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Professor Andrew John Herbertson.

1865-1915.

ANDREW JOHN HERBERTSON, who died after some month's illness, on July 30th, was born at Galashiels, and studied at the University of Edinburgh, Montpellier, and Freiburg, taking the degree of Doctor of Philosophy in Geography at the last named. He held successively the position of Lecturer on Geography at the Heriot Watt College, Edinburgh, and at Owens College, Manchester, and Reader in Geography at the University of Oxford, and received the title of University Professor of Geography in 1910. He was a member of Wadham College and an honorary M.A. of the University.

Professor Herbertson devoted himself to the educational aspects of geography with great enthusiasm and success and did much to build up the Oxford School of Geography and to improve the teaching of the subject by the teachers he trained and the numerous admirable text-books which he wrote. In his literary work he was fortunate in having the collaboration of his wife, herself a geographical writer of no small distinction. While it is on his achievements in geographical education that the reputation of Professor Herbertson must mainly rest, we are more concerned in this place with the valuable contributions he made to the science of climatology. During his student life at Edinburgh he had occasion to take part in the work of the Ben Nevis Observatory and so came under the inspiring influence of the late Dr. A. Buchan. He joined Dr. J. G. Bartholomew in the editorship of the great *Atlas of Meteorology*, published in 1899, and devoted much time to the preparation of monthly average rainfall maps of all the continents. This work was published by the Royal Geographical Society in 1900, under the title of "The Distribution of Rainfall over the Land."

Professor Herbertson was a member of the Royal Commission on Canals and Inland Navigation during the years 1906 to 1910, and in 1910 he was president of Section E of the British Association. His kindly disposition and charm of manner made him many friends and endeared him to the students of the School of Geography to whom his death will be a heavy loss. We have

enjoyed the friendship of Professor Herbertson for nearly thirty years and have worked together with him at many times and on many subjects, so that we can speak as warmly of his qualities as a man as of his distinction as a geographer.

AN ANTARCTIC BAROMETRIC SEE-SAW.

At a meeting of the Royal Society of Edinburgh, held on June 28th, a paper by Mr. R. C. Mossman on "A Barometric See-Saw between the Weddell Sea and the Ross Sea," was read. The phenomena described were analogous to the see-saws of pressure observed between such pairs of stations as Stykkisholm in Iceland, and Ponta Delgada in the Azores, or between Bombay and Cordoba. The localities under discussion were McMurdo Sound, where Captain Scott's two expeditions furnished four years' complete observations, and Laurie Island, South Orkneys. During 1902 there were no data available from the South Orkneys, but values were interpolated from the isobaric charts for the Weddell Sea area, prepared in connection with the International Antarctic scheme of observation, 1902 to 1904. The data were discussed in three monthly groups, corresponding to the seasons of the year in more temperate regions, with the result that the synchronous pressure departures from the normal were of opposite sign in the two regions. Conditions on the great Antarctic plateau were doubtless the controlling factor. A strong negative correlation between barometric pressure in New Zealand and the Magellan Straits region on the one hand, and that of McMurdo Sound on the other, was also prevalent at all seasons of the year, the pressure relations being similar to those between Australia and McMurdo Sound, to which Dr. Simpson had previously drawn attention. The velocity of the wind was in harmony with the barometric variations, since only in the winter of 1911 and the spring of 1903 were the departures from the normal represented by the same sign in the Weddell Sea and the Ross Sea. That is to say, when it was stormy in the one area light winds prevailed in the other region, and *vice versa*.

As regards air temperature it was shown that in five summers (Shackleton's data for 1908-9 adding another year to the period available for discussion), the departures from the normal in the Ross Sea were the same as those at the South Orkneys, Patagonia, New Zealand and Perth, W.A., and the reverse of those at Sydney and St. Helena. In autumn as in summer the temperature variations in New Zealand and New South Wales were strongly influenced by Antarctic conditions. In spring there was no exception to the rule that cold weather in McMurdo Sound was associated with warm weather at Hobart, Adelaide, Punta Arenas and Rio de Janeiro, while at this season when the temperature at McMurdo Sound was in excess of the normal, there was a deficiency at the

above named places. It was found that when the temperature in summer at McMurdo Sound was below the normal, warm autumns followed at Adelaide, Perth, W.A., St. Helena and Southern Brazil, while warm summers in the Ross Sea area were succeeded by cool autumns in the regions specified. As the wind velocity curve at the South Orkneys smoothed in 3-year groups had steadily fallen since 1905, while the air temperature at St. Helena had risen in sympathy with this diminished air movement, there was probably an intimate inter-relation between the Trade Winds of the South Atlantic and the Antarctic circulation.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

THE LIMITS OF THE SEASONS.

WITH regard to the length of the seasons I am quite aware that in my letter in your April number my argument represented mainly the question of temperature, which is the dominant question in the matter. Other questions have not the same relation. That is to say temperature and its daily changes appeal to us more than any other meteorological element, and also to animal life. Thus October to March is in our country the period of wind and storms, and April to September the period of moderate wind. Again, rain is least in our spring and greatest in our autumn. Thunderstorms occur mainly between May and August, although occasionally we get a thunderstorm in winter. These and other matters do not affect us to the same degree as temperature. We must not argue too much on accidental phenomena. We all know that temperatures above 80° can be found in May and above 90° in September, but we cannot call either of these months summer. Again in summer we may have maximum temperatures not much higher than what is sometimes reached in winter. Seasons can only be defined by what is the general state of things. If seasons are to be arranged in a new fashion we shall have different periods in comparatively small geographical areas, thus creating greater difficulty in making comparison between them. Any long established system, if not exactly perfect, should not be hastily given up. For instance, the Centigrade thermometer has made slow progress in our country as people cannot readily realize what temperature 20° or 30° means. Again attempts have been made to revise our calendar by giving the months an equal number of days, but without much success, as it would disturb so much the relation of many events with special days in a manner that would be inconvenient and disagreeable.

WILLIAM ELLIS.

June 23rd, 1915.

HAS not a sufficiently conclusive answer been given to the season question in the June number of this Magazine, wherein Mr. Bonacina's rhapsody over a summer evening in May is immediately followed by the Rev. R. P. Dansey's account of a mid-May snow storm? Mr. Bonacina will no doubt contend that a mid-May snow storm is unusual, but he must admit that snow in mid-August is unknown. I happened also to be in the west of England at the end of May and I was chiefly struck, while passing through the Somerset Marshes, by the acres of black and frost bitten potatoes which I saw, the result of a winter morning in May. My own experience of the west of England, of which I am a native, is that summer seldom asserts itself before mid-summer, or winter before Christmas, and that the early spring is the most disagreeable part of the year. During the 25 years we have kept a record, a frost has been registered as late as May 28th, but none before the second week of October.

Mr. Bonacina loses sight of the fact that the Atlantic Ocean has as much or more influence on our climate than the actual altitude of the sun. It takes till September for this great volume of water to attain its maximum, and till March its minimum, temperature; with the result that our seasons are retarded by some weeks. Mr. Bonacina's theory is no doubt correct for the interior of continents, but it does not apply to regions under the influence of great oceans, like the British Isles, and in fact the whole western fringe of Europe.

A. C. F. LUTTRELL.

July 28th, 1915.

LIGHTNING HOLES.

MR. J. S. DINES, in your July number (p. 97), thinks that the tube like hole, which he found where the lightning had struck, existed previously. I venture to doubt this from my experience of the *two* similar holes, each at the foot of a groove on different sides of a tree, which I found at Charlton Kings in 1898, as described in your Magazine, Vol. 33, p. 136.

JAMES G. WOOD.

115, Sutherland Avenue, London, W., July 16th, 1915.

[In confirmation of Mr. Wood's contention we may refer to the well known phenomenon of the formation of fulgarites by lightning in sand, and for the formation of such holes in ordinary soil to a paper by the Rev. C. F. Box on "Effects of a Lightning Stroke at Earl's Fee, Bowers Gifford, Essex, April 13th, 1904," read to the Royal Meteorological Society in June, 1904, and summarized in this Magazine, Vol. 39, p. 114).—Ed., S.M.M.]

AUDIBILITY OF DISTANT THUNDER.

ON the evening of August 1st, as it was growing dark, between 9 and 9.15 p.m., I was watching a bank of thunder clouds to the west and north-west which rose in towering masses to about 30° from the horizon. They were lighted up at rather long intervals by bright flashes of lightning, the sky elsewhere being almost cloudless. As there was sufficient time between the flashes to avoid any fear of confusion, I determined to note carefully the time-interval between the lightning and its accompanying thunder. A flash at about 9.5 in the W.N.W. was followed by distinctly audible thunder in 115 seconds, and another shortly afterwards in 112 seconds. Taking the velocity of sound at 1121 feet per second (the temperature here at the time was about 59°F.), the distance of the first flash works out at 24.41 miles, and of the second at 23.77 miles. This would indicate that the lightning occurred over the sea about seven miles S.S.W. of Barrow. As the land is almost level from my point of observation (100 ft. above sea-level) to the sea coast near Fleetwood, in the direction of the storm, there was little or nothing to interfere with the transmission of the sound.

The above observation shows that the distance at which thunder can be heard under favourable conditions is much greater than that generally stated in text-books.

HOWARD WILSON.

Garstang, August 3rd, 1915.

THUNDERSTORM AND HAIL ON JULY 4th.

IN my note on this event published in your journal for July I might have mentioned that the rainfall during the half an hour's storm amounted to 1.07 in. at Clifton. In the morning .48 in. fell during a heavy downpour between 4 and 5 a.m. Mr. William Garnett at Blackwell Hill House, near Bristol, registered .82 in. between 2.30 and 2.55 p.m. With regard to the dimensions of the hail stones, several reliable Observers give striking descriptions. At Shipham the larger ones were $5\frac{1}{2}$ inches round. At Winscombe and Axbridge in Somerset they were as large as hen's eggs. At Ilfracombe Mr. C. Wills was shown four lumps of ice which weighed a pound, and on the day after the storm he saw in one yard a barrowful of ice which had survived the hot weather. At Combe Martin large green houses were almost entirely destroyed and trees stripped of their fruit. Along the Chew Valley, a few miles south of Bristol, and at many other places in the track of the storm, it raged with disastrous effect.

W. F. DENNING.

Bristol, July 19th, 1915.

THUNDERSTORM RAIN.

DURING the last few weeks thunder storms have been very frequent in Scotland; one of them occurred at The Trossachs on the afternoon of the 26th July, accompanied by very heavy rain. At 2 p.m. thunder was heard in the distance in an east-south-easterly direction and by 3 o'clock was directly overhead, and the thunder very loud. At that hour the rain commenced and soon became so very heavy that I thought it looked like making a record rate of fall. As there was no rain-gauge in the place I hunted for something suitable to take its place, and succeeded in getting a cylindrical metal vessel $4\frac{1}{4}$ inches in diameter, as it had a thin lip it suited the purpose very well. By the time I had got the gauge out it was 3.20 p.m. At 3.23 the rain became lighter, so the gauge was taken in, when it was found that $\frac{1}{4}$ inch of rain had fallen in the three minutes. Though it continued raining the gauge was not then put out, as it was just ordinary heavy rain. At 3.30, however, it again began to come down very heavily and the gauge was again put out and left till 3.59, when the rain somewhat suddenly ceased. During these 29 minutes $1\frac{1}{2}$ inches of rain fell, or at the rate of fully .10 in. per two minutes. The rainfall for the hour the storm lasted would be considerably over 2 inches, as in addition to the $1\frac{1}{4}$ inches measured there was a very heavy fall for some time before the gauge was put out, and some also fell during the seven minutes while the gauge was not exposed. There was a good deal of hail mixed with the rain, but nothing remarkable about the size or structure of the stones. The storm was very local. Little rain fell one mile to the east or three miles to the W.N.W., the direction to which the storm passed. By 4.30 the sun was shining brightly.

JOHN AITKEN.

Ardenlea, Falkirk, 4th July, 1915.

AFFORESTATION AND THE FLOW OF SPRINGS.

FOR the purpose of an enquiry before a Parliamentary Committee relating to a Public Water Supply I have recently had occasion to make an examination of certain springs in the County of Northumberland. These springs, of which there are a considerable number, break out along the hillside over a distance of rather more than half a mile at Tosson, near Rothbury. They are shown very clearly on the first edition of the 6-inch Ordnance Map, the survey for which was made in 1863. Of the whole number shown only the three most westerly springs are marked "Springs" on this plan, and it may therefore be presumed that they were particularly well defined when the survey was made. These three springs are not so marked on the 2nd edition of the 6-inch Ordnance Survey, which was revised in 1896, and have now nearly ceased to

flow. What is the reason of this? I believe it to be explained by the fact that a large plantation which did not exist when the first survey was made in 1863, has since been established on the hillside just above them. The plantation does not extend sufficiently to the eastward to affect the flow of the remainder of the springs. As this cause of the depletion of springs has not previously come under my notice, I think the suggestion I make may be of interest to your readers, some of who may possibly be able to throw light upon the matter from personal experience. It can be readily understood that the growth of trees may reduce the flow of springs in two ways: firstly, by absorbing water from the ground, and secondly, by reason of the rainfall being arrested on their foliage and thence evaporated. This subject is one of considerable importance, because if I am right in thinking that the depletion of the springs is due to the plantation, there is an element of insecurity in water supplies so derived and also in those obtained by means of impounding reservoirs, unless in all cases the gathering grounds are under the control of the Water Authorities interested.

W. VAUX GRAHAM.

5, Queen Anne's Gate, Westminster, London, S.W., July 15th, 1915.

[The great interest of this subject leads us to hope that some of our readers may be able to give an account of the springs in question extending over the period since the plantation grew up.—Ed., *S.M.M.*]

PREDICTION BY THE SUNSPOT CYCLE.

In your July issue (p. 96), Mr. Bryant is reported as saying of a theory, that the best proof of its value would be found in prediction, "a test," he adds, "which had proved an absolute failure in the case of the sunspot forecast." I would offer proof that it is possible, in certain cases, with the aid of the sunspot cycle, to forecast a Rothesay summer with reasonable confidence.

Rothesay, it is known, has a valuable record of rainfall going back to 1800, since which date there have been ten sunspot minima. The average summer rainfall is about 11·8 in., and the figures range from 3·9 in. up to 19·1 in. Now we might, I think, formulate two rules, as follows:—

Rule I.—Of the three summers min. 1, 2 (*i.e.*, minimum sunspot year and the two following), expect at least two to have less than 12 in. This has occurred in nine cases out of the ten. In the tenth case (1856 min.), with only one summer under 12 in., the average of the three is under 12 in. I need not enlarge on how this rule would operate. It would not tell us much about the first of the three; but if that had more than 12 in. the two others

might be counted on to have less, and so on. 1913 is the last minimum; that summer and 1914 had both less than 12 in.; thus the character of the present summer would be obscure.

Rule II.—Of the three summers 5, 6, and 7 after min., expect at least two to have more than 12 in. This has occurred in eight cases out of the nine available. The exceptional case is after the 1878 min. To those two rules I would add two relating to the Rothsay year.

Rule III.—In a min. year expect not *more* than six wet months.

Rule IV.—In the fifth year after a min. expect not *less* than six wet months.

The above rules do not cover a great deal of the ground; but they are, I consider, valid as far as they go, and might prove useful on occasion.

ALEX. B. MACDOWELL.

21, Crichton Road, Rothsay, 2nd August, 1915.

THE STORM CLOUDS OF JUNE 30th, 1915.

UNLIKE June, 1914, which, besides being a magnificent month of intense sun-heat, was characterized almost throughout by terrific thunderstorms, with an exceptional number of lightning fatalities, up and down the country, the June of 1915 was not so remarkable for great storms even during the spell of severe heat which prevailed from the 4th to 9th. But when at last the long parching and often unusually chilly drought broke about the 26th, destructive thunderstorms occurred daily in different parts of the country. The mid-day storm on the 30th which appears to have concentrated its masses of hail over the Essex suburbs, was evinced in Kensington Gardens, where I happened to be at the time, by the blackest and most massive of storms-sheets in the north-east sky, depicting in no mild colours the grand and terrible nature of that species of atmospheric commotion which we see in summer thunderstorms, especially those of the slow-moving stagnant type—which may lock up a valley or clasp a hill range to their inky bosom for hours together. To watch that gigantic thunder pile in London that day, with its black desolate flanks, its tremendous precipices, its gloomy caverns, its lofty snow peaks, now radiant crystal, now hidden by flying scud, was in effect—save only in respect of mutability—to behold the sublimity of the high mountains. We must remember, too, that the white peaks and summits of cumuloform clouds must be from the height at which they are condensed at the top of powerful convection currents, actually composed of snow particles, a fact which renders the analogy between cumulus ranges and mountain ranges the more fascinating.

L. C. W. BONACINA.

Hampstead, N. W., July 5th, 1915.

INTERNATIONAL BALLOON ASCENTS.

By W. H. DINES, F.R.S.

April 11th, 1912.

Starting Point.	Country.	A (Hc) miles	B (Tc) ° F.	C miles.	D ° F.	E miles.	F
Manchester	England ..	6·6	—69	14·1	—60	155	S.E.
Brussels	Belgium ..	7·0	—73	10·1	—64	100	S.E.
Paris.....	France....	7·2	—89	7·6	—85	116	S.E.
Strassburg	Germany..	5·9	—60	6·2	—60	90	S.E.
Munich	„ ..	6·1	—62	9·1	—63	95	S.E.
Vienna.....	Austria ..	4·9	—51	8·6	—53	66	E.S.E.
Pavia	Italy.....	7·3	—80	17·0	?	93	S.S.E.

April 12th, 1912.

Manchester.....	England ..	6·9	—76	7·1	—73	63	S.S.E.
Brussels	Belgium ..	6·5	—78	14·3	—58 ?	128	S.E.
Hamburg.....	Germany..	4·3	—49	11·0	—49	70	S.S.E.
Lindenburg	„ ..	4·3	—55	7·6	—47	36	E. by S.
Strassburg	„ ..	6·5	—71	7·2	—70	107	S.E.
Munich	„ ..	6·1	—61	6·7	—59	94	E.S.E.
Vienna.....	Austria....	6·1	—54	11·2	—58	101	S. by E.
Pavia	Italy	6·9	—80	9·5	—67	89	E.S.E.
Nizhni Olchedaëff	Russia	3·9	—43	7·1	—46	36	E.N.E.
Batavia	E. Indies ..	10·4	—116	10·9	?	13	W.

April 13th, 1912,

Manchester.....	England ..	6·5	—72	8·9	—62	43	S.
Pyrton Hill	„ ..	6·3	—75	8·1	—62	25	S.S.E.
Brussels	Belgium ..	7·1	—76	16·9	?	58	S.S.E.
Hamburg	Germany..	5·9	—81	7·1	—68	74	S. by E.
Lindenberg	„ ..	4·9	—65	9·5	—62	83	S. by E.
Paris	France....	6·3	—62	10·6	—62	53	S.S.E.
Munich	Germany..	6·3	—74	8·6	—63	75	S.S.E.
Vienna.....	Austria ..	4·9	—58	7·1	—58	80	S.E.
Pavia	Italy	8·3	—80	?	?	47	S.E.
Pavlovsk.....	Russia	5·0	—56	7·6	—54	93	N.N.W.

A Height in miles of commencement of isothermal column.

B Temperature, F°, at bottom of column.

C Greatest height of reliable record in miles.

D Temperature, F°, at greatest height.

E Distance in miles of point where balloon fell

F Bearing of falling point from starting point

The distribution of pressure was somewhat unusual, there being a very considerable decrease of pressure from west to east. On the 12th the difference reached one inch.

Some of the values of Hc are very low, since it is not often that they are less than five miles. The temperature over Batavia, —116F. is again noticeable. It is a very remarkable fact that the lowest temperatures that occur naturally should be found near the equator.

REVIEW.

The Weather and Climate of Chicago. By HENRY J. COX and JOHN H. ARMINGTON. Chicago, 1914. Size $9\frac{1}{2} \times 7$. Pp. 25+375, and plates.

THIS work forms Bulletin No. 4 of the Geographic Society of Chicago, the greater part of the expense of production having been defrayed by several private individuals and companies. The climatic features of the locality, based on official records since 1870, supplemented by some earlier data, have been discussed by the authors in a very exhaustive and clear manner. The work is divided into seven parts, dealing respectively with temperature, precipitation, atmospheric moisture, cloudiness and sunshine, wind direction and velocity, barometric pressure, and storm tracks. The discussion deals first with annual, seasonal, and monthly values, followed by a synopsis of the daily conditions. The data given in the numerous tables are graphically shown in 9 plates and 99 figures, which add greatly to the clearness and interest of the text. More than one-third of the work is devoted to "temperature," and it is pointed out that owing to the proximity of Lake Michigan "the city often enjoys delightful and refreshing breezes while the interior of the country away from the lake is sweltering in an air hot and still almost to the point of suffocation." An interesting example of "lake influence" on temperature is shown in Fig. 26, which gives the thermograph trace for July 21st, 1901, the hottest day on record, with a shade maximum of 103° . Until 2 p.m. a land breeze from the south-west prevailed, when a north-east breeze from the lake set in, bringing the temperature down 18° in the space of a single hour. At 3.25 a land breeze was again asserting itself, and by 6 p.m. the temperature had risen to 103° . Rapid temperature changes are common especially in winter, thus on November 11th and 12th, 1911, a fall of 60° from 74° to 14° occurred in 18 hours, and on February 8th, 1900, between 8 a.m. and midnight, the temperature fell 52° . The mean annual temperature from 1830 to 1910 is $47^{\circ}\cdot7$, the extremes being $53^{\circ}\cdot0$ in 1846, and $42^{\circ}\cdot6$ in 1864. The warmest month was July, 1868, and the coldest January, 1857, with means of $80^{\circ}\cdot6$ and $10^{\circ}\cdot7$ respectively. The absolute minimum was -24° on December 24th, 1872, showing an extreme temperature range of 127° . The monthly mean temperatures range from $24^{\circ}\cdot0$ in January to $71^{\circ}\cdot9$ in July. Fig. 4 shows the average maximum, minimum, and mean temperature for each day in the year, based on the official records from 1872 to 1910. The cold period in May comes out very clearly, and the retardation of the winter fall during the first half of December is also well shown, the mean temperature on December 14th being only a tenth of a degree lower than on November, 29th. The records of precipitation which begin in 1843, suffer owing to several changes in the height and position of the

gauge. The mean annual fall is 33.99 ins., that of 1858, the wettest year, 47.10 in., and of 1867, the driest, 22.41 in. The wettest month was August, 1885, with 11.28 in., and the driest February, 1877, with .06 in. Rain falls on the average on 125 days annually. The longest period on which a "trace" or more of rain was recorded is 18 days, and the longest absolute drought 21 days, in February, 1877. The record short period rain was 2.13 in. in an hour, and the heaviest daily rainfall 6.19 in. on August 2nd-3rd, 1885. An interesting map (Fig. 50), gives the precipitation over the city during what is described as a "freak" snowstorm on November 26th, 1903, when 14 inches of snow fell in South Chicago, near the lake, and none over the western sections of the city, where the sun was shining brightly. The extremes of sea level pressure were 30.94 in. (on two occasions) and 28.98 in., the absolute range in 41 years being thus less than 2 inches. It is worthy of note that the absolute highest pressure occurred on January 28th, 1902, three days before an anti-cyclone of great intensity gave record readings slightly above 31.1 inches in the East of Scotland. R.C.M.

METEOROLOGICAL NEWS AND NOTES.

STROMBERG'S SYSTEM OF WEATHER PREDICTION is the subject of an important article, the publication of which we hope to begin next month. It is from the pen of Dr. Hans Pettersson, Lecturer on Geography in the University of Göteborg, son of the distinguished Swedish oceanographer, Professor Otto Pettersson. Dr. Hans Pettersson assists his father at the remarkable oceanographical laboratory which they have established on the island of Bornö in the Gullmar Fjord, one of the inlets of the Skagerrak.

THE SEVEREST WINTER ON RECORD in the Argentine Republic is just coming to an end. Temperatures far below the freezing point have been recorded in places where no previous winter minimum of 32° F. have been known.

THE LIMITS OF THE SEASONS have been under discussion by a London evening newspaper, which suggests on the authority, as they put it, "of a disgruntled pessimist," that Spring should be termed East Wind Season; Summer, Rainy Season; Autumn, Foggy Season; Winter, Wind Season. This was evidently intended as a joke, but bears some resemblance to the new names of the months introduced after the French Revolution, when everything was being placed upon a new, and as events proved often, an unstable basis.

ERRATUM.—Page 95, Table IV., percentage rainfall at Ajo, April, *should be 515 not 15.*

RAINFALL TABLE FOR JULY, 1915.

STATION.	COUNTY.	Lat. N.	Long. W. [*E.]	Height above Sea. ft.	RAINFALL OF MONTH.	
					Aver. 1875— 1909. in.	1915. in.
Camden Square.....	London.....	51 32	0 8	111	2'57	4'10
Tenterden.....	Kent.....	51 4	*0 41	190	2'21	3'43
Arundel (Patching).....	Sussex.....	50 51	0 27	130	2'46	4'31
Fawley (Cadland).....	Hampshire.....	50 50	1 22	52	2'42	4'60
Oxford (Magdalen College).....	Oxfordshire.....	51 45	1 15	186	2'43	3'93
Wellingborough(Swanspool).....	Northampton.....	52 18	0 41	155	2'54	3'72
Shoburyness.....	Essex.....	51 31	*0 48	13	1'73	2'42
Bury St. Edmunds(Westley).....	Suffolk.....	52 15	*0 40	226	2'68	3'51
Geldeston [Beccles].....	Norfolk.....	52 27	*1 31	38	2'37	5'53
Polapit Tamar [Launceston].....	Devon.....	50 40	4 22	315	2'74	4'79
Rousdon [Lyme Regis].....	".....	50 41	3 0	516	2'68	3'75
Stroud (Upfield).....	Gloucestershire.....	51 44	2 13	226	2'75	3'26
Church Stretton (Wolstaston).....	Shropshire.....	52 35	2 48	800	2'58	5'55
Boston.....	Lincolnshire.....	52 58	0 1	11	2'35	4'98
Workshop (Hodsock Priory).....	Nottinghamshire.....	53 22	1 5	56	2'35	4'57
Mickleover Manor.....	Derbyshire.....	52 54	1 32	280	2'57	6'41
Macclesfield.....	Cheshire.....	53 15	2 7	501	3'41	5'45
Southport (Hesketh Park).....	Lancashire.....	53 39	2 59	38	2'92	3'59
Arnellife Vicarage.....	Yorkshire, W. R.....	54 8	2 6	732	4'75	5'73
Wetherby (Ribston Hall).....	".....	53 59	1 24	130	2'56	5'31
Hull (Pearson Park).....	"..... E. R.....	53 45	0 20	6	2'39	5'73
Newcastle (Town Moor).....	Northumberland.....	54 59	1 38	201	2'90	2'77
Borrowdale (Seathwaite).....	Cumberland.....	54 30	3 10	423	8'91	11'67
Cardiff (Ely).....	Glamorgan.....	51 29	3 13	53	3'26	4'75
Haverfordwest.....	Pembroke.....	51 48	4 58	90	3'39	3'85
Aberystwyth (Gogerddan).....	Cardigan.....	52 26	4 1	83	4'03	3'31
Llandudno.....	Carnarvon.....	53 20	3 50	72	2'52	4'09
Cargen [Dumfries].....	Kirkcudbright.....	55 2	3 37	80	3'20	3'94
Marchmont House.....	Berwick.....	55 44	2 24	498	3'30	4'57
Girvan (Pinmore).....	Ayr.....	55 10	4 49	207	3'73	3'89
Glasgow (Queen's Park).....	Renfrew.....	55 53	4 18	144	2'91	3'62
Inveraray (Newtown).....	Argyll.....	56 14	5 4	17	4'72	6'85
Mull (Quinish).....	".....	56 34	6 13	35	4'12	4'16
Dundee (Eastern Necropolis).....	Forfar.....	56 28	2 57	199	2'84	3'44
Braemar.....	Aberdeen.....	57 0	3 24	1114	2'65	3'11
Aberdeen (Cranford).....	".....	57 8	2 7	120	3'00	5'65
Gordon Castle.....	Moray.....	57 37	3 5	107	3'25	4'34
Fort Augustus (S. Benedict's).....	E. Inverness.....	57 9	4 41	68	2'98	3'01
Loch Torridon (Bendamph).....	W. Ross.....	57 32	5 32	20	5'35	5'99
Dunrobin Castle.....	Sutherland.....	57 59	3 56	14	2'91	4'43
Wick.....	Caitness.....	58 26	3 6	77	2'67	2'55
Killarney (District Asylum).....	Kerry.....	52 4	9 31	178	3'53	4'33
Waterford (Brook Lodge).....	Waterford.....	52 15	7 7	104	3'13	4'68
Nenagh (Castle Lough).....	Tipperary.....	52 54	8 24	120	3'02	5'56
Ennistymon House.....	Clare.....	52 57	9 18	37	3'57	5'97
Gorey (Courtown House).....	Wexford.....	52 40	6 13	80	2'90	4'63
Abbey Leix (Blandsfort).....	Queen's County.....	52 56	7 17	532	2'99	4'79
Dublin (Fitz William Square).....	Dublin.....	53 21	6 14	54	2'60	5'78
Mullingar (Belvedere).....	Westmeath.....	53 29	7 22	367	3'16	5'44
Crossmolina (Ennisceoe).....	Mayo.....	54 4	9 16	74	3'26	4'96
Cong (The Glebe).....	".....	53 33	9 16	112	3'72	4'95
Collooney (Markree Obsy.).....	Sligo.....	54 11	8 27	127	3'36	5'47
Seaforde.....	Down.....	54 19	5 50	180	3'32	4'27
Bushmills (Dundarave).....	Antrim.....	55 12	6 30	162	3'28	...
Omagh (Edenfel).....	Tyrone.....	54 36	7 18	280	3'34	5'34

RAINFALL TABLE FOR JULY, 1915—continued.

RAINFALL OF MONTH (con.)					RAINFALL FROM JAN. 1.				Mean Annual 1875-1909.	STATION.
Diff. from Av. in.	% of Av.	Max. in 24 hours.	No. of Days	Aver. 1875-1909.	1915.	Diff. from Aver. in.	% of Av.			
		in. Date.	Days	in.	in.			in.		
+1.53	160	.79	6	15	13.53	18.04	+4.51	133	25.11	Camden Square
+1.22	155	1.20	16	16	13.65	17.60	+3.95	129	27.64	Tenterden
+1.85	175	1.21	16	13	14.92	21.24	+6.32	142	30.48	Patching
+2.18	190	1.35	17	15	15.73	22.04	+6.31	140	31.87	Cadland
+1.50	162	.90	6	19	13.03	16.59	+3.56	127	24.58	Oxford
+1.18	147	.83	6	18	13.76	13.88	+ .12	101	25.20	Swanspool
+ .69	140	.50	16	14	9.73	11.16	+1.43	115	19.28	Shoeburyness
+ .83	131	.69	6	17	13.44	14.33	+ .89	107	25.40	Westley
+3.16	233	1.00	14	21	11.98	18.51	+6.53	154	23.73	Geldeston
+2.05	175	1.42	16	20	18.62	25.41	+6.79	136	38.27	Polapit Tamar
+1.07	140	.87	16	16	17.01	18.33	+1.32	108	33.54	Rousdon
+ .51	119	.54	24	18	15.83	16.80	+ .97	106	29.81	Stroud
+2.97	215	1.20	16	21	16.88	22.63	+5.75	134	32.41	Wolstaston
+2.63	212	1.38	4	21	12.21	13.88	+1.67	114	23.35	Boston
+2.22	194	1.19	16	16	13.15	13.24	+ .09	101	24.46	Hodsock Priory
+3.84	250	2.47	16	20	14.34	18.65	+4.31	130	26.65	Mickleover
+2.04	160	1.20	16	20	18.17	21.69	+3.52	119	34.73	Macclesfield
+ .67	123	.78	27	13	15.88	17.61	+1.73	111	32.70	Southport
+ .98	121	1.06	7	25	31.97	32.80	+ .83	103	61.49	Arneliffe
+2.75	208	1.40	16	13	14.19	16.85	+2.66	119	26.87	Ribston Hall
+3.34	240	1.74	4	17	13.47	15.71	+2.24	117	26.42	Hull
- .13	96	.39	27	18	14.45	12.85	- 1.60	89	27.94	Newcastle
+2.76	131	1.50	8	25	65.29	66.91	+1.62	102	129.48	Seathwaite
+1.49	146	1.44	16	25	20.48	21.43	+ .95	105	42.28	Cardiff
+ .46	114	1.06	16	15	22.84	26.52	+3.68	116	46.81	Haverfordwest
- .72	82	.48	19	19	22.15	25.80	+3.65	116	45.46	Gogerddan
+1.57	162	1.06	7	17	14.89	17.72	+2.83	119	30.36	Llandudno
+ .74	123	.67	15	19	22.26	26.11	+3.85	117	43.47	Cargen
+1.27	138	1.24	7	20	17.68	15.67	-2.01	89	33.76	Marchmont
+ .16	104	.58	19	18	24.83	27.86	+3.03	112	49.77	Girvan
+ .71	124	.63	19	20	18.42	17.07	-1.35	93	35.97	Glasgow
+2.13	145	1.37	18	25	34.04	38.59	+6.59	113	68.67	Inveraray
+ .04	101	.86	18	22	27.67	28.62	+ .95	103	56.57	Quinish
+ .60	121	.63	19	19	14.86	14.79	- .07	100	28.64	Dundee
+ .46	117	.47	24	25	17.80	21.48	+3.68	121	34.93	Braemar
+2.65	188	1.12	7	24	17.02	18.96	+1.94	111	32.73	Aberdeen
+1.09	133	1.19	14	25	15.52	17.42	+1.90	112	30.34	Gordon Castle
+ .03	101	.57	3	21	23.20	18.27	-4.93	79	44.53	Fort Augustus
+ .64	112	.75	19	24	42.90	41.41	-1.49	97	83.93	Bendamph
+1.52	152	1.21	28	17	17.19	...	...	...	31.90	Dunrobin Castle
- .12	96	...	...	...	15.38	12.72	-2.66	83	29.88	Wick
+ .80	123	.70	4	28	28.40	27.97	- .43	98	54.81	Killarney
+1.55	150	1.10	31	19	20.53	20.33	- .20	99	39.57	Waterford
+2.54	184	.93	6	25	20.53	21.92	+1.39	107	39.43	Castle Lough
+2.40	167	.67	6	28	23.24	25.94	+2.70	112	46.52	Ennistymon
+1.73	160	1.39	31	22	18.32	18.11	- .21	99	34.99	Courtown Ho.
+1.80	160	1.28	6	25	18.83	19.16	+ .33	102	35.92	Abbey Leix
+3.18	222	1.04	16	23	14.75	16.90	+2.15	115	27.68	Dublin
+2.28	172	.65	3, 6	29	19.17	23.09	+3.92	120	36.15	Mullingar.
+1.70	152	.93	16	29	26.64	27.89	+1.25	105	52.87	Ennisceoe
+1.23	133	.77	26	25	25.13	24.63	- .50	98	48.90	Cong
+2.11	163	.54	22	28	22.19	26.19	+4.00	118	42.71	Markree
+ .95	129	1.00	6	22	20.74	20.49	- .25	99	38.91	Seaforde
...	...	...	...	...	18.77	...	...	...	37.56	Dundarave
+2.00	160	1.05	29	28	20.44	22.33	+1.89	109	39.38	Omagh

SUPPLEMENTARY RAINFALL, JULY, 1915.

Div.	STATION.	Rain inches	Div.	STATION.	Rain inches.
II.	Warlingham, Redvers Road .	4·53	XI.	Lligwy	3·87
„	Ramsgate	1·97	„	Douglas	3·81
„	Hailsham	4·17	XII.	Stoneykirk, Ardwell House...	3·79
„	Totland Bay, Aston House...	3·51	„	Carsphairn Shiel	6·33
„	Stockbridge, Ashley	4·59	„	Beattock, Kinnelhead	4·75
„	Grayshott	4·88	„	Langholm, Drove Road	5·22
III.	Harrow Weald, Hill House...	5·85	XIII.	Meggat Water, Cramilt Lodge	4·06
„	Caversham, Rectory Road ...	5·14	„	North Berwick Reservoir.....	3·66
„	Pitsford, Sedgebrook.....	3·78	„	Edinburgh, Royal Observatory.	2·72
„	Woburn, Milton Bryant.....	4·91	XIV.	Maybole, Knockdon Farm ...	4·00
„	Chatteris, The Priory.....	3·63	XV.	Ballachulish House	5·52
IV.	Elsenham, Gaunts End	4·33	„	Campbeltown, Witchburn ..	3·02
„	Colchester, Hill Ho., Lexden	4·40	„	Holy Loch, Ardnadam	5·89
„	Ipswich, Rookwood, Copdock	3·74	„	Islay, Eallabus	3·68
„	Blakeney	3·27	„	Tiree, Cornaigmore	2·75
„	Swaffham	4·48	XVI.	Dollar Academy	4·84
V.	Bishops Cannings	4·39	„	Balquhider, Stronvar.....	...
„	Wimborne, St. John's Hill ...	4·49	„	Glenlyon, Meggernie Castle..	3·95
„	Ashburton, Druid House	3·99	„	Blair Atholl	2·84
„	Cullompton	4·61	„	Coupar Angus	3·40
„	Lynmouth, Rock House	3·75	„	Montrose, Sunnyside Asylum.	4·81
„	Okehampton, Oaklands	5·11	XVII.	Alford, Lynturk Manse	5·87
„	Hartland Abbey.....	4·59	„	Fyvie Castle	4·44
„	Probus, Lamellyn.....	4·33	„	Keith Station	6·27
„	North Cadbury Rectory.	5·14	XVIII.	Rothiemurchus	4·30
VI.	Clifton, Pembroke Road.....	6·18	„	Loch Quoich, Loan	10·05
„	Ross, The Graig	4·50	„	Drumnadrochit	3·50
„	Shifnal, Hatton Grange.....	5·90	„	Skye, Dunvegan .....	...
„	Droitwich	6·79	„	Lochmaddy, Bayhead	1·49
„	Blockley, Upton Wold.....	3·03	„	Glencarron Lodge	4·73
VII.	Market Overton.....	6·04	XIX.	Invershin	5·17
„	Market Rasen	4·91	„	Melvich	3·70
„	Bawtry, Hesley Hall	4·10	„	Loch Stack, Achfary	3·68
„	Derby, Midland Railway.....	7·39	XX.	Dunmanway, The Rectory ..	7·37
„	Buxton .....	...	„	Glanmire, Lota Lodge.....	5·51
VIII.	Nantwich, Dorfold Hall	4·94	„	Mitchelstown Castle.....	5·46
„	Chatburn, Middlewood	3·01	„	Darrynane Abbey.....	7·54
„	Lancaster, Strathspey	3·55	„	Clonmel, Bruce Villa	4·39
IX.	Langsett Moor, Up. Midhope	4·67	„	Newmarket-on-Fergus,Fenloe	6·02
„	Scarborough, Scalby	7·64	XXI.	Laragh, Glendalough .....	...
„	Ingleby Greenhow	5·12	„	Ballycumber, Moorrock Lodge	4·79
„	Mickleton .....	...	„	Balbriggan, Ardgillan	5·56
X.	Bellingham, High Green Manor	3·52	XXII.	Ballynahinch Castle.....	6·13
„	Ilderton, Lilburn Cottage ...	5·15	„	Woodlawn	5·95
„	Keswick, The Bank.....	4·10	„	Westport, St. Helens ...	3·13
XI.	Llanfrehfa Grange	6·17	„	Dugort, Slievemore Hotel ...	5·22
„	Treherbert, Tyn-y-waun	11·28	„	Mohill Rectory	4·64
„	Carmarthen, The Friary	4·14	XXIII.	Enniskillen, Portora	4·35
„	Fishguard Goodwick Station.	3·22	„	Dartrey [Cootehill]	4·47
„	Crickhowell, Tal-y-maes.....	4·60	„	Warrenpoint, Manor House ..	3·91
„	New Radnor, Ednol	6·00	„	Banbridge, Milltown	5·16
„	Birmingham WW., Tyrmynydd	6·19	„	Belfast, Cave Hill Road	4·92
„	Lake Vyrnwy .....	...	„	Ballymena Harryville	4·99
„	Llangynhafal, Plas Draw.....	2·96	„	Londonderry, Creggan Res...	5·29
„	Dolgelly, Bryntirion.....	5·28	„	Dunfanaghy, Horn Head ...	4·53
„	Bettws-y-Coed, Tyn-y-bryn...	...	„	Killybegs	5·88



ALTITUDE SCALE Below 250 feet 250 to 500 feet 500 to 1000 feet Above 1000 feet

SCALE OF MILES 0 5 10 15 20

THE WEATHER OF JULY.

THE characteristic features of the weather of July were an excess of rainfall, a deficiency of sunshine, and a mean temperature markedly below the normal, the days' relative to the average being much cooler than the nights. High day temperatures over the greater part of the country were conspicuous by their absence, and low night temperatures were equally rare.

The month opened with a high pressure system spreading in from the Atlantic, which in England was associated with generally dry weather. On the 3rd a depression approaching the coast of Ireland led to the development of local thunderstorms. At many places the 3rd and 4th were the warmest days of the month, the shade maximum on the 3rd rising to 86° at Greenwich, 84° at Camden Square, and 83° at Southend-on-Sea, while in the north of Scotland, Lerwick recorded a maximum of 61°, and places as far apart as Wick and Blacksod Point, 62°. Even higher temperatures were noted on the 4th, viz., 87° at Greenwich, 86° at Camden Square, and 85° at Kew, but readings exceeding 80° were restricted to places in the east and south-east of England, while in the north of Ireland the maximum recorded did not exceed 69°. Very heavy falls of rain and hail occurred during the thunderstorms of the 4th, 2·56 in. falling at Skegness and 1·74 in. at Hull.

On the 6th a depression which came in from the Atlantic caused general rains over the British Islands. In the west of Ireland less than an inch fell in most districts, but falls of 1·70 in. at Dunmanway, 1·60 in. at Dungeon Ghyll, and 1·57 in. at St. Ives were reported, while at Oughtershaw, in Yorks., 3·02 in. fell on the 6th and 7th. From the 8th to the 13th the only pronounced dry spell noted anywhere during the whole month prevailed over the southern half of England. The approach of a deep depression from the Atlantic on the 16th caused widespread and heavy rains as it moved over the Midlands, especially in the Soar Valley, where more than 3 inches fell. The maximum falls so far reported are Barrow, 3·12 in., Kingston, 2·84 in., and Derby, 2·56 in. Over Ireland the fall in general was less than 2 inches, but at Dublin as much as 2·84 in. was measured. This disturbance was associated with strong northerly winds and a low temperature which failed to reach 60° in several districts.

During the second half of July shallow disturbances moving in a generally S.W. to N.E. direction caused cool rainy conditions and frequent thunderstorms. On the 23rd at Middlesbrough 1·84 in. fell between 2·45 and 4 p.m., and on the 27th thunderstorms and torrential rains were general.

Rainfall was above the average nearly everywhere and more than twice the normal fell over the Midlands. A slight deficiency was noted at Newcastle, near Fort William, and in Cardigan. In England the greatest excess was west and north of Leicester, where from 8 to 9 inches fell, although considerably more fell in the normally wet areas in Cumberland and Glamorgan. The driest region was a small area near Margate with less than 2 inches. The whole of Ireland had over 4 inches, and in Scotland the driest area was in the estuary of the Forth, with less than 3 inches.

The Thames Valley map shows that more than five inches of rain fell over parts of three parallel bands crossing the Valley from S.W. to N.E., while a little more than three inches fell in the districts between. Over the Kingdom as a whole the general rainfall expressed as a percentage of the average was as follows:—England and Wales, 155; Scotland, 125; Ireland, 158; British Isles, 148.

Sunshine was moderate, the following amounts being reported:—Camden Square, 163 hours; Totland Bay, 234 hours; Copdock, 185 hours; Sidmouth, 191 hours; Weymouth, 235 hours; Ashbourne, 145 hours; Felsted, 210 hours; Southport, 194 hours; Hull, 122 hours; Haverfordwest, 209 hours; Paisley, 169 hours; Loch Stack, 124 hours; Swinton, 132 hours.

In London (Camden Square), the mean temperature was 62°·0, or 1°·5 below the average. Duration of rain 44·7 hours. Evaporation 2·50 inches.

Climatological Table for the British Empire, February, 1915.

STATIONS. (Those in italics are South of the Equator.)	Absolute.				Average.				Absolute.		Total Rain		Aver. Cloud.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	
	Temp.	Date.	Temp.	Date.									
London, Camden Square	51°·9	4	24°·7	25	46°·7	34°·7	36°·6	87	86°·4	20°·6	3°·42	18	7·2
Malta	63°·3	15	43°·0	27	60°·6	49°·6	...	86	141°·0	...	2°·09	10	1·8
Lagos	91°·0	3	73°·0	2	88°·9	77°·5	75°·2	75	153°·0	71°·3	1°·59	4	6·3
Cape Town	98°·1	15	52°·3	25	83°·7	62°·4	58°·2	62	...	...	°·00	0	1·8
Natal, Durban	90°·0	11	65°·0	14	83°·6	71°·2	70°·2	77	...	...	9°·66	8	6·7
Johannesburg	85°·9	26	48°·9	20	76°·4	57°·6	59°·1	84	...	48°·8	5°·04	8	5·2
Mauritius	90°·5	12	70°·5	6	86°·8	74°·2	71°·4	76	...	64°·8	10°·12	21	6·1
Bloemfontein	89°·3	27	52°·3	23	83°·0	60°·3	57°·7	63	..	...	5°·39	11	4·8
Calcutta	93°·1	17	53°·1	13	84°·1	61°·0	57°·8	62	...	41°·9	°·39	1	2·1
Bombay	86°·9	21	62°·5	19	82°·2	68°·5	64°·0	70	134°·0	46°·8	°·30	1	1·3
Madras	90°·5	5	66°·3	10	86°·7	71°·1	69°·5	77	156°·8	63°·3	°·30	1	2·9
Colombo, Ceylon	97°·2	23	67°·7	3	89°·8	72°·3	73°·5	80	163°·7	61°·8	5°·42	5	4·6
Hongkong	79°·0	10	49°·8	19	67°·8	59°·4	58°·5	81	...	...	°·51	6	8·3
Sydney	94°·8	21	58°·5	27	81°·6	67°·7	63°·6	70	152°·4	49°·9	1°·31	14	6·0
Melbourne	103°·8	15	47°·5	24	77°·8	58°·0	53°·2	59	155°·1	41°·3	°·79	10	5·2
Adelaide	109°·8	1	52°·9	26	89°·5	65°·3	52°·8	39	160°·8	41°·4	°·04	2	3·7
Perth	107°·3	12	56°·0	16	84°·8	64°·9	60°·1	61	163°·0	49°·0	2°·98	8	3·8
Coolgardie	107°·6	13	54°·8	16	86°·6	64°·1	59°·0	58	160°·8	53°·8	3°·25	10	5·0
Hobart, Tasmania	88°·2	13	45°·0	10	71°·3	54°·1	48°·4	60	151°·3	36°·3	2°·18	13	6·7
Wellington	77°·4	27	42°·6	20	67°·6	55°·9	52°·1	72	144°·6	32°·2	1°·25	7	7·5
Auckland	77°·5	15	52°·5	20	71°·7	58°·8	58°·0	78	148°·0	49°·0	°·65	5	6·1
Jamaica, Kingston	88°·5	4	65°·1	12	..	...	66°·9	74	...	...	°·83	3	...
Grenada	87°·0	28	71°·0	14	84°·1	73°·5	...	73	135°·0	...	1°·23	9	2·5
Toronto	42°·3	14	2°·9	3	31°·8	20°·3	20°·6	84	107°·5	0°·2	2°·65	16	6·9
Fredericton	44°·2	25, 26	-19°·0	4	32°·3	-19°·0	17°·0	83	...	...	3°·28	13	5·7
St. John, N.B.	47°·4	25	-10°·5	2	33°·0	18°·4	20°·0	78	..	...	3°·44	13	5·9
Alberta, Edmonton	40°·1	15	-12°·2	1	26°·3	3°·4	...	92	96°·0	-16°·8	°·06	2	5°·4
Victoria, B.C.	52°·2	9, 27	34°·0	19	47°·7	39°·0	39°·0	84	...	...	°·98	15	7·5

Johannesburg.—Bright sunshine 211·7 hours.

Mauritius.—Mean temp. 1°·2, dew point 0°·3, and R 3°·09 in. above, averages. Mean hourly velocity of wind 1·3 miles above average.

COLOMBO, CEYLON.—Mean temp. 81°·0 or 0°·8 above, dew point 2°·7 above, and R 3°·44 in. above, averages. Mean hourly velocity of wind 5·4 miles. TS on 8th and 28th.

HONGKONG.—Mean temp. 63°·6. Mean hourly velocity of wind 13·1 miles. Bright sunshine 82·6 hours.

Melbourne.—Mean temp. 0°·5 above, and R °·91 in. below, averages.

Adelaide.—Mean temp. 3°·4 above, and R °·58 in. below, averages.

Coolgardie.—Rainfall 2°·60 ins. above average.

Hobart.—Mean temp. 0°·3, and R °·76 in. above, averages.

Wellington.—Mean temp. 0°·5 below, and R 2°·18 in. below, averages. Bright sunshine 162·7 hours.

Auckland.—Cool, dry and cloudy. Rainfall less than a fifth of the average. Mean temp. nearly 2° below average.

ALBERTA, EDMONTON.—Warm, sunny, calm and damp with very little snow.