

## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

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# Monthly Weather Review.

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No. 7

## INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather forecasting, and reports by mail from voluntary observers and storm signal agents. For the material used in tracing the paths of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

## REMARKS UPON THE WEATHER.

The weather of July like that of June did not differ much from average in Canada excepting in the rainfall, which was unusually heavy throughout the larger portion of the more eastern provinces. This heavy rainfall, coupled with much bright sunshine throughout the greater part of the Dominion, was most beneficial and although some districts suffered from drought vegetation generally was in about average condition on the 31st.

In the Province of British Columbia the weather was for the most part fine, warm and dry, but did not differ much from normal, and the condition of vegetation was excellent. Unusually high temperatures occurred on or about the 16th and 26th.  $101^{\circ}5$  being recorded at Griffin Lake, and  $99^{\circ}4$  at Kamloops on the 15th.

In the North-west Territories there was much bright sunshine, but in some districts much rain fell, whilst the mean temperature was about average. Thunderstorms occurred frequently, and in a few places, were accompanied by hail, though little damage appears to have been caused thereby. The maximum temperatures of the month occurred on the 17th or 18th.  $102^{\circ}$  being recorded at Chaplin, and at most places they were well above  $90^{\circ}$ . Vegetation was in excellent condition on the 31st.

The weather in Manitoba was normal, both the temperature and rainfall being about average, and other conditions differing little. Thunderstorms occurred at most places, and together with plenty of sunshine were most beneficial. The dates upon which maximum temperatures occurred varied, but the readings were much the same as in the Territories. Vegetation was in about average condition on the 31st.

The chief characteristic of the weather in Ontario was the exceptionally heavy rainfall in northern and eastern districts, and drought or light rainfall elsewhere, the latter conditions also prevailing in districts north of Lake Superior. Cool nights and in most districts comparatively cool days with much bright sunshine prevailed making altogether ideal weather. On July 11th, at about 4.45 p.m. a most destructive hail storm passed over the district, 15 miles north of the town of Chatham. The storm's path was from north-west to south-east, was chiefly confined to the township of Chatham, and although felt, more or less, 15 miles upon either side of its path the area devastated was not more than a mile in width. The usual electrical display and heavy rain accompanied the storm, but no damage appears to have been caused thereby. According to reports, hail fell in some places to a depth of six inches upon level ground, some of the stones being one and a half inches in diameter, and many as large as walnuts. As might well be supposed the destruction was enormous, the "smiling farms" as one observer puts it "were converted into barren fields" and in many cases farmers lost all their crops. Corn was torn and left in tatters, whilst wheat and other cereals were completely threshed out, the stalks only being left standing. A thunderstorm also passed over the country in the vicinity of Gravenhurst, doing much damage to farm property. Vegetation, where not affected by drought, was in very good condition on the 31st.

In the Province of Quebec the rainfall was above average, and the mean temperature somewhat below; there was much fine bright weather, which brought vegetation forward; nevertheless, plant life in most districts, was below normal. Maximum temperatures nowhere reached  $90^{\circ}$ .

The weather conditions of New Brunswick were much the same as in Quebec the rainfall being even heavier and much exceeding the average. Low temperatures, and much cloud and fog on the coast prevailed making some exceedingly unpleasant weather; and added to several destructive thunderstorms, the conditions were not favourable to vegetation.

Up to the 21st in Nova Scotia there was some exceedingly unpleasant weather with much rain and fog; after this date, however, it became fine and continued so to the end of the month. Both the temperature and rainfall were above average in most places, and although vegetation was somewhat backward, it made great progress after the 20th.

In Prince Edward Island the weather was for the most part cloudy with much rain, and although the mean temperature was above average, vegetation was quite backward. The highest maximum temperature reported was 82°·8 from Charlottetown.—F. F. PAYNE.

#### ATMOSPHERIC PRESSURE.

The mean atmospheric pressure was above average from the Rocky Mountains to Lake Superior, and average or a little below elsewhere over the Dominion, except along the Nova Scotian coast, where it was slightly above. The greatest amount above average ·050 to ·060 inches was recorded in Assiniboia, and the greatest amount below average ·030 inches, was at Montreal.

#### LOW AREAS.

No less than ten depressions were sufficiently well marked to be charted, and there were others, of which the tracks were too doubtful. All of the ten travelled from the West or North-west either over the northern portion of, or to the northward of the Lake Region to the Gulf of St. Lawrence. The areas were also attended by much rain over nearly the whole of Canada, Southern Ontario proving the exception to the rule. The northerly track of the depressions may have been to a certain extent the cause of the paucity of the rainfall in Southern Ontario.

No. 1. A continuance probably of No. 9 on the June Chart. It was situated over Lake Superior on the morning of the 1st, and then moved quickly far north over Canada to the Gulf of St. Lawrence. During its presence thunderstorms were recorded on Lake Superior, and also over the Island of Anticosti. No. 2 was a very shallow depression, which passed over Manitoba to Lake Superior between the 2nd and 3rd, and then dispersed. It was attended, however, by local showers, and thunderstorms as far as the St. Lawrence Valley. No. 3 was first well defined on the morning of the 4th over the Upper Mississippi Valley as a very shallow depression. It was, however, attended by a very pronounced rain area, and as it moved slowly into the Lower Lake Region excessive rainfalls occurred on the 4th and 5th in the Georgian Bay District. It also caused heavy rains in the Ottawa Valley as well as in Quebec and the greater portion of the Maritime Provinces. No. 4 was situated in Northern Minnesota on the morning of the 6th; it formed in an existing low pressure trough. Its ultimate course was south-eastward over the Lake Region to the State of New York, and thence across the Maritime Provinces. It gave rain very generally from the Lakes to the Atlantic between the 7th and 10th together with moderate gales in portions of the Gulf and the Maritime Provinces. Between the 11th and 14th thunderstorms were numerous and heavy in the Ottawa and St. Lawrence Valleys and the Maritime Provinces and locally in the Lake Region attendant upon a shallow depression, which first appeared in the St. Lawrence Valley. No. 5 was a shallow depression, which moved into the Lower Lake Region on the 16th, from the Western States, thence down the St. Lawrence Valley and near the Straits of Belle Isle. It was attended by numerous showers and thunderstorms throughout its course, and by very strong westerly winds in the Gulf of St. Lawrence. No. 6 traversed the Territories and Manitoba between the 16th and 19th, accompanied by occasional showers and thunderstorms. Between the 20th and 21st, when it moved over Lake Superior to the St. Lawrence Valley where it dispersed, heavy rains and thunderstorms occurred in all localities to our Atlantic Coast except in Southern Ontario where there were local showers only. No. 7 was accompanied by numerous heavy showers and thunderstorms in the Territories and Manitoba between the 20th and 23rd, and it then passed far north over Canada reaching the Gulf of St. Lawrence on the 26th, showers and thunderstorms meanwhile occurring from the Lakes to the Atlantic, more especially in the Gulf and Maritime Provinces, where the rainfall was considerable. No. 8 passed into the Lake Superior district on the 26th from the Western States, thence to the Ottawa Valley and across the Maritime Provinces. Like many of its predecessors it gave numerous showers and thunderstorms from the Lakes to the Atlantic in nearly all localities except the southern portion of Ontario. No. 9 moved into the North Saskatchewan Valley during the night of the 26th, accompanied by high winds and showers. It travelled with great rapidity in a far northerly course and reached the Gulf of St. Lawrence on the 30th. Its accompanying showers and thunderstorms were locally experienced in Ontario, but very generally in Quebec and the Maritime Provinces, and it was especially noticeable for the high winds which it brought, these attaining the force of a gale in some localities, more especially perhaps in

the Georgian Bay Region. No. 10 was a shallow depression which moved into the North-west during the night of the 29th and then passed south-eastwards giving showers and thunderstorms generally from the Rockies to Manitoba.

#### HIGH AREAS.

There was very little high pressure during the month, four areas were charted but they were of feeble energy only.

No. 1 was a very moderate high which was situated in Northern Manitoba on the 7th whence it passed southward and dispersed on the 10th over the Middle States. No. 2 was another shallow high which was situated in Alberta on the 5th and then passed south-eastward to the Middle States where it also dispersed. No. 3 was a small area which appeared over Lake Superior on the 21st in the rear of low No. 6 and travelled south-eastward over the St. Lawrence Valley and the Maritime Provinces. No. 4 moved into the North-west Territories on the 28th from Northern British Columbia and travelled in the rear of low area No. 9 to the Lower Lake Region where it broke up. It was accompanied by quite cool weather, and when in the Territories and Manitoba, night temperatures dangerously near the freezing point were recorded.

#### TEMPERATURE.

Temperature was a little above average over British Columbia, Manitoba and the extreme eastern portion of the Maritime Provinces, and average or a little below in all the larger remaining portion of the Dominion. The greatest amount above average, namely 6°, was recorded at Port Simpson, B.C., and the greatest amount below average, 4°, was at Barrie.

*The Highest and Lowest Temperature in each Province during July, 1899, were:*

British Columbia,	101°.5 on 15th at Griffin Lake.	34°.0 on 11th at Barkerville.
North-west Territories,	102°.0 on 18th at Chaplin.	33°.0 on 2nd at Banff.
“ “	“ “	“ 28th at Alameda.
Manitoba,	96°.0 on 24th at Rosebank.	35°.0 on 30th at Barnardo.
Ontario,	97°.0 on 4th at Cottam.	28°.0 on 19th at White River.
Quebec,	89°.8 on 5th at Chicoutimi.	38°.3 on 22nd at Chicoutimi.
New Brunswick,	89°.7 on 2th at Fredericton.	40°.1 on 1st at Sussex.
Nova Scotia,	87°.0 on 27th at Halifax.	37°.8 on 21st at Truro.
Prince Edward Island,	82°.8 on 12th at Charlottetown.	47°.0 on 23rd at Charlottetown.

#### PRECIPITATION.

The distribution of rain over the Dominion during the month was, in many respects, very remarkable. This was especially the case in Ontario, where, in several counties contiguous to Lakes Erie and Ontario, and also on the southern portion of Lake Huron, the amount of rain was exceedingly small, while in more northern localities rain fell frequently and heavily, and in some places the total fall for the month was abnormally large. A striking instance in the discrepancy in the rainfalls over different portions of the Province is shown between Wooler, near the Bay of Quinté and Ottawa City; the former place records a total fall for the month of only 0.3 inches, the latter 7.6 inches, and Ottawa Experimental Farm as much as 9.9 inches. The rainfall was also much above average in many portions of the North-west Territories and throughout Quebec and the Maritime Provinces. At Montreal and Yarmouth the average amount was exceeded by 3.6 inches, and at St. John by 4.2 inches.

#### WINDS.

In British Columbia the general direction of the wind was on the whole westerly, on fourteen days fresh breezes were experienced and on two occasions there were strong winds. In the North-west Territories and Manitoba no one direction prevailed, there were, however, numerous fresh breezes and on three or four occasions strong winds were recorded. In the Lake Region light to moderate variable winds largely predominated, on several occasions, however, the winds became strong from the westerly direction, and between the 29th and 30th a moderate west to north-west gale was felt in many localities more so, perhaps, in the Georgian Bay Region than elsewhere. In the St. Lawrence Valley and the Gulf the winds were westerly on fourteen days and generally variable on others, there were eight days of fresh breezes, five of strong breezes and on one occasion a moderate gale was locally recorded. In the Maritime Provinces the direction was largely westerly, on twelve days the winds were fresh and on two strong.

#### BRIGHT SUNSHINE.

Bright sunshine was above average in all portions of Canada where sunshine observations are taken except at Fredericton, N.B., where it was a little below. It is also probable that the average amount of sunshine was not maintained in the more northern portions of Ontario. Toronto registered the largest amount, 68 per cent of the possible Victoria 67 per cent, Battleford 66 per cent, Winnipeg 64 per cent.



N. W. TERRITORIES—Con.

Table with multiple columns containing names of locations (e.g., Indian Head, Mannington Manor, Macleod, Yarrow, Garesgarth, Grenfell, Kneehill, Muscowpetung, Fort Simpson, Alameda, Duck Lake, Tagish (Yukon), Red Deer, Mosquito Creek, Collier, Skataton, Crane Lake) and various numerical data points including dates, times, and other metrics.

MANITOBA:

Table listing locations in Manitoba (e.g., Winnipeg, St. Alban's (Aweome), Fort Osborne, Emerson, Portage la Prairie, Brandon, Channeled Island, Elkhorn, Stony Mountain, Russell, Treleure, Rosebank, Hillview, Pipestone, Roseberry) with associated numerical data.

ONTARIO:

Table listing locations in Ontario (e.g., Healeybury, Sudbury, Savanne, Mississauga, Schreiber, Heron Bay, North Bay, White River, Port Arthur, Farry Sound, Saugeen, Owen Sound, Uplands, Durham, North Bruce, Collingwood (2), Eglar, Bognor, Whiteside, Sprucehead, Orillia, Colla water, Bear River, Graveshurst, Hainburg, Point Clark, Birmam, London, Port Stanley, Woodstock, Port Dover, Pelee Island, Port Rowan, St. George, Paris, St. Mary's, Stratford, Lucknow) with associated numerical data.



QUEBEC—(Continued.)

Grindstone	47 23 61 38	in.	29 52 30 27	in.	29 53 0 69	in.	25	50 0	23	—	3	6	14	15	0	93	9.4	24.0	20 N	in.	0.66 0.65	9.22	0	0	7								
Anticosti, W. Pt.	49 52 64 32	in.	29 58 30 21	in.	29 53 0 68	in.	11	41 1	8 0	—	7	17	41	41	7	120	744	20 N	in.	4.08 2.16	17.14	0	0	2									
Anticosti, S. W. Pt.	48 24 63 35	in.	29 56 30 28	in.	29 59 0 69	in.	24	43 0	20	—	6	1	24	7	16	90	II	1 S W	in.	1.76 0.85	9.20	0	0	2									
Abitibi	48 43 79 22	in.	29 57 30 29	in.	29 57 0 69	in.	24	38 0	20	—	6	1	24	7	16	90	II	1 S W	in.	1.76 0.85	9.20	0	0	2									
Anticosti, E. Pt.	49 5 61 42	in.	29 56 30 30	in.	29 60 0 70	in.	26	51 0	19	—	14	20	1	3	4	69	II	1 S W	in.	1.76 0.85	9.20	0	0	2									
Bird Rocks	47 51 61 8	in.	29 56 30 30	in.	29 60 0 70	in.	26	51 0	19	—	14	20	1	3	4	69	II	1 S W	in.	1.76 0.85	9.20	0	0	2									
Bird Rocks	48 31 72 13	in.	29 56 30 30	in.	29 60 0 70	in.	26	51 0	19	—	14	20	1	3	4	69	II	1 S W	in.	1.76 0.85	9.20	0	0	2									
Perce	46 31 64 12	in.	29 56 30 30	in.	29 60 0 70	in.	26	51 0	19	—	14	20	1	3	4	69	II	1 S W	in.	1.76 0.85	9.20	0	0	2									
NEW BRUNSWICK:																																	
Fredricton	45 57 66 36	in.	29 56 30 27	in.	29 53 0 69	in.	2	42 3	1 20 2	—	67	6	26	9	5	93	6.3	13.8	20 N W	in.	2.54 0.90	16.10	0	5	7								
Chatham	47 3 65 29	in.	29 56 30 27	in.	29 53 0 69	in.	2	42 3	1 20 2	—	67	6	26	9	5	93	6.3	13.8	20 N W	in.	2.54 0.90	16.10	0	5	7								
Grand Manan	44 47 66 46	in.	29 56 30 27	in.	29 53 0 69	in.	2	42 3	1 20 2	—	67	6	26	9	5	93	6.3	13.8	20 N W	in.	2.54 0.90	16.10	0	5	7								
Point Lepreau	45 4 66 24	in.	29 56 30 27	in.	29 53 0 69	in.	2	42 3	1 20 2	—	67	6	26	9	5	93	6.3	13.8	20 N W	in.	2.54 0.90	16.10	0	5	7								
St. John	45 17 66 4	in.	29 56 30 27	in.	29 53 0 69	in.	2	42 3	1 20 2	—	67	6	26	9	5	93	6.3	13.8	20 N W	in.	2.54 0.90	16.10	0	5	7								
Dalhousie	48 4 66 22	in.	29 56 30 27	in.	29 53 0 69	in.	2	42 3	1 20 2	—	67	6	26	9	5	93	6.3	13.8	20 N W	in.	2.54 0.90	16.10	0	5	7								
St. Stephen	45 11 67 16	in.	29 56 30 27	in.	29 53 0 69	in.	2	42 3	1 20 2	—	67	6	26	9	5	93	6.3	13.8	20 N W	in.	2.54 0.90	16.10	0	5	7								
Moncton	46 9 64 45	in.	29 56 30 27	in.	29 53 0 69	in.	2	42 3	1 20 2	—	67	6	26	9	5	93	6.3	13.8	20 N W	in.	2.54 0.90	16.10	0	5	7								
Sussex	45 38 65 33	in.	29 56 30 27	in.	29 53 0 69	in.	2	42 3	1 20 2	—	67	6	26	9	5	93	6.3	13.8	20 N W	in.	2.54 0.90	16.10	0	5	7								
NOVA SCOTIA:																																	
Halifax	44 3 63 36	in.	29 56 30 27	in.	29 60 0 72	in.	27	45 0	21 18 5	—	7	94	0	0	12	185	130	212	78	33	744	8.4	21.5	9 S	in.	5.75	1.68	2.90	13.17	0	0	5	
Sydney	46 10 60 10	in.	29 56 30 27	in.	29 60 0 72	in.	27	45 0	21 18 5	—	7	94	0	0	12	185	130	212	78	33	744	8.4	21.5	9 S	in.	5.75	1.68	2.90	13.17	0	0	5	
Truro	45 22 63 18	in.	29 56 30 27	in.	29 60 0 72	in.	27	45 0	21 18 5	—	7	94	0	0	12	185	130	212	78	33	744	8.4	21.5	9 S	in.	5.75	1.68	2.90	13.17	0	0	5	
Yarmouth	43 50 66 2	in.	29 56 30 27	in.	29 60 0 72	in.	27	45 0	21 18 5	—	7	94	0	0	12	185	130	212	78	33	744	8.4	21.5	9 S	in.	5.75	1.68	2.90	13.17	0	0	5	
Pictou	45 42 62 41	in.	29 56 30 27	in.	29 60 0 72	in.	27	45 0	21 18 5	—	7	94	0	0	12	185	130	212	78	33	744	8.4	21.5	9 S	in.	5.75	1.68	2.90	13.17	0	0	5	
Digby	44 38 65 46	in.	29 56 30 27	in.	29 60 0 72	in.	27	45 0	21 18 5	—	7	94	0	0	12	185	130	212	78	33	744	8.4	21.5	9 S	in.	5.75	1.68	2.90	13.17	0	0	5	
Port Hastings	45 29 61 8	in.	29 56 30 27	in.	29 60 0 72	in.	27	45 0	21 18 5	—	7	94	0	0	12	185	130	212	78	33	744	8.4	21.5	9 S	in.	5.75	1.68	2.90	13.17	0	0	5	
Whitehead	45 15 61 8	in.	29 56 30 27	in.	29 60 0 72	in.	27	45 0	21 18 5	—	7	94	0	0	12	185	130	212	78	33	744	8.4	21.5	9 S	in.	5.75	1.68	2.90	13.17	0	0	5	
Sable Island, E. Pt.	43 58 59 46	in.	29 56 30 27	in.	29 60 0 72	in.	27	45 0	21 18 5	—	7	94	0	0	12	185	130	212	78	33	744	8.4	21.5	9 S	in.	5.75	1.68	2.90	13.17	0	0	5	
Guysborough	45 27 61 30	in.	29 56 30 27	in.	29 60 0 72	in.	27	45 0	21 18 5	—	7	94	0	0	12	185	130	212	78	33	744	8.4	21.5	9 S	in.	5.75	1.68	2.90	13.17	0	0	5	
Sable Island, M. station	43 57 60 6	in.	29 56 30 27	in.	29 60 0 72	in.	27	45 0	21 18 5	—	7	94	0	0	12	185	130	212	78	33	744	8.4	21.5	9 S	in.	5.75	1.68	2.90	13.17	0	0	5	
Parrboro'	44 28 64 20	in.	29 56 30 27	in.	29 60 0 72	in.	27	45 0	21 18 5	—	7	94	0	0	12	185	130	212	78	33	744	8.4	21.5	9 S	in.	5.75	1.68	2.90	13.17	0	0	5	
Wolfville	45 7 64 20	in.	29 56 30 27	in.	29 60 0 72	in.	27	45 0	21 18 5	—	7	94	0	0	12	185	130	212	78	33	744	8.4	21.5	9 S	in.	5.75	1.68	2.90	13.17	0	0	5	
Bridgetown	43 49 65 16	in.	29 56 30 27	in.	29 60 0 72	in.	27	45 0	21 18 5	—	7	94	0	0	12	185	130	212	78	33	744	8.4	21.5	9 S	in.	5.75	1.68	2.90	13.17	0	0	5	
P. E. ISLAND:																																	
Charlottetown	46 14 63 10	in.	29 56 30 27	in.	29 51 0 76	in.	12	47 0	23 16 7	—	6	4	19	61	0	15	87	253	70	36	203	744	5.5	10.6	25 S W	in.	5.05	1.53	0.98	13.12	0	1	0
Georgetown	46 11 62 35	in.	29 56 30 27	in.	29 51 0 76	in.	12	47 0	23 16 7	—	6	4	19	61	0	15	87	253	70	36	203	744	5.5	10.6	25 S W	in.	5.05	1.53	0.98	13.12	0	1	0
Summerside	46 18 63 51	in.	29 56 30 27	in.	29 51 0 76	in.	12	47 0	23 16 7	—	6	4	19	61	0	15	87	253	70	36	203	744	5.5	10.6	25 S W	in.	5.05	1.53	0.98	13.12	0	1	0
Hamilton	46 25 63 48	in.	29 56 30 27	in.	29 51 0 76	in.	12	47 0	23 16 7	—	6	4	19	61	0	15	87	253	70	36	203	744	5.5	10.6	25 S W	in.	5.05	1.53	0.98	13.12	0	1	0
NEWFOUNDLAND:																																	
St. John's	47 34 52 42	in.	29 56 30 27	in.	29 46 0 77	in.	12	40 0	2 17 0	—	6	9	13	0	3	4	25	4	13	1	0	62	17.0	29 N	in.	8.81	0.09	1.10	15.16	0	3	8	
Chapel	47 37 50 9	in.	29 56 30 27	in.	29 46 0 77	in.	12	40 0	2 17 0	—	6	9	13	0	3	4	25	4	13	1	0	62	17.0	29 N	in.	8.81	0.09	1.10	15.16	0	3	8	
Cape Norman	51 38 55 52	in.	29 56 30 27	in.	29 46 0 77	in.	12	40 0	2 17 0	—	6	9	13	0	3	4	25	4	13	1	0	62	17.0	29 N	in.	8.81	0.09	1.10	15.16	0	3	8	
Amour Point	51 28 56 51	in.	29 56 30 27	in.	29 46 0 77	in.	12	40 0	2 17 0	—	6	9	13	0	3	4	25	4	13	1	0	62	17.0	29 N	in.	8.81	0.09	1.10	15.16	0	3	8	
Point Rich	50 42 57 25	in.	29 56 30 27	in.	29 46 0 77	in.	12	40 0	2 17 0	—	6	9	13	0	3	4	25	4	13	1	0	62	17.0	29 N	in.	8.81	0.09	1.10	15.16	0	3	8	
BREBUDA:																																	
Prospect	37 20 64 50	in.	29 56 30 27	in.	29 93 0 38	in.	20	69 4	2 11 0	—	4	0	0	0	2	5	2	21	3	5	24	62	13.0	11 S	in.	5.67	1.13	1.34	15.15	0			

## PRECIPITATION AT STATIONS REPORTING RAIN, WEATHER, &amp;c., DURING JULY, 1899.

STATIONS.	RAINFALL.					THUNDER OR LIGHTNING, &c.
	Amount in inches.	Days '01 or Over.	No. of Fair Days.	Heaviest Fall in Month.	Date.	
BRITISH COLUMBIA—						
Cumberland.....	1·83	3	28	0·69	21	
Langley.....	0·92	5	26	0·25	3	
Beaver Creek.....	1·20	4	27	0·69	23	
Nanaimo.....	0·73	3	28	0·73	22	
Royal Oak.....	0·10	1	30	0·10	3	
N. W. TERRITORIES—						
Estevan.....	2·76	5	26	2·00	25	
Didsbury.....	2·22	10	21	0·45	4	8, 20.
Coutts.....	3·44	11	20	1·40	3	
Saltcoats.....	0·22	6	25	0·50	7	
Innisfail.....	6·53	9	23	2·58	30	
Lethbridge.....	2·53	6	25	1·35	22	
West Beaver Hills.....	3·72	13	18	1·00	6	10, 13, 18, 22, 26.
Rouleau.....	2·23	8	23	0·48	5	
MANITOBA—						
Ullswater.....	3·28	9	22	2·07	5	
Greenwood.....	3·55	9	22	1·26	31	
Oakbank.....	2·41	12	17	0·43	11	9, 14, 18, 27.
Morden.....	2·10	3	25	1·50	6	
Turtle Mountain.....	2·31	5	26	2·10	5	3, 5, 9.
Rapid City.....	1·76	5	26	0·77	31	
Clear Spring.....	2·23	10	18	0·57	6	1, 2, 3, 11, 19, 21, 23, 27, 31.
Gretna.....	3·96	9	21	1·25	6	21, 22, 31.
Pembina Crossing.....	4·34	7	17	1·74	6	2, 3, 5, 8, 9, 11, 12, 14, 15, 16, 19, 21, 22, 25, 26, 27.
Selkirk.....	2·14	9	22	0·80	31	9, 11, 14, 17, 18, 23, 31.
Elgin.....	1·19	12	17	0·46	6	2, 3, 8, 9, 14, 15, 22.
Oak Lake.....	1·07	3	28	0·43	31	
Shoal Lake.....	0·30	1	30	0·30	31	
Cartwright (2).....	2·18	4	23	1·10	22	
Hartney.....	1·61	7	24	0·78	6	
Belmont.....	3·61	9	22	2·34	22	1, 2, 14, 15, 18, 20, 22, 25, 26.
Cartwright (1).....	2·87	10	21	1·14	3	2, 3, 5, 11, 15, 20, 22, 31.
Norquay.....	3·16	12	19	1·81	12	1, 3, 12, 15, 19, 21, 23, 27, 28, 29.
Beaver Creek.....	1·76	5	26	0·72	22	
ONTARIO—						
Providence Bay.....	1·62	8	22	0·35	7	17, 25, 26.
Penetanguishene.....	3·37	12	19	1·32	5	
Lion's Head.....	3·22	8	23	0·90	5	7.
N. Williamsburg.....	7·24	12	19	1·33	5	5, 8, 10, 11.
Huntsville.....	3·60	10	21	1·25	25	
Thompson.....	2·16	3	28	0·91	20	
Sunshine.....	4·00	12	19	1·31	8	3, 11, 21.
Ursa.....	3·34	12	19	0·83	5	
Port Burwell.....	1·99	5	26	0·79	29	
Sparrow Lake.....	4·88	6	24	1·21	5	3, 4, 5, 8.
Glen Elm.....	6·23	10	21	1·79	8	4, 20.
Montague.....	7·10	6	25	3·14	8-9	5, 21.
Croydon.....	2·41	5	26	1·20	10	
Oliver's Ferry.....	4·61	8	23	1·32	6	
Parma.....	1·20	4	27	0·50	8	
Wyoming.....	1·47	6	25	0·50	7	3, 7, 11.
Lansdowne.....	2·17	7	24	0·95	9	8, 9, 17, 21, 29.
Arden.....	3·11	12	19	0·70	5	5, 9, 12, 18, 21, 27, 30.
Jermyn.....	2·21	4	27	1·54	8	3, 4, 8.
Wooler.....	0·32	4	27	0·13	9	29.
Dutton.....	1·61	6	25	0·62	7	5, 7, 11, 22, 24.
Scarboro'.....	1·35	9	18	0·58	8	7, 8, 15, 21, 25, 27, 29.
Watford.....	1·78	6	25	0·84	7	
Wilton Grove.....	0·81	6	25	0·20	25	7, 11.
Goderich.....	1·75	6	25	0·50	3	
Midland.....	2·42	11	20	0·68	25	3, 4, 5, 7, 25, 26.
Aurora.....	3·02	8	23	0·79	7	3, 7, 8.
Lynedoch.....	1·75	6	25	0·73	17	
Emsdale.....	4·04	12	19	1·87	6	4, 5, 7, 21, 26.
Georgetown.....	1·90	12	16	0·47	15	3, 4, 5, 7, 10, 11, 26, 27, 29.
Ennismore.....	1·52	5	26	0·50	10	
Orangeville.....	3·45	9	22	1·09	4	3, 4, 8.
Dealtown.....	2·22	8	23	0·81	29	7, 29.
Roblin's Mills.....	1·85	3	28	0·85	8	
Cherry Valley.....	1·17	3	28	0·86	8	
Uxbridge.....	3·04	7	24	0·81	8	5, 7, 11.
Warton.....	3·41	6	25	2·30	4-5	3, 4, 15.
Princeton.....	1·08	3	28	0·63	25	
Deer Park.....	0·90	6	24	0·41	16	
Elgin.....	2·31	7	24	1·00	9	
Nottawasaga.....	3·00	7	24	0·80	5	
NEW BRUNSWICK—						
Poin's Escuminac.....	6·77	18	13	1·23	9	4, 5, 18.
NOVA SCOTIA—						
Port Morien.....	5·02	11	20	1·08	18	
P. E. ISLAND—						
Mount Stewart.....	4·52	9	22	1·07	7	31.
Murray River.....	5·15	13	18	1·35	12	14.

*Thunderstorms recorded on—*

1. Stony Mountain, Kneehill, Savanne, Clear Spring, Belmont, Norquay, N. Sister Rock, Moose Factory.
2. Percé, Mosquito Creek, Calgary, Nicola Lake, Lucknow, Clear Spring, Pembina Crossing, Elgin, Belmont, Swift Current, Medicine Hat, Emerson, Oonikup.
3. Whiteside, Stratford, Durham, Owen Sound, Portage la Prairie, Nicola Lake, Beatrice, Jermyn, Hamilton, Kinmount, Meaford, Erasmus, Agincourt, Bancroft, Stony Creek, Point Clark, Birnam, Sunshine, Sparrow Lake, Wyoming, Midland, Aurora, Georgetown, Orangeville, Wiarton, Turtle Mountain, Clear Spring, Elgin, Norquay, Battleford, Medicine Hat, Parry Sound, Toronto, Emerson, Yarrow, Barrie, Moose Factory.
4. Whiteside, Crane Lake, London, Lindsay, Coldwater, Durham, Mosquito Creek, Owen Sound, Brome, Beatrice, Meaford, Erasmus, Bancroft, Point Escuminac, Glen Elm, Jermyn, Midland, Emsdale, Orangeville, Wiarton, Bermuda, Swift Current, Medicine Hat, Barrie, St. John.
5. Montreal, Stratford, Coldwater, Durham, Truro, Fredericton, Pictou, Moncton, Calgary, Kneehill, Beatrice, Clontarf, St. Anne, Meaford, Bancroft, Brantford, Sprucedale, Welland, Lucknow, N. Williamsburg, Sparrow Lake, Montague, Arden, Dutton, Midland, Emsdale, Uxbridge, Sydney, Bermuda, Ottawa, Swift Current, Port Stanley, Charlottetown, Barrie.
6. Rosebank, Stony Mountain, Fredericton, Port Hastings, Red Deer, Brome, Point Clark, Sydney, St. Johns, Ottawa, Kingston, Quebec.
7. Stratford, Lindsay, Guelph, Durham, Stony Mountain, Woodstock, Calgary, Red Deer, Griffin Lake, Clontarf, Uplands, Gosfield S., Ridgetown, Bancroft, Point Clark, Sprucedale, Providence Bay, Lion's Head, Wyoming, Dutton, Scarboro, Wilton Grove, Midland, Aurora, Emsdale, Georgetown, Dealtown, Uxbridge, Banff, Medicine Hat, Parry Sound, Toronto, N. Sister Rock, Barrie.
8. London, Macleod, Hillview, Kneehill, Beatrice, Clontarf, Otonabee, Agincourt, Scarboro, Stouffville, Peterboro, Bancroft, Point Clark, Sparrow Lake, Lansdowne, Jermyn, Orangeville, Pembina Crossing, Elgin, Didsbury, Prince Albert, Ottawa, Calgary, Medicine Hat, Port Stanley, Kingston, Yarmouth, Toronto, Barrie.
9. Rosebank, Crane Lake, Stony Mountain, Portage la Prairie, Pipestone, Kneehill, Duck Lake, Red Deer, Stouffville, Lansdowne, Arden, Oakbank, Turtle Mountain, Selkirk, Elgin, Battleford, Medicine Hat, Winnipeg, Kingston, Yarmouth.
10. Crane Lake, Moose Jaw, Gatesgarth, Duck Lake, Bullion, Point Clark, W. Beaver Hills, Bermuda, Swift Current, Medicine Hat, Saugeen, Quebec, N. Sister Rock.
11. Rosebank, London, Lindsay, Durham, Stony Mountain, Barnardo, Portage la Prairie, Treherne, Hillview, Clontarf, Gosfield S., Kinmount, Meaford, Otonabee, Ridgetown, Agincourt, Bancroft, Sarnia, Brantford, Point Clark, Port Dover, Lucknow, N. Williamsburg, Sunshine, Wyoming, Dutton, Wilton Grove, Uxbridge, Clear Spring, Pembina Crossing, Selkirk, Battleford, Prince Albert, Swift Current, Minnedosa, Port Stanley, Toronto, Oonikup.
12. Rosebank, Crane Lake, Deseronto, Stony Mountain, Brome, Welland, Norquay, Ottawa, Quebec, Father Point Oonikup.
13. Wolfville, Percé, Truro, Fredericton, Calgary, Brome, Savanne, Prince Albert, Medicine Hat, Quebec, Grand Manan.
14. Mosquito Creek, Truro, Summerside, Channel, Pictou, Hillview, Brome, Tobacco Plains, Murray River, Oakbank, Pembina Crossing, Selkirk, Elgin, Belmont, Swift Current, Medicine Hat, Minnedosa, Yarrow,
15. Aweme, Stony Mountain, Pipestone, Brandon, Otonabee, Ridgetown, Scarboro, Wiarton, Pembina Crossing, Elgin, Belmont, Norquay, Quebec, Moose Factory.
16. London, Barnardo, Calgary, Griffin Lake, Clontarf, Otonabee, Peterboro, Calgary, Emerson.
17. Whiteside, Stratford, Lindsay, Gravenhurst, Beatrice, Clontarf, St. Anne, Gosfield S., Bancroft, Brantford, Paris, Providence Bay, Lansdowne, Arden, Selkirk, Parry Sound, Quebec.
18. Moncton, Hillview, Gatesgarth, Duck Lake, Red Deer, Cannington Manor, Brandon, Clontarf, Uplands, Brantford, Point Escuminac, Oakbank, Selkirk, W. Beaver Hills, Prince Albert, Emerson, St. John.
19. Stony Mountain, Hillview, Red Deer, Savanne, Clear Spring, Pembina Crossing, Norquay, Barker, ville, Battleford, Prince Albert, Banff, Qu'Appelle, Minnedosa, Winnipeg, Quebec.
20. Rosebank, Stratford, Durham, Barnardo, Haliburton, Saskatoon, Pipestone, Kneehill, Red Deer, Cannington Manor, Brandon, Griffin Lake, Clontarf, Port Hope, Bancroft, Point Clark, Lucknow, Glen Elm, Belmont, Didsbury, Kamloops, Banff, Port Arthur, White River, N. Sister Rock.
21. Montreal, Rosebank, Crane Lake, Lindsay, Durham, Truro, Fredericton, Point Lepreaux, St. Stephen, Moncton, Sussex, Red Deer, Brome, Richmond, Nelson, Beatrice, St. Anne, Arden, Agincourt, Bancroft, Welland, Sunshine, Montague, Lansdowne, Scarboro, Emsdale, Gretna, Norquay, Bermuda, Battleford, Swift Current, Medicine Hat, Qu'Appelle, Winnipeg, Yarmouth, Grand Manan, Emerson, Oonikup, Barrie, St. John

22. Crane Lake, Barnardo, Truro, Portage la Prairie, Treherne, Dutton, Gretna, Pembina Crossing, Elgin, Belmont, W. Beaver Hills, St. Johns, Swift Current, Medicine Hat, Qu'Appelle, Minnedosa, Port Arthur, Yarmouth, Grand Manan, Sable Island, Yarrow, St. John.

23. Aweme, Stony Mountain, Mosquito Creek, Chilliwack, Calgary, Nicola Lake, Savanne, Bancroft, Clear Spring, Selkirk, Norquay, Battleford, Medicine Hat, Minnedosa, Winnipeg, Emerson, Oonikup.

24. Crane Lake, Macleod, Mosquito Creek, N. Nicomen, Hazelmere, Nelson, Tobacco Plains, Dutton, Langley, Abitibi, Battleford, Port Arthur, White River, N. Sister Rock, Yarrow, Moose Factory.

25. London, Lindsay, Coldwater, Durham, Woodstock, Moose Jaw, Agincourt, Paris, Welland, Providence Bay, Scarboro, Abitibi, Battleford, Medicine Hat, Toronto, N. Sister Rock, Barrie.

26. Rosebank, Owen Sound, Treherne, Red Deer, Meaford, Erasmus, Brantford, Belmont, Stony Creek, Sprucedale, Providence Bay, Midland, Emsdale, Pembina Crossing, Port Arthur, Parry Sound, N. Sister Rock, Oonikup.

27. Montreal, Whiteside, Stratford, Lindsay, Fredericton, St. Stephen, Portage la Prairie, Treherne, Brome, N. Nicomen, Hazelmere, Bancroft, Arden, Scarboro, Georgetown, Oakland, Clear Spring, Norquay, Battleford, Winnipeg, Port Arthur, Quebec, Toronto.

28. Portage la Prairie, Norquay, Sydney.

29. Brome, Clontarf, St. Anns, Gosfield S., Ridgeway, Brantford, Paris, Lansdowne, Wooler, Scarboro, Dealtown, Norquay, Victoria, St. Johns, Port Stanley, Moose Factory.

30. Macleod, Moncton, Calgary, Kneehill, Griffin Lake, Tobacco Plains, Arden, Banff, Yarrow.

31. Rosebank, Barnardo Pictou, Portage la Prairie, Treherne, Gatesgarth, Nelson, Banff, Mount Stewart, Clear Spring, Selkirk, Minnedosa, Winnipeg, Yarrow.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I) being the brightest, (IV) the feeblest in brilliancy.*

1. Aweme, II; Georgetown, IV; Treherne, Cannington Manor, IV; Bancroft, II; Meaford, IV; Savanne.

2. Pembina Crossing, IV; Red Deer, II.

3. Truro, II; Sydney, I.

4. Hillview, II; Pembina Crossing, II; Minnedosa, II.

6. Georgetown, IV.

7. Montreal, III; Pembina Crossing, II; Channel Island, IV; Meaford, IV; Savanne, Minnedosa, I.

8. Aweme, II.

9. Pembina Crossing, III; Savanne.

10. Georgetown, IV; Cape Magdalen, Red Deer, III; Savanne, Kingston, III; Quebec, IV.

15. Hillview, II; Banff, IV.

16. Hillview, II; Pembina Crossing, III; Channel Island, IV.

25. Pembina Crossing, II; Savanne.

26. Moose Jaw, Swift Current, IV.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF JULY, 1899.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON.	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
VICTORIA.....	0'00	0'26	0'60	0'63	0'64	0'73	0'84	0'84	0'90	0'89	0'88	0'90	0'84	0'82	0'69	0'06
KUPER ISLAND.....																
AGASSIZ.....		0'03	0'18	0'54	0'62	0'62	0'65	0'67	0'72	0'67	0'68	0'67	0'64	0'57	0'22	0'00
BATTLEFORD.....	0'59	0'65	0'65	0'70	0'73	0'73	0'75	0'73	0'72	0'71	0'75	0'75	0'66	0'56	0'40	0'11
INDIAN HEAD.....		0'02	0'43	0'64	0'71	0'72	0'77	0'77	0'77	0'78	0'79	0'80	0'71	0'74	0'64	0'22
BRANDON.....																
WINNIPEG.....	0'22	0'62	0'75	0'74	0'72	0'74	0'74	0'75	0'80	0'76	0'73	0'63	0'63	0'61	0'58	0'14
DURHAM.....	0'00	0'02	0'28	0'41	0'40	0'47	0'58	0'63	0'71	0'68	0'70	0'66	0'69	0'65	0'37	0'08
WOODSTOCK.....	0'00	0'11	0'62	0'73	0'70	0'80	0'82	0'81	0'77	0'73	0'75	0'73	0'72	0'69	0'60	0'10
TORONTO.....	0'00	0'25	0'70	0'79	0'78	0'72	0'82	0'81	0'84	0'84	0'81	0'79	0'79	0'78	0'55	0'04
LINDSAY.....	S	0'30	0'42	0'67	0'77	0'75	0'73	0'72	0'74	0'72	0'75	0'74	0'64	0'48	0'37	0'22
BARRIE.....	0'05	0'31	0'61	0'65	0'69	0'70	0'70	0'74	0'71	0'80	0'76	0'69	0'71	0'68	0'34	0'00
KINGSTON.....	S	0'33	0'76	0'79	0'78	0'75	0'76	0'75	0'76	0'76	0'75	0'70	0'64	0'61	0'40	S
OTTAWA.....	0'31	0'59	0'69	0'74	0'74	0'74	0'75	0'77	0'77	0'74	0'60	0'54	0'54	0'44	0'37	0'00
MONTREAL.....	S	0'34	0'53	0'58	0'72	0'78	0'70	0'70	0'73	0'74	0'77	0'69	0'66	0'42	0'05	0'00
FREDERICTON.....	0'16	0'26	0'31	0'43	0'46	0'50	0'56	0'62	0'56	0'58	0'50	0'52	0'48	0'44	0'10	0'00

	VICTORIA.	KUPER ISLAND.	AGASSIZ.	BATTLEFORD.	INDIAN HEAD.	BRANDON.	WINNIPEG.	DURHAM.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	OTTAWA.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0'67		0'48	0'66	0'60		0'64	0'47	0'64	0'68	0'60	0'60	0'63	0'58	0'63	0'48
DIFFERENCE FROM AVERAGE.....	+0'14		+0'02	+0'09	+0'01		+0'06	-	+0'06	+0'08	+0'03	+0'05	+0'06	-	+0'04	-0'08
MAXIMUM DAILY AMOUNT.....	0'88		0'82	0'98	0'86		0'92	0'88	0'93	0'91	0'99	0'90	0'90	0'88	0'98	0'93
DATE.....	11'13		25	17	1		30	30	24	30	31	28	31	31	24	28
NO. OF DAYS COMPLETELY CLOUDED.....	1		7	0	0		0	5	1	0	0	0	0	2	3	8

## FORECASTS FOR JULY, 1899.

The forecasts issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 929. These were divided as follows :—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully	No. Partly	No. Not	Percentage
MANITOBA.....	91	60	25	6	79·7
LAKE SUPERIOR.....	103	74	19	10	81·1
LOWER LAKE REGION.....	116	87	17	12	82·3
GEORGIAN BAY.....	114	80	25	9	81·1
OTTAWA VALLEY.....	103	80	11	12	83·1
UPPER ST. LAWRENCE.....	102	75	19	8	82·8
LOWER ST. LAWRENCE.....	97	70	15	12	80·0
GULF.....	98	72	22	4	84·7
MARITIME PROVINCES.....	105	77	23	5	84·3
TOTAL.....	929	675	176	78	82·1

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent the predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

R. F. STUPART,  
*Director.*

Meteorological Office, Toronto,  
26th August, 1899.