	-30	-37	12
Chicago	41 53	87 37	823	98	102	12	- 7	-16	12
Toronto	43 40	79 24	381	96	103	12	-11	-22	12
New York	40 47	73 58	156	96	104	12	+ 1	-13	12
St. John, N.B.	45 17	66 4	119	82	87	12	-14	-20	12
S.W. Point, Anticosti	49 24	63 33	30	75	85	12	-21	-40	12
Sable Island	43 57	60 6	25	75	86	11	+ 5	- 3	11
Port aux Basques	47 35	59 10	30	74	80	7	0	-10	7
St. John's, N'foundland	47 34	52 42	125	84	90	12	- 6	-11	12
Madrid	40 24	3 41	2188	103	109	12	+19	+14	12
Nantes	47 15	W. 1 34	120	91	97	12	21	13	12
Paris	48 49	E. 2 29	165	91	101	12	15	4	12
Marseille	43 18	5 23	246	92	98	12	23	16	12
Zurich	47 23	8 33	1617	90	98	12	11	3	12
Rome	41 54	12 27	149	93	96	12	28	25	12
Vienna	48 15	16 22	666	86	92	12	12	+ 3	12
Budapest	47 31	19 2	427	94	102	12	10	- 2	12
Bucharest	44 25	26 6	269	99	105	11	3	- 9	11
Odessa	46 29	30 46	214	90	96	12	+ 3	-13	11
Kharkov	50 0	36 14	459	91	98	12	-12	-22	11
Novorossiisk	44 44	37 49	122	90	99	12	+ 8	- 3	12
Tiflis	41 43	44 48	1325	97	101	12	+16	+ 8	12
Astrakhan	46 21	48 2	-66	97	100	9	- 8	-20	8
Krasnovodsk	40 0	52 59	-19	103	110	8	+16	+11	7
Aralskoe More	46 47	61 42	184	99	102	6	—	—	—
Tachkent	41 20	69 18	1568	106	110	11	0	-13	10
Narynskoe	41 26	76 2	6610	—	—	—	-26	-35	8
Vernyi	43 16	76 53	2759	97	105	8	—	—	—
Moukden	41 48	123 23	144	96	103	12	-21	-27	11
Joshin	40 40	129 11	105	90	99	12	- 5	-12	12
Yuki	42 20	130 24	215	89	97	7	- 6	-12	7
Vladivostok	43 7	131 55	420	86	92	12	-16	-22	11
Ochiai	47 20	142 46	21	86	91	12	-34	-40	11
Nemuro	43 20	145 35	88	80	87	12	+ 4	- 2	11
Syana	45 14	E. 147 53	129	81	82	7	- 1	- 8	6

Station.	Lat. N.	Long.	Ht. Ft.	Annual Maxima.			Annual Minima.		
				Mean.	Extreme	No. of yrs.	Mean.	Extreme	No. of yrs.
Zone 40°-30° N.									
San Francisco ..	37 48	W. 122 26	155	91	101	12	+37	+33	12
San Luis Obispo ..	35 18	120 39	201	100	110	12	28	20	12
San Diego ..	32 43	117 10	87	93	110	12	+36	+25	12
Modena ..	37 48	113 54	5479	95	99	12	-14	-24	12
Santa Fé ..	35 41	105 57	7014	88	90	12	-1	-12	12
Denver ..	39 45	105 0	5292	96	101	12	-11	-21	12
Abilene ..	32 23	99 40	1739	104	108	12	+9	+1	12
St. Louis ..	38 38	90 12	568	99	105	12	-3	-17	12
Mobile ..	30 41	88 2	57	98	101	12	+24	+17	12
Nashville ..	36 10	86 47	545	97	102	12	5	-10	12
Charleston ..	32 47	79 56	48	98	101	12	24	+12	12
Washington ..	38 54	77 3	112	98	106	12	6	-13	12
Bermuda ..	32 17	64 46	151	88	90	12	46	+43	12
Santa Cruz ..	39 27	31 9	92	82	84	6	41	34	6
Horta ..	38 32	28 38	213	82	87	12	45	41	12
Ponta Delgada ..	37 44	25 40	72	80	88	12	46	41	11
Madeira ..	32 37	16 54	82	89	101	12	47	41	12
Lisbon ..	38 43	9 9	312	97	103	12	36	32	12
Gibraltar ..	36 6	5 21	53	93	97	12	40	36	10
Melilla ..	35 18	W. 2 59	26	98	101	7	38	36	7
Palma ..	39 34	E. 2 39	75	95	99	12	34	27	12
Algiers ..	36 48	3 2	1122	104	109	12	36	28	12
Tunis ..	36 48	10 10	69	111	118	12	34	30	11
Malta ..	35 54	14 31	185	96	104	12	43	37	12
Riposto ..	37 41	15 14	46	90	95	8	42	39	8
Athens ..	37 58	23 43	351	101	109	12	29	23	12
Alexandria ..	31 12	29 53	105	103	111	12	43	38	12
Nicosia ..	35 9	33 22	522	106	112	11	30	25	11
Beirut ..	33 54	35 28	111	95	107	10	40	30	10
Baghdad ..	33 21	44 28	125	118	123	9	29	24	8
Busrah ..	30 31	47 53	25	115	122	8	32	24	8
Lenkoran ..	38 46	48 52	-66	90	94	9	23	10	9
Tehran ..	35 41	51 25	4002	—	—	—	19	+10	6
Meshed ..	36 16	59 35	3104	103	112	10	3	-8	10
Seistan ..	31 0	61 30	?	113	116	7	20	+12	6
Quetta ..	30 11	67 3	5502	101	104	12	14	3	12
Peshawar ..	34 2	71 37	1112	119	122	7	30	28	7
Lahore ..	31 34	74 20	702	115	118	12	34	29	12
Simla ..	31 7	77 8	7234	80	83	12	+26	+17	12
Leh ..	34 10	77 42	11493	84	86	12	-4	-13	12
Hankow ..	30 35	114 17	121	100	104	11	+22	+19	11
Tientsin ..	39 10	117 10	16	101	104	11	2	-2	11
Shanghai ..	31 12	121 26	23	99	102	12	16	+12	12
Jinsen ..	37 29	126 37	221	93	97	12	2	-6	12
Nagasaki ..	32 44	129 52	436	93	95	11	25	+22	11
Kyoto ..	35 1	135 44	141	97	99	11	19	12	11
Tokyo ..	35 41	139 45	70	93	94	11	22	17	11
Kanayama ..	37 53	140 46	81	93	95	6	12	6	6
Myako ..	39 38	E. 141 59	100	93	97	11	12	7	11
Zone 30°-20° N.									
Honolulu ..	21 19	W. 157 52	38	86	88	12	59	57	12
Leon ..	21 7	101 41	5935	93	95	8	31	28	8
Galveston ..	29 18	94 50	54	95	99	12	26	16	12
New Orleans ..	29 57	90 4	53	98	102	12	27	17	12
Havana ..	23 8	82 21	80	91	94	12	54	50	12
Key West ..	24 33	81 48	22	91	92	12	52	44	12
Nassau Bahamas ..	25 5	77 21	24	91	93	10	58	54	10
Watling Island ..	24 6	74 26	110	—	—	—	63	61	6
Izaña ..	28 19	16 30	7766	80	82	6	20	16	6
La Laguna ..	28 28	W. 16 20	1795	99	104	8	39	37	8
Insalah ..	27 1	E. 2 21	919	125	129	7	29	25	6
Cairo (Helwan) ..	29 52	31 20	381	110	115	12	39	36	12
Aswan ..	24 2	32 53	327	117	124	12	43	37	11
Tor ..	28 14	33 37	6	106	111	7	41	35	8
Bushire ..	28 59	50 53	14	107	112	12	43	35	12
Jask ..	25 44	57 47	13	108	113	12	51	43	12
Karachi ..	24 53	66 57	13	101	113	12	49	43	12
Hyderabad Sind ..	25 24	68 18	96	117	121	8	41	36	8
Jacobabad ..	28 17	68 29	219	123	127	7	34	30	7
Jaipur ..	26 56	75 52	1430	113	118	12	38	33	12
Nagpur ..	21 8	79 5	1017	113	118	12	46	44	12
Allahabad ..	25 25	81 51	309	114	116	12	40	37	12

Station.	Lat. N.	Long.	Ht.	Annual Maxima.			Annual Minima.		
				Mean.	Extreme	No. of yrs.	Mean.	Extreme	No. of yrs.
Zone 30° - 20° N.—(contd.)									
Darjeeling	27 3	88 18	7434	76	77	7	30	27	7
Calcutta	22 36	88 23	21	103	107	12	49	45	12
Gauhati	26 8	91 41	196	97	101	12	44	41	12
Cherrapunji	25 15	91 42	4311	82	87	12	39	32	11
Akyab	20 11	92 56	20	95	99	12	53	48	12
Mandalay	21 59	96 0	250	110	112	7	51	48	7
Tengueh	25 2	98 33	5331	83	85	6	26	24	6
Phu Lien	20 48	106 38	381	100	107	12	47	43	12
Moncay	21 31	107 51	30	97	102	12	39	36	12
Hong Kong	22 18	114 10	109	92	94	12	43	39	12
Amoy	24 27	118 4	10	96	100	6	41	39	6
Taihoku	25 2	121 31	30	97	99	11	41	35	11
Basco	20 28	121 59	61	—	—	—	59	55	6
Naha	26 13	127 41	34	94	96	11	45	41	11
Titizima Bonin Is. ..	27 5	E. 142 11	13	92	95	6	48	45	6
Zone 20° - 10° N.									
Morelia	19 12	W. 101 7	6309	84	89	7	—	—	—
Mexico	19 24	99 12	7575	87	91	11	31	24	10
Salina Cruz	16 12	95 12	184	95	96	6	62	60	7
San Salvador	13 42	89 13	2238	101	105	11	50	45	11
Belize	17 29	88 12	17	91	95	12	59	53	11
Jamaica (Negril Pt.) ..	18 15	78 23	33	92	94	12	62	57	12
Port au Prince	18 33	72 20	123	98	100	12	63	59	12
Caracas	10 30	66 55	3419	88	91	8	48	45	7
St. Croix	17 45	64 42	22	91	91	7	67	64	7
Montserrat	16 41	62 9	130	95	98	7	63	59	7
Grenada	12 5	61 46	509	91	93	12	69	67	12
Barbados	13 8	59 36	181	89	91	12	63	61	12
São Vicente, C. Verde ..	16 54	25 4	36	87	89	10	59	54	10
San Tiago, C. Verde ..	14 54	23 31	131	90	93	12	63	56	12
Bathurst	13 27	16 36	6	101	105	11	57	53	7
M'Carthy Is.	13 33	14 45	4	112	115	8	54	49	9
Timbuktu	16 43	W. 3 2	886	115	121	7	44	42	6
Sokoto	13 2	E. 5 14	1158	110	115	12	50	39	11
Kaduna Capital	10 32	7 25	2090	101	104	8	49	45	8
Maiduguri	11 47	13 11	1184	115	119	11	49	44	11
El Obeid	13 11	30 14	1867	109	112	12	42	36	12
Khartoum	15 37	32 33	1280	113	117	12	48	45	12
Port Sudan	19 37	37 13	18	115	117	8	58	54	8
Berbera	10 22	45 2	31	113	116	8	62	59	8
Aden	12 45	45 3	94	100	109	12	68	65	12
Bombay	18 54	72 49	37	95	96	12	61	59	12
Cochin	10 58	76 21	9	95	99	12	67	64	12
Kodaikanal	10 14	77 28	7687	77	78	12	40	37	12
Bangalore	12 59	77 38	3018	98	99	8	51	50	8
Madras	13 4	80 14	22	108	113	12	62	60	12
Vizagapatam	17 42	83 19	38	102	109	12	62	59	12
Port Blair	11 40	92 40	59	95	96	12	69	67	12
Rangoon	16 46	95 48	18	101	103	12	59	56	12
Saigon	10 47	106 42	36	99	104	11	63	61	11
Nhatrang	12 15	109 12	12	99	103	12	61	53	12
Bolinao	16 23	119 53	23	99	101	11	64	61	11
Vigan	17 34	120 23	40	97	100	12	63	60	12
Manila	14 35	120 59	47	98	101	12	62	58	12
Ormoc	11 0	124 36	18	94	97	12	63	59	12
Guam Ladrone Is. ..	13 24	E. 144 38	67	91	93	10	70	67	11
Zone 10° N.—0°									
Fanning Is.	3 54	W. 159 23	17	95	100	8	71	69	8
Colon	9 23	79 23	36	91	93	8	71	68	8
Merida, Venez	8 36	71 9	5384	83	85	7	52	52	6
Georgetown B.G.	6 50	58 12	6	90	92	12	70	68	12
Paramaribo	5 49	55 9	12	94	99	11	65	63	11
Cayenne	4 56	52 21	20	94	96	11	68	66	9
Konakri	9 4	13 42	52	97	101	7	68	66	6
Freetown S.L.	8 29	13 9	224	98	101	12	66	60	9
Cape Coast	5 5	W. 1 13	?	—	—	—	58	54	6
Lagos	6 27	E. 3 24	15	97	104	12	67	60	12
Zungeru	9 48	6 10	427	106	110	12	56	53	11
Libreville	0 23	9 26	115	94	99	7	65	61	6
Yola	9 12	12 30	850	107	109	11	59	56	8
Wau	7 42	28 3	1444	106	115	11	54	50	10

Station.	Lat. N.	Long.	Ht. Ft.	Annual Maxima.			Annual Minima.		
				Mean.	Extreme	No. of yrs.	Mean.	Extreme	No. of yrs.
Zone 10° N. — 0° — (contd.)									
Malakal	9 35	31 37	1293	109	111	8	56	54	6
Mongalla	5 11	31 47	1440	107	109	7	—	—	—
Entebbe	0 5	32 29	3842	87	92	12	57	52	12
Colombo	6 54	79 53	24	94	97	12	64	61	12
Nuwara Elija ..	6 59	80 46	6188	78	79	8	30	27	8
Trincomalee ..	8 34	81 14	99	100	102	8	68	66	8
Medan	3 35	98 41	82	95	97	8	65	60	8
Penang	5 34	100 20	16	95	97	12	68	63	12
Singapore	1 18	103 51	10	94	97	12	70	67	12
Sandakan	5 50	118 7	104	93	96	9	72	70	0
Iwahig	9 44	118 38	43	94	96	7	63	59	7
Tagbilaran	9 38	123 51	70	94	96	11	66	63	10
Menado	1 30	124 50	28	94	97	7	67	65	7
Surigao	9 48	125 29	20	95	99	10	68	65	11
Yap	N. 9 29	E. 138 8	118	94	96	7	71	69	7
Zone 0° — 10° S.									
Manaos	S. 3 8	W. 60 1	144	98	101	10	70	68	10
Taperinha	2 30	54 20	66	—	—	—	67	65	7
Turyassu	1 43	45 26	50	96	100	8	67	65	8
Barra do Corda ..	5 30	45 16	266	100	103	6	56	54	7
Quixeramobim ..	5 16	39 15	679	96	97	12	68	67	12
Fernando Noronha ..	3 50	W. 32 25	348	85	86	10	69	65	10
Loanda	8 49	E. 13 13	194	88	91	9	61	59	9
Brazzaville	4 17	15 16	1050	—	—	—	59	55	6
Masaka	0 21	31 47	4200	86	89	6	55	53	6
Nairobi	1 14	36 44	6000	85	88	11	39	34	11
Zanzibar	6 10	39 11	72	91	94	12	70	69	12
Lamu	2 16	40 50	10	93	100	10	67	52	10
Seychelles	4 37	55 27	15	88	89	12	72	70	11
Padang	0 56	100 22	22	92	93	6	70	68	6
Batavia	6 11	106 50	26	93	95	12	70	69	12
Pontianak	0 1	109 20	8	93	95	6	69	68	6
Pasuruan	7 38	112 55	16	93	95	8	64	58	8
Kajoemas	7 56	114 9	3478	87	91	6	58	56	6
Ambonia	3 42	128 10	14	93	94	6	68	67	6
Tulagi B.S.I. ..	9 5	160 8	7	95	97	10	71	67	11
Ocean Is.	0 52	E. 169 35	177	92	95	11	71	70	12
Zone 10° — 20° S.									
Apia, Samoa	13 48	W. 171 46	7	91	93	10	65	63	10
Alofi Niue Is. ..	19 2	169 55	120	96	98	11	58	54	8
Arequipa	16 22	71 33	8041	77	82	12	41	38	12
Puerto de Arica ..	18 28	70 20	16	83	94	8	50	47	10
Corumba	18 59	57 39	381	103	106	7	—	—	—
Cuyaba	15 36	56 6	541	98	101	12	51	41	12
Bello Horizonte ..	19 55	43 57	2938	93	95	11	40	36	11
Caetite	14 3	42 37	2943	93	97	12	51	49	12
Ondina (Bahia) ..	13 0	38 31	153	92	95	12	66	62	12
Aracaju	10 54	37 3	13	90	91	8	67	65	9
St. Helena	15 57	W. 5 40	1900	82	84	12	50	49	12
Gwelo	19 28	E. 29 48	4649	98	100	12	30	27	9
Salisbury	17 48	31 5	4780	96	102	12	33	30	12
Zomba	15 23	35 18	3133	95	101	12	45	42	12
Antananarivo	18 55	47 32	4593	88	91	12	41	37	12
Cocos Keeling Is. ..	12 5	96 53	15	90	91	9	70	69	9
Christmas Is. ..	10 25	105 43	18	93	95	12	69	67	12
Kupang	10 10	123 34	148	97	99	8	62	59	8
Derby	17 18	123 40	53	108	112	12	48	45	12
Hall's Creek	18 13	127 46	1227	109	112	12	36	32	12
Darwin	12 28	130 51	97	98	101	12	62	59	12
Daly Waters	16 16	133 23	692	109	112	12	43	37	12
Mein	13 13	142 47	400	101	104	12	51	43	12
Georgetown, Queensland	18 22	143 32	991	104	109	12	37	34	12
Suva, Fiji	18 8	E. 178 26	58	92	96	12	60	55	12
Zone 20° — 30° S.									
Rarotonga	21 12	W. 159 47	20	89	92	8	55	48	10
Punta Tortuga ..	29 56	71 21	89	75	79	12	42	37	11
Iquique	20 12	70 11	30	83	87	6	50	46	6
Catamarca	28 27	65 47	1673	111	119	7	26	23	7
Salta	24 46	65 28	3865	97	99	7	21	15	6
Goya	29 9	59 15	85	106	114	10	33	31	10
Asuncion	25 21	57 37	305	106	110	7	31	29	7

Station.	Lat.		Long.	Ht.	Annual Maxima.			Annual Minima.		
	N.				Mean.	Extreme	No. of yrs.	Mean.	Extreme	No. of yrs.
Zone 20° – 30° S.—(contd.)										
Curityba	25	25			Ft.	°F.	°F.		°F.	°F.
Rio de Janeiro	22	54	W. 49 17	2979	92	94	9	24	21	9
Windhoek	22	35	E. 43 10	201	96	100	11	57	55	11
Kimberley	22	35	E. 17 5	5512	93	98	10	32	28	9
Johannesburg	28	42	24 47	3944	101	103	9	23	21	9
Pretoria	26	11	28 4	5925	88	90	12	27	25	12
Durban	25	46	28 13	4593	95	101	11	27	23	12
Lourenço Marques	29	52	31 3	50	92	97	10	45	32	11
Mauritius	25	58	32 36	194	105	112	12	48	46	12
Onslow	20	6	57 33	181	91	95	12	53	51	12
Peak Hill	21	43	114 57	14	114	116	12	42	39	12
Nullagine	25	38	118 47	1929	109	113	11	37	32	12
Laverton	21	53	120 5	1266	112	114	12	33	29	12
Alice Springs	28	40	122 23	1529	111	112	12	30	24	12
William Creek	23	38	133 37	1926	107	110	12	27	23	12
Boulia	28	55	136 21	250	113	116	12	31	26	12
Thargomindah	22	55	139 38	479	112	119	11	36	31	10
Mitchell	27	58	143 43	404	109	112	6	34	30	6
Rockhampton	26	32	147 52	1102	107	111	12	25	19	12
Brisbane	23	24	150 30	37	104	112	12	38	35	12
Norfolk Is.	27	28	153 2	137	100	106	12	39	36	12
	29	4	E. 167 59	50	85	89	7	49	47	8
Zone 30° – 40° S.										
Juan Fernandez	33	37	W. 78 50	33	80	81	7	43	39	9
Punta Tumbes	36	37	73 6	394	77	83	7	35	34	7
Punta Angeles (Valparaiso).	33	1	71 38	135	87	94	12	39	36	12
Santiago	33	27	70 42	1706	95	99	12	27	25	12
Cordoba	31	25	64 12	1388	105	114	10	20	13	10
Bahia Blanca	38	45	62 15	82	104	107	10	25	21	10
Buenos Ayres	34	36	58 22	82	98	102	11	26	22	11
Montevideo	34	55	56 13	80	97	109	12	32	25	12
Porto Alegre	30	2	W. 51 13	77	100	103	8	31	25	8
Cape Town	33	56	E. 18 29	40	99	103	12	36	33	12
Danger Point	34	37	19 18	91	86	95	8	38	30	9
East London	33	1	27 54	32	95	102	12	39	34	12
Perth	31	57	115 51	197	105	108	12	37	34	12
Katanning	33	42	117 35	1017	105	111	12	31	30	12
Coolgardie	30	57	121 10	1388	110	113	12	32	29	12
Eucla	31	45	128 58	15	112	121	12	34	32	12
Streaky Bay	32	48	134 13	43	109	114	12	37	31	12
Adelaide	34	56	138 35	140	109	113	12	36	33	12
Melbourne	37	49	144 58	115	105	107	12	31	29	12
Bourke	30	13	145 58	364	114	117	12	31	27	12
Sydney	33	51	151 13	133	100	105	12	40	37	12
Lord Howe Island	31	20	159 0	15	84	86	9	45	43	9
Auckland	36	50	174 50	125	79	82	12	37	34	12
Napier	39	32	E. 176 53	70	91	93	7	31	28	8
Zone 40° – 50° S.										
Isla Guafo	43	34	W. 74 45	459	70	79	8	35	34	8
Punta Galera	40	1	73 44	131	71	80	12	36	35	12
Sarmiento	45	30	69 0	899	94	99	7	12	3	7
Punta Madryn	42	49	W. 64 58	46	100	102	7	21	11	7
Launceston	41	27	E. 147 10	33	93	101	12	28	27	12
Hobart	42	53	147 20	177	96	102	12	31	25	12
Invercargill	46	25	168 21	12	84	90	8	23	19	8
Dunedin	45	52	170 31	300	85	90	12	29	27	12
Christchurch	43	31	172 39	25	88	94	12	25	23	12
Wellington	41	16	E. 174 46	10	80	85	12	32	29	12
Zone 50° – 60° S.										
Is. de los Evangelistas	52	24	W. 75 6	180	58	65	10	29	26	11
Pto de Punta Arenas	53	10	70 54	92	73	77	11	21	15	11
Pta. Dungeness	52	24	68 26	16	73	79	11	25	20	10
Santa Cruz	50	11	68 21	39	91	93	6	13	6	6
Año Nuevo	54	39	64 8	164	59	64	8	23	20	8
C. Pembroke	51	41	W. 57 42	69	68	75	12	23	21	12
S. Georgia	54	14	36 33	13	67	71	9	10	8	10
Zone 60° – 70° S.										
S. Orkneys	60	44	W. 44 39	23	46	52	12	—26	—33	12