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METEOROLOGICAL SERVICE, DOMINION OF CANADA.

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# Monthly Weather Review.

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No. 4

## 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 ON THE WEATHER.

The weather of April, though unusually cold during the first few days, did not depart much from normal; the precipitation, however, was deficient throughout the greater part of the country; and whilst in western Canada the mean temperature was generally below average, in the eastern portion of the Dominion it was above. Owing, doubtless, to the exceptionally backward condition of vegetation on the last day of March there was not the usual progress in April, and on the 30th it was still very backward in most districts.

In British Columbia the weather was for the most part fine and cool, the mean temperature being below average. The rainfall, though light in some places, did not differ much from normal and in a few districts it was above average. Frosts at night occurred frequently during the first week in most places, and they were also recorded later in the month at some stations. Vegetation throughout the province was somewhat backward on the 30th.

In the North-west Territories the weather was exceptionally cold during the first few days of the month, the temperature falling to from  $-10^{\circ}$  to  $-20^{\circ}$  on the 1st and 2nd in Saskatchewan and Assiniboia. On the 5th it moderated and continued mild to the 26th, and although the nights were often cold the day temperatures were comparatively high. On the 26th it again turned colder, snow falling in most districts a day or so later. Although there was much bright sunshine vegetation was backward and warm rains were much needed.

The weather in Manitoba though not so cool as in the Territories was cooler than usual; there was however much bright sunshine, and after the 5th it was more springlike. The precipitation though rather above average at Winnipeg and St. Albans was generally below elsewhere. Vegetation was backward throughout the province but was not so much so as in the Territories.

In the Province of Ontario the weather was cool and unpleasant up to the 11th, after which it became mild and spring like and continued so to the end of the month. In districts bordering on Lake Huron the precipitation was rather greater than usual, elsewhere however it was below average; and vegetation, which was backward, was much in need of warm rain. In districts contiguous to the Georgian Bay there was enough snow for sleighing on the 13th, and in some places even six days later. Thunder storms occurred at most stations and at Point Clarke and Toronto five were recorded.

The weather in the Province of Quebec was exceptionally fine, mild and dry, the temperature being above average and the precipitation below. During the first ten days it was cool but fine mild weather succeeded this, and the snow which in some places was several feet in depth was quickly melted. The lowest temperatures occurred generally on or about the 5th and the highest about the 30th. Frosts were recorded upon several occasions and in some cases they were severe. Vegetation though somewhat backward made good progress towards the end of the month.

The weather conditions in New Brunswick were much the same as in Quebec the temperature being above average and the precipitation below; it was, however, finer, more especially towards the end of the month. Frosts occurred frequently at night and although the days were mild vegetation was doubtless retarded in some districts in consequence. About the 29th the weather turned unusually warm, temperatures from  $75^{\circ}$  to  $83^{\circ}$  being recorded.

In Nova Scotia the weather conditions took much the same character as in the two last named provinces, it being for the most part fine, mild and dry; the extremes of temperature, however, were not quite so great and clouded skies were more frequent. Frosts occurred frequently throughout the month and plant life was rather backward on the last day.

The weather in Prince Edward Island was generally fair and mild and the precipitation in most districts was light; night frosts however were of frequent occurrence and vegetation was somewhat backward in consequence. The highest temperatures occurred on or about the 29th and the lowest on the 7th. F. F. PAYNE.

#### HIGH AREAS.

Five high pressure areas were sufficiently well marked to be traced but none of them were very energetic.

No. 1 was centered in the North-west Territories on the morning of the 1st, attended by very cold weather, Qu'Appelle reporting  $-24^{\circ}$ . The area spread quickly over Canada to the Atlantic accompanied by cold weather, but the main body of the system did not leave the North-west Territories and Manitoba until the evening of the 3rd, when it moved southeastward to the Lake Region and passed on the 6th off the New England Coast. No. 2 travelled over the North Pacific States on the 6th and reached the States bordering on the Gulf of Mexico on the 9th. It then, between the 9th and 11th, spread northeastward into Canada from the Lower Lakes to the Atlantic attended by very fine weather. No. 3 was situated in the North Pacific States on the 13th. On the 15th it had reached Dakota; thence it moved to the South Atlantic States where it was centred on the morning of the 17th. From the South Atlantic States its centre was transferred to the Lower St. Lawrence Valley and on the 19th, and for several days afterwards high pressure and fine weather prevailed from the lakes to the Atlantic. No. 4 moved into the North Pacific States on the 19th, thence slowly over the Lake Region to the St. Lawrence Valley and broke up. It was of moderate energy only. No. 5 moved into the Lower St. Lawrence Valley on the 26th from the northward and thence passed slowly southward to the Middle Atlantic Coast. It was of little energy, but it was accompanied by a spell of very fine weather in the Maritime Provinces.

#### LOW AREAS.

Ten areas of low pressure were sufficiently well marked to be charted and there were one or two other depressions of minor importance whose tracks were too doubtful to be accurately ascertained.

No. 1 appeared in the vicinity of New Mexico on the 2nd, and passed over the Southern States and thence off the Carolina Coast and to the northward of Bermuda. It did not affect the weather in Canada. No. 2 first became well defined on the 5th when on the Texas Coast. It travelled northeastward as a depression of importance, reached the St. Lawrence Valley during the night of the 8th, whence it passed to the Straits of Belle Isle. Between the 7th and 9th it brought heavy precipitation from the lakes to the Atlantic which in the northern portions of Ontario and over the greater portion of Quebec was largely as snow; moderate gales were also generally experienced. No. 3 was situated over Alberta on the morning of the 9th and between the 9th and 11th passed over the Territories and Manitoba and thence north of Lake Superior. It was attended by a few scattered showers only in the North-west but owing to its influence showers and thunderstorms were generally experienced in the Lake Region on the 11th, and in the Ottawa and St. Lawrence Valleys on the 12th. No. 4 passed over Cape Breton during the night of the 12th having moved in from the Atlantic. It caused a fall of rain west as far as Halifax. No. 5 passed into Alberta from British Columbia during the night of the 11th. Between the 12th and 14th it traversed the Territories, Manitoba and the Lake Region and dispersed in the Lower St. Lawrence Valley. It was attended by local falls of rain and snow in the North-west and by numerous showers and thunderstorms in Ontario and Quebec. No. 6 formed during the night of the 15th in the Middle Atlantic States in an existing low pressure trough. On the 17th it passed along the Nova Scotia Coast as a disturbance of considerable energy attended in the Maritime Province by heavy rains and fresh northeasterly to northerly gales. No. 7 passed southeastward over British Columbia on the 15th skirting Southern Alberta on the 16th. On the 17th it covered the North-west States. On the 18th it reached Lake Superior and on the 19th dispersed. It caused light snowfalls in the North-west and showers in Ontario, as a rule light. No. 8 formed on the 19th in the Western States. Its ultimate course is doubtful, but the area was noticeable for the fall of snow which it occasioned in Manitoba on the 19th and 20th. No. 9 was a depression of considerable importance when over the northwestern portion of the continent between the 25th and 27th, the barometer reduced to sea level falling to 28.80 inches. The area however did not extend further east than Lake Superior and it seemingly passed to Hudson Bay. During its presence in the North-west thunderstorms were experienced at first, followed by a change to decidedly colder weather and light snowfalls. A fall of rain also occurred over the Lake Superior Region. No. 10 was a marked depression on the morning of the 30th centered in Colorado, it having developed during the night. It travelled northeasterly and on May 1st dispersed over Lake Superior. Showers and thunderstorms were general in Ontario and Quebec on the 30th attendant apparently to a great extent on this area.

#### ATMOSPHERIC PRESSURE.

The mean atmospheric pressure was above the average from the Straits of Mackinaw east to our Atlantic Coast and below everywhere else. The greatest amount above average 0.10 of an inch occurred in southwestern New Brunswick, and the greatest amount below average was in the interior of British Columbia.

## BRIGHT SUNSHINE.

Bright sunshine was above the average amount at all stations in Canada except at Battleford where it was just average. The two extreme portions of Canada gave the largest amounts above average, Victoria being 14 per cent and Fredericton 16 per cent.

## TEMPERATURE.

The mean temperature of the month was above average in the Dominion everywhere east of a line drawn north and south through Winnipeg, and below average everywhere to the westward; the greatest excess was over the more central portions of Ontario, and the greatest departure below average ( $6^{\circ}$ ) was in Alberta and the more western parts of Saskatchewan and Assiniboia. The temperature was decidedly below average for the first ten days in all districts between the Great Lakes and the Maritime Provinces, then abnormally high temperature became prevalent, and during the last few days summer-like conditions obtained. In the North-west Territories the month closed cold and disagreeable, and snow was reported in many localities. The following are the highest and lowest temperatures recorded in each province during April, 1899 :—

British Columbia . . . . .	$83^{\circ}0$ on 27th at Quesnelle.	$0^{\circ}0$ on 1st at Barkerville.
North-west Territories. . . . .	$74^{\circ}1$ on 26th at Medicine Hat.	$-24^{\circ}0$ on 1st at Qu'Appelle.
Manitoba . . . . .	$81^{\circ}0$ on 27th at Emerson.	$-12^{\circ}8$ on 6th at Winnipeg.
Ontario . . . . .	$88^{\circ}0$ on 30th at Paris and Cottam.	$-11^{\circ}0$ on 4th at White River.
Quebec . . . . .	$82^{\circ}0$ on 30th at Montreal.	$4^{\circ}0$ on 5th at Brome.
New Brunswick . . . . .	$81^{\circ}7$ on 30th at Fredericton.	$11^{\circ}0$ on 7th at Dalhousie.
Nova Scotia . . . . .	$78^{\circ}4$ on 30th at Pictou.	$16^{\circ}6$ on 1st at Parrsboro.
Prince Edward Island . . . . .	$70^{\circ}6$ on 28th at Charlottetown.	$18^{\circ}5$ on 7th at Hamilton.

## PRECIPITATION.

The precipitation was less than average throughout the Dominion, except in Eastern Manitoba and north of Lake Superior, and perhaps on Vancouver Island. Rain was needed in South-western Ontario, and on the North-western prairie lands, but elsewhere the ground has been well watered by melting snow and thunder-showers.

## WINDS.

In British Columbia the westerly winds were the most prevalent, and although for the most part they were fresh to strong, there were no gales recorded. One moderate and three strong gales occurred in the North-west, the most prevalent wind being also westerly. There were several strong winds in Manitoba, but only one moderate gale was recorded, and here also the greater number of winds were westerly. In Ontario winds were as a rule moderate, the force of a moderate gale being attained only once during the month and there were numerous variable winds and calms. The winds were about equally divided between the easterly and the westerly. In Quebec the westerly was the most prevalent wind and whilst they were often fresh, a moderate gale was only recorded twice. In the Maritime Provinces there was one fresh and one strong gale and the westerly were the most numerous winds. Warnings were sent out twice during the month to stations in the Maritime Provinces where navigation was open, on the 7th for a moderate gale, a moderate gale occurring on the 8th and 9th; and again on the 16th for a strong gale, a heavy gale prevailing on the 17th and 18th.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, APRIL, 1899.

Barometer not reduced to Sea Level. \* Stations not furnished with Registering Thermometers.

Table with columns for Station, Latitude N., Longitude W., Elevation above Sea Level, Pressure (Mean reduced, Highest, Lowest, Range), Temperature (Mean, Difference from average, Years observ., Highest, Lowest, Date, Mean daily range, Mean relative humidity, Mean amount of cloud, No. of days completely clouded), Direction of Wind from (N., N.E., E., S.E., S., S.W., W., N.W., C.), Velocity of Wind (Mean miles per hour, Highest days velocity, Date and direction from), and Precipitation (Amount, Difference from average, Heaviest fall in month, Days with 0.1 or more, No. of thunder storms, No. of Auroras, No. of Fogs).

N. W. TERRITORIES: Medicine Hat, Edmonton, Swift Current, Fort Assiniboia, Calgary, Prince Albert, Battleford, Omapuk, eBanf, Calgary (2), Moose Jaw.



PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, APRIL, 1899.

α. Barometer not reduced to Sea Level. \*Stations not furnished with Registering Thermometers.

Table with columns: STATION, Latitude N, Longitude W, Elevation above Sea Level in feet, PRESSURE (Mean reduced, Highest, Lowest, Range), TEMPERATURE (Mean, Difference from average, Highest, Lowest, Date, Mean daily range, Mean temperature of Dewpoint, Mean relative humidity, Mean amount of Cloud, No. of days complete, No. of days cloudy), DIRECTION OF WIND FROM (N, N.E., E, S.E., S, S.W., W, N.W., C), VELOCITY OF WIND (Mean miles per hour, Highest days, Date and direction from), PRECIPITATION (Amount, Difference from Average, Heaviest fall in month), and No. of fogs, No. of Thunder storms, No. of Auroras, Days with 01 or more.

STATION.

- Ontario.—Con.
Brantford
DeCewville
Consewago
Stoney Creek
Toronto
Welland
Niagara
Peterborough
Leedsford
Deseronto
Lakeland
Kingston
Clontarf
Renfrew
Ottawa
Bisset
Metfava
Cartiera
St. Arvis
Stouffville
Sarnia
Millbrook
Barris
Eramus
Galt
Bloomfield
Calumbe
Otonabee
Windsor
(α)
Alton
Aurora
Newport
Harrison
Port Hope
Kitchener
Cookburn Island
Chatham
Delaware Mills
Marquette
Georgetown
Quebec
Montreal
Richmond
Bross
Quebec
Chateaufort
Yamche Point
Yamche Point
Cape Chatte
Bequette
Cape Magdalen
Grindstone
Anticosti, P.
Anticosti, S.W. Pt.



OBSERVATIONS AT STATIONS REPORTING RAIN, SNOW AND WEATHER, DURING  
APRIL, 1899.

STATIONS.	RAINFALL.					SNOWFALL.				THUNDER OR LIGHTNING.	REMARKS.
	Amount in inches.	Days '01 or Over.	No. of Fair Days.	Heaviest Fall in Month.	Date.	Amount in inches.	No. of Days.	Heaviest Fall in Month.	Date.		
<b>BRITISH COLUMBIA—</b>											
Cumberland.....	2.75	8	22	1.50	15-16						
Beaver Creek.....	4.56	16	14	0.95	21	*	4	*			
Langley.....	4.33	13	17	0.83	11					30	
Nanaimo.....	1.72	4	26	0.81	11						
Goldstream Lake.	5.95	16	14	2.94	11						
Royal Oak.....	3.22	15	15	1.38	11						
Salt Spring Island.	1.54	7	23	0.54	12						
Valdez Islander ..	3.76	14	14	1.10	19						
<b>N. W. TERRITORIES—</b>											
Coutts.....	0.21	1	26	0.21	18	4.0	3	4.0	30		
Innisfail.....	0.13	2	27	0.07	21	3.0	4	2.0	21		
Didsbury.....			28			1.4	2	1.4	21		
West Beaver Hills	0.52	5	19	0.24	26	7.4	7	3.8	30		
Salteoats.....	0.01	1	28	0.01	26	0.5	2	0.5	4		
<b>MANITOBA—</b>											
Selkirk.....	1.25	2	25	0.65	23	3.0	3	3.0	19	23, 26	
Pembina Crossing.	0.30	1	22	0.30	26	13.0	6	11.0	20	23, 26	
Rapid City.....	0.50	1	27	0.50	27	2.0	2	1.0	5-21	26	
Gretna.....	0.91	5	18	0.48	19	3.3	6	2.0	17	23, 24, 26	
Morden.....	0.11	3	20	0.05	19	10.0	7	7.0	20-21	24, 26	
Hartney.....	0.25	1	27	0.25	26	5.0	2	4.0	20		
Belmont.....	0.87	3	24	0.51	26	7.0	3	7.0	20	26	
Shoal Lake.....						*	2				
Cartwright.....	1.89	4	25	0.52	12	9.0	4	7.0	19	26	
Oakbank.....	1.61	7	20	0.64	26	8.0	7	4.0	4	26	
Cartwright (2)....	2.35	3	24	1.72	26		3				
Greenwood.....	0.41	1	28	0.41	26	6.6	1	6.0	20		
Beaver Creek.....	1.64	3		1.01	26						
Elgin.....	0.42	4	21	0.19	26	4.0	4	3.5	26	26	
Deloraine.....	0.53	2	23	0.30	26	3.5	5	2.0	19	26	
Norquay.....	1.11	3	22	0.54	24	11.0	5	6.0	20	24, 26	
Turtle Mountain..	0.45	3	26	0.25	13	12.0	3	12.0	19-20	26	
<b>ONTARIO—</b>											
Midland.....	1.52	8	19	0.50	30	*	3			13, 30	
Ursa.....	0.97	5	24	0.32	14	3.0	2	2.0	7		
Cherry Valley.....	0.94	4	25	0.34	22	1.0	2	0.5	2	30	
Croydon.....	0.95	2	27	0.80	8	0.5	1	0.5	9	29	
Providence Bay...	1.48	6	24	0.56	14					11, 22, 29, 30	
Ennismore.....	0.94	5	23	0.25	14	4.0	2	2.0	8		
Warton.....	1.77	4	22	0.61	30	3.0	3	3.0	2	11, 13, 14, 30	
Princeton.....	0.60	1	29	0.60	11					11	
Lion's Head.....	1.68	6	24	0.46	18					13, 14, 30	
Kitley.....	1.27	2	27	1.00	8	*	3			12	
Oliver's Ferry.....	0.45	3	27	0.15	8						
Thompson.....	3.86	4	26	1.15	14					14	
Deer Park.....	1.57	5	24	0.72	12	1.5	2	1.0	16		
Huntsville.....	0.57	3	26	0.27	19	0.5	1	0.5	5		
Coldstream.....	0.92	4	26	0.51	11					11	
Watford.....	1.21	4	26	0.43	29						
Orangeville.....	1.76	6	22	0.84	11	4.5	2	3.5	16	11, 13, 14	
Port Burwell.....	0.52	7	23	0.26	9	*	1				
Mortagne.....	0.30	2	28	0.30	8						
Elgin.....	1.29	3	27	0.92	7						
Lansdowne.....	1.18	3	25	1.08	8-9	0.5	1	0.5	8		
Jermyn.....	0.86	3	27	0.50	8	*	1			13, 14	
Wooler.....	1.17	7	22	0.47	8	*	4			13, 30	
Parma.....	1.07	4	26	0.81	8	1.5	1	1.5	9		
Wyoming.....	1.07	4	25	0.40	11						
Wilton Grove.....	0.51	6	23	0.28	11	*	1			11, 30	
Lynedoch.....	0.76	6	24	0.27	7						
Sunshine.....	1.55	6	22	0.96	12	5.5	3	2.5	16	11, 24, 26	
Roblin's Mills.....	0.65	3	27	0.45	7						
Aurora.....	1.22	6	23	0.50	11	2.8	2	2.0	15	13, 30	
Scarboro'.....	1.62	10	16	0.66	11	*	5			11, 13, 14, 24, 25, 30	
Dutton.....	0.38	4	5	0.16	11	*	1			22, 30	
Georgetown.....	1.31	8	14	0.91	11	2.7	4	2.7	16	11, 14, 30	
Emsdale.....	0.76	6	23	0.28	19	0.5	1	0.5	8	14, 30	
Goderich.....	0.54	2	28	0.50	30						
Arden.....	0.72	4	26	0.59	8	1.0	1	1.0	8	14	
Dealtown.....	0.22	3	25	0.16	7	*	2				
<b>NEW BRUNSWICK—</b>											
Poinc Escuminac..	0.11	1	25	0.11	17	0.7	4	0.5	13		
<b>NOVA SCOTIA—</b>											
Port Morien.....	2.31	5	25	0.84	12						
<b>P. E. ISLAND—</b>											
Mount Stewart....	2.07	3	27	0.93	17						
Port Hill.....	0.22	2	25	0.22	17	3.0	3	1.5	12		
Murray River.....	2.86	5	25	0.75	8						



*Thunder recorded on :—*

1. Bermuda.
3. Quesnelle Forks.
5. Bermuda.
10. Regina.
11. Coldstream, Orangeville, Wilton Grove, Sunshine, Scarboro, Stony Creek, Paris, Point Clark, St. George, Welland, Erasmus, Hamilton, Sarnia, St. Ann's, Agincourt, Birnam, Lucknow, Niagara, Brantford, Providence Bay, Wiarton, Princeton, Guelph, London, Stratford, Battleford, St. Mary's.
12. Dalhousie Mills, Otonabee, Kitley, Savanne, Brome.
13. Paris, Point Clark, Whiteside, Erasmus, Lakefield, Bruce Mines, Agincourt, Peterborough, Meaford, Lucknow, Haliburton, Niagara, Stouffville, Brome, Midland, Wiarton, Lion's Head, Orangeville, Jermyn, Wooler, Aurora, Scarboro, Coldwater, Gravenhurst, Durham, Lindsay, Saugeen, Haileybury, Barrie.
14. Point Clark, Whiteside, Cockburn Island, Lakefield, Hamilton, Bruce Mines, Beatrice, Bancroft, Uplands, St. Ann's, Peterborough, Meaford, Lucknow, Haliburton, Brantford, Lion's Head, Midland, Wiarton, Orangeville, Jermyn, Wilton Grove, Scarboro, Arden, Coldwater, London, Gravenhurst, Durham, Lindsay, White River, Parry Sound, Saugeen, Port Stanley, Haileybury, Barrie.
16. Bognor, Bermuda.
19. Red Deer.
21. Cockburn Island, N. Nicomen, Victoria.
22. Providence Bay.
23. Selkirk, Pembina Crossing, Aweme, Emerson.
24. Stony Creek, Erasmus, Sunshine, Scarboro, Portage la Prairie, Rosebank, Gretna, Morden, Norquay, Guelph, Winnipeg.
25. Scarboro, Collingwood, Barnardo, Emerson, Lindsay, Port Arthur.
26. Norquay, Coldwater, Elgin, Collingwood, Winnipeg, Cannington Manor, Point Clark, Sunshine, Portage la Prairie, Rosebank, Brandon, Selkirk, Pembina Crossing, Rapid City, Gretna, Morden, Hillview, Belmont, Cartwright, Oakbank, Turtle Mountain.
27. Port Arthur, White River.
28. Cottam, Ridgetown, Birnam, Lucknow.
29. Abbotsford *heaviest hail for 10 years*, Cockburn Island, Erasmus, Bruce Mines, Agincourt, Croydon, Providence Bay, Aweme, White River.
30. Langley, Paris, Point Clark, Owen Sound, Windsor, Cockburn Island, Erasmus, Otonabee, Agincourt, Port Hope, Sprucedale, Meaford, Birnam, Lucknow, Niagara, Dalhousie Mills, Hamilton, Bruce Mines, Collingwood, Beatrice, Bancroft, Uplands, Stouffville, Midland, Cherry Valley, Ennismore, Wiarton, Lion's Head, Thompson, Wooler, Wilton Grove, Aurora, Emsdale, Chatham, Collingwood, Montreal, Woodstock, Saugeen, Coldwater, Gravenhurst, London, Durham, Lindsay, Stratford, Bermuda, Parry Sound, Port Stanley, Quebec, Haileybury, St. Mary's, Barrie.

*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. Pembina Crossing, III; Cannington Manor, IV; Savanne, Regina, II.
2. Hillview, IV; Duck Lake, III; Cannington Manor, IV; Red Deer, IV; Savanne, Regina, IV; Haileybury, IV.
3. Pembina Crossing, III; Hillview, IV; Beatrice, IV; Regina, II; Quebec, IV; Haileybury, II; Oonikup.
4. Georgetown, IV; Chicoutimi, Cockburn Island, Erasmus, W. Beaver Hills, IV; Gatesgarth, Red Deer, IV; Regina, III; Barnardo, II; Coldwater, II; Quebec, IV; Haileybury, IV; Oonikup.
5. Cannington Manor, IV; Qu'Appelle, Father Point, IV; Haileybury, IV.
6. Aweme, IV; Pembina Crossing, III; Hillview, I; Cockburn Island, W. Beaver Hills, IV; Red Deer, IV; Cape Magdalen, Savanne, Regina, III; Truro, IV; Qu'Appelle, Quebec, IV; Father Point, IV.
7. Pembina Crossing, III; Duck Lake, Savanne, Regina, IV; Truro, IV; Qu'Appelle, Swift Current IV; Father Point, III.
8. Pembina Crossing, IV.
9. Pembina Crossing, III; Cockburn Island, Birnam III; W. Beaver Hills, III; Calgary, III; Red Deer, II; Savanne, Coldwater, II; Swift Current, IV; Medicine Hat, II; Quebec, IV; Haileybury, IV; Barrie.
10. Pembina Crossing, III; Chicoutimi, Bancroft, IV; Cannington Manor, IV; Sussex, Truro, III; Minnedosa II; Swift Current, IV; Quebec, IV; Channel Island, IV.
11. Pembina Crossing, III; Cannington Manor, II; Regina, III; Father Point, III.

12. Minnedosa, III; Haileybury, III.
15. Pembina Crossing, IV; Portage la Prairie, Hillview, II; Haileybury, IV; Channel Island, IV.
16. Minnedosa, III.
18. Cape Magdalen.
19. Red Deer, II; Sussex, Yarmouth, IV.
20. Truro, IV.
21. Pembina Crossing, IV.
23. Emerson.
24. Pembina Crossing, III; Treherne, Hillview, II; W. Beaver Hills, III; Calgary, III; Duck Lake, III; Barnardo, IV; Battleford, III; Quebec, III; Channel Island, IV.
25. Treherne, Stony Mountain, IV; Minnedosa, IV.
27. Pembina Crossing, IV.
28. Channel Island, IV.
29. Aweme, III; Pembina Crossing, II; Treherne, Portage la Prairie, II; Hillview, I; Cannington Manor, II; Red Deer, IV; Barnardo, II; Channel Island, IV.
30. Minnedosa, III.

*Appearance of spring birds, &c.*

*Swallows.*—Ursa, 22nd; Gatesgarth, 19th; Beaver Creek, B.C., 2nd; Abitibi, 30th; N. Nicomen, 28th; Haileybury, 28th; Ridgetown, 19th; Bognor, 30th; Erasmus, 19th; Lakefield, 15th; Bancroft, 19th; St. Ann's, 27th; Port Hope, 14th; Peterborough, 15th; Sprucedale, 27th; Lucknow, 24th; Ursa, 22nd; Georgetown, 13th; Gravenhurst, 25th; Port Stanley, 19th.

*Robins.*—Ursa, 12th; Providence Bay, 6th; Princeton, 1st; Dalhousie, 16th; Donald, 6th; Gatesgarth, 16th; St. Stephen, 9th; Summerside, 15th; Brome, 8th; Bognor, 7th; Cockburn Island, 13th; Erasmus, 4th; Hamilton, 8th; Collingwood, 6th; Kinmount, 6th; Agincourt, 6th; Port Hope, 4th; Sprucedale, 11th; Lucknow, 1st; Pembina Crossing, 13th; Thompson, 12th; Montague, 5th; Jermyn, 6th; Emsdale, 13th; Arden, 7th; Fredericton, 23rd; Gravenhurst, 10th; Haileybury, 12th; Barrie, 7th; Oonikup, 23rd.

*Blue Birds.*—Donald, 9th; Chaplin, 6th; Welland, 24th; Erasmus, 10th; Georgetown, 6th; Arden, 7th.

*Whippoor Will.*—Clontarf, 29th; Erasmus, 28th.

*Black Birds.*—Midland, 16th; Princeton, 16th; Kitley, 5th; Gatesgarth, 19th; Coutts, 12th; Paris, 9th; Clontarf, 12th; Ridgetown; Welland, 7th; Bognor, 10th; Erasmus, 10th; Bancroft, 11th; Port Hope, 8th; Peterborough, 8th; Pembina Crossing, 17th; Rosebank, 21st; Georgetown, 9th; Arden, 1st; Fredericton, 16th; Emerson, 13th; Oonikup, 24th.

*Wild Ducks.*—Chaplin, 7th; Gatesgarth, 9th; Cannington Manor, 8th; Cartwright, 12th; Norquay, 10th; Bognor, 1st; Pembina Crossing, 10th; Gretna, 9th; Hillview, 11th; Barnardo, 12th; Rosebank, 11th; Portage la Prairie, 11th; Thompson, 2nd; Arden, 13th.

*Geese.*—Donald, 16th; Moose Jaw, 4th; Duck Lake, 5th; Chaplin, 7th; Gatesgarth, 10th; Cannington Manor, 9th; W. Beaver Hills, 14th; St. Stephen, 10th; Aweme, 9th; Cartwright, 14th; Coldwater, 12th; Norquay, 9th; Regina, 9th; Pembina Crossing, 10th; Gretna, 9th; Morden, 13th; Hillview, 12th; Barnardo, 10th; Oak Lake, 8th; Rosebank, 8th; Portage la Prairie, 10th; Thompson, 13th; Montague, 5th; Wyoming, 14th; Erasmus, 9th; Oonikup, 11th.

*Crows.*—Duck Lake, 10th; Aweme, 1st; Rapid City, 6th; Hillview, 16th; Barnardo, 6th; Rosebank, 2nd; Portage la Prairie, 6th; Savanne, 3rd; Regina, 12th; Emerson, 2nd.

*Humming birds.*—N. Nicomen, 17th.

*Gulls.*—Abitibi, 18th; Lakefield, 1st; Uplands, 8th; Pembina Crossing, 19th; Gravenhurst, 11th.

*Meadow Larks.*—Aweme, 10th; Cartwright, 10th; Welland, 28th; Lakefield, 22nd; Port Hope, 10th; Lucknow, 10th; Pembina Crossing, 12th; Gretna, 8th; Meadow Lark, 16th; Portage la Prairie, 17th.

*Frogs.*—Midland, 23rd; Princeton, 12th; Gatesgarth, 20th; Cannington Manor, 12th; Stony Creek, 18th; Paris, 12th; Summerside, 30th; Cartwright, 18th; Coldwater, 16th; Clontarf, 28th; Whiteside, 20th; Welland, 18th; Bognor, 21st; Erasmus, 7th; Beatrice, 18th; Bancroft, 23rd; St. Ann's, 4th; Agincourt, 20th; Meaford, 19th; Lucknow, 5th; Niagara, 13th; Pembina Crossing, 23rd; Hillview, 14th; Barnardo, 22nd; Rosebank, 10th; Portage la Prairie, 11th; Savanne, 22nd; Huntsville, 22nd; Wyoming, 13th; Sunshine, 19th; Scarboro, 17th; Truro, 15th; Georgetown, 14th; Emsdale, 23rd; Fredericton, 24th; Emerson, 12th; Gravenhurst, 18th; Stratford, 17th; Haileybury, 28th; Barrie, 24th; Oonikup, 25th.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF APRIL, 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 .....		0·01	0·17	0·34	0·46	0·53	0·59	0·62	0·69	0·64	0·58	0·58	0·54	0·40	0·12	.....
Kuper Island .....																.....
Agassiz, B.C. ....		0·00	0·06	0·10	0·24	0·33	0·28	0·33	0·37	0·36	0·28	0·23	0·18	0·09	0·00	.....
Battleford .....	0·10	0·38	0·38	0·45	0·53	0·57	0·61	0·65	0·66	0·61	0·62	0·57	0·48	0·37	0·17	.....
Indian Head .....		0·00	0·02	0·20	0·46	0·52	0·56	0·61	0·59	0·62	0·60	0·61	0·52	0·28	0·00	.....
Brandon .....		0·00	0·28	0·42	0·56	0·63	0·69	0·70	0·68	0·68	0·60	0·55	0·39	0·24	0·00	.....
Winnipeg .....		0·11	0·22	0·39	0·57	0·67	0·63	0·67	0·69	0·70	0·65	0·61	0·63	0·49	0·08	.....
Durham .....		0·00	0·05	0·20	0·45	0·51	0·53	0·55	0·54	0·54	0·53	0·52	0·36	0·23	0·04	.....
Woodstock .....		0·00	0·10	0·39	0·63	0·60	0·64	0·67	0·63	0·66	0·67	0·59	0·58	0·37	0·01	.....
Toronto .....		0·00	0·25	0·53	0·61	0·63	0·65	0·66	0·68	0·69	0·65	0·63	0·59	0·57	0·21	.....
Lindsay .....		0·06	0·40	0·44	0·53	0·55	0·67	0·72	0·69	0·72	0·66	0·54	0·51	0·44	0·25	.....
Barrie .....		0·00	0·28	0·47	0·57	0·65	0·73	0·68	0·72	0·69	0·64	0·64	0·63	0·57	0·11	.....
Kingston .....		0·05	0·44	0·72	0·75	0·73	0·70	0·63	0·63	0·60	0·63	0·62	0·59	0·35	0·00	.....
Ottawa .....		0·06	0·37	0·61	0·68	0·70	0·70	0·73	0·67	0·63	0·63	0·68	0·65	0·44	0·08	.....
Montreal .....		0·04	0·36	0·57	0·62	0·71	0·78	0·76	0·77	0·70	0·66	0·69	0·60	0·23	0·00	.....
Fredericton .....	0·07	0·50	0·56	0·61	0·65	0·76	0·76	0·79	0·76	0·81	0·80	0·71	0·59	0·21	0·00	.....

  

	Victoria.	Kuper Island.	Agassiz.	Battleford.	Indian Head.	Brandon.	Winnipeg.	Durham.	Woodstock.	Toronto.	Lindsay.	Barrie.	Kingston.	Ottawa.	Montreal.	Fredericton.
Mean proportion for month. <i>(Constant sunshine being 1.)</i>	0·46	.....	0·27	0·49	0·41	0·46	0·52	0·37	0·48	0·56	0·55	0·54	0·55	0·56	0·63	0·63
Difference from average.....	+·14	.....	+·06	0·00	+·07	+·10	+·04	—	+·06	+·07	+·03	+·11	+·09	—	+·11	+·16
Maximum daily amount.....	0·90	.....	0·85	0·95	0·76	0·89	0·92	0·80	0·79	0·91	0·98	0·92	0·89	0·92	0·93	0·95
Date.....	23	.....	23	15	11	1	6	12	5	5	10	4	5	24	24	6
No. of days completely clouded.....	4	.....	10	4	4	5	4	11	2	1	1	3	3	4	3	2

## APRIL FORECASTS.

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 840. These were divided as follows :—

DISTRICT.	No. Issued.	VERIFIED.			
		No. Fully	No. Partly	No. Not	Percentage
Manitoba .....	87	60	22	5	81·6
Lake Superior .....	86	59	21	6	80·8
Lower Lake Region .....	108	80	19	9	80·9
Georgian Bay .....	105	85	13	7	87·2
Ottawa Valley .....	92	67	11	14	78·8
Upper St. Lawrence .....	90	67	14	9	82·2
Lower St. Lawrence .....	88	74	7	7	88·1
Gulf .....	89	70	13	6	86·0
Maritime Provinces .....	95	73	18	4	86·3
Total .....	840	635	138	67	83·8

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.

## OBSERVATIONS AT MARTIN'S FALLS, 1898.

Latitude N. 51° 30'. Longitude W. 86° 30'. Height, — feet.

	MEAN PRESSURE AT 32°.				MEAN TEMPERATURE.						PRECIPITATION.	
	9 a.m.	2 p.m.	7 p.m.	Mean.	9 a.m.	2 p.m.	7 p.m.	Mean Max.	Mean Min.	Monthly Mean.	Total Amount.	Depth of Snow.
	in.	in.	in.	in.	°	°	°	°	°	°	in.	in.
January .....	29·25	29·25	29·27	29·257	-7·1	2·8	-3·6	5·5	-18·7	-6·60	0·79	7·9
February .....	29·41	29·38	29·40	29·397	-4·4	4·6	-4·0	6·4	-17·0	-5·30	1·00	10·0
March .....	29·29	29·26	29·30	29·283	9·6	19·3	9·6	20·9	2·5	11·70	0·95	9·5
April .....	29·38	29·34	29·40	29·373	35·5	43·5	36·0	46·1	16·8	31·45	0·05	0·5
May .....	29·26	29·22	29·21	29·230	48·0	57·5	50·6	60·4	35·3	47·85	1·10	0·6
June .....	29·25	29·21	29·22	29·227	55·0	63·9	56·9	66·7	39·9	53·30	0·55	—
July .....	..	..	..	..	..	..	..	..	..	..	..	..
August .....	29·20	29·19	29·19	29·193	57·9	66·4	58·2	69·0	45·6	57·30	1·52	—
September .....	29·15	29·12	29·11	29·127	48·5	56·3	50·9	57·8	40·3	49·05	1·14	—
October .....	29·33	29·32	29·33	29·327	32·5	38·9	33·9	40·1	26·1	33·10	1·06	4·1
November .....	29·20	29·18	29·18	29·187	17·5	22·2	18·0	23·1	9·7	16·40	2·17	21·7
December .....	29·11	29·09	29·13	29·110	-0·1	6·6	1·2	7·4	-8·6	-0·60	0·35	3·5

## OBSERVATIONS AT NORWAY HOUSE, N. W. TERRITORIES, 1898-99.

Latitude, N. 53° 58'. Longitude, W. 97° 52'. Height 730 feet.

	MEAN PRESSURE AT 32°.			MEAN TEMPERATURE.					PRECIPITATION.	
	8 a.m.	6.20 p.m.	Mean.	8 a.m.	6.28 p.m.	Mean Max.	Mean Min.	Monthly Mean.	Total Amount.	Depth of Snow.
	in.	in.	in.	°	°	°	°	°	in.	in.
January .....	29·10	29·08	29·090	-10·6	-5·3	4·8	-17·1	-6·15	0·77	7·7
February .....	29·28	29·28	29·280	-8·5	-3·3	4·0	-16·6	-6·30	0·59	5·9
March .....	29·21	29·20	29·205	1·9	12·4	19·8	-7·9	5·95	0·69	6·9
April .....	29·21	29·19	29·200	32·5	38·6	44·9	21·1	33·00	0·46	0·3
May .....	29·17	29·13	29·150	48·6	55·0	64·4	35·9	50·15	0·22	*
June .....	29·06	29·05	29·055	52·9	57·7	66·0	43·8	54·90	1·21	
July .....	29·06	29·05	29·055	62·4	66·7	73·4	51·4	62·40	1·88	
August .....	29·05	29·07	29·075	59·2	62·0	67·3	51·6	59·45	5·38	
September .....	28·98	28·96	28·970	49·7	52·7	60·0	42·8	51·40	2·58	
October .....	29·18	29·16	29·170	29·6	32·0	37·8	25·8	31·80	0·90	5·9
November .....	29·07	29·09	29·080	8·3	10·3	18·7	1·5	10·10	1·48	14·8
December .....	29·07	29·09	29·080	-2·9	-0·3	8·9	-10·9	-1·00	0·83	8·3
1899.										
January .....	29·13	29·12	29·125	-16·8	-13·1	-5·0	-26·7	-15·85	0·33	3·3
February .....	29·13	29·13	29·130	-21·4	-11·1	-3·9	-24·5	-14·20	0·71	7·1

## OBSERVATIONS AT FORT CHURCHILL, HUDSON BAY, 1898.

Latitude, N. 48° 51'. Longitude, W. 94° 10'. Height, 38 feet.

	MEAN PRESSURE AT 32°.				MEAN TEMPERATURE.						PRECIPITATION.	
	6 a.m.	2 p.m.	10 p.m.	Mean.	6 a.m.	2 p.m.	10 p.m.	Mean Max.	Mean Min.	Monthly Mean.	Total Amount.	Depth of Snow.
	in.	in.	in.	in.	°	°	°	°	°	°	in.	in.
January .....	29·94	29·92	29·94	29·933	-25·7	-21·1	-24·9	-14·0	-32·9	-23·45	0·30	3·0
February .....	30·16	30·16	30·15	30·157	-19·2	-13·1	-16·3	-8·3	-27·7	-18·00	1·00	10·00
March .....	30·06	30·05	30·06	30·057	-18·3	-5·0	-11·7	1·5	-23·3	-10·90	0·80	8·0
April .....	29·96	29·95	29·94	29·950	21·2	31·2	24·5	35·4	17·0	26·20	1·23	11·9
May .....	29·99	29·97	29·97	29·977	31·2	38·3	31·0	45·4	25·3	35·35	1·20	1·0
June .....	29·85	29·84	29·85	29·847	42·4	49·4	42·8	59·2	33·9	46·55	0·88	5·5
July .....	29·74	29·76	29·72	29·740	52·5	58·4	52·2	67·2	30·4	48·80	1·09	
August .....	29·80	29·79	29·79	29·793	50·4	56·4	49·4	65·6	33·3	49·45	1·95	
September .....	29·76	29·76	29·77	29·763	41·6	45·5	41·6	53·4	25·2	39·30	1·49	3·5
October .....	30·00	29·99	30·02	30·003	25·1	27·4	25·9	29·8	13·3	21·55	1·00	7·0
November .....	30·00	29·93	29·94	29·960	0·7	3·7	0·2	7·7	-14·2	-3·25	0·92	9·2
December .....	29·88	29·87	29·85	29·867	-4·2	-3·0	-6·6	8·8	-20·0	-5·60	0·57	5·7

## OBSERVATIONS AT FORT CHIPEWYAN, 1898.

Latitude, N. 58° 43'. Longitude, W. 111° 10'. Height—feet.

	MEAN PRESSURE AT 32°.				TEMPERATURE.						PRECIPITATION.	
	8 a.m.	2 p.m.	8 p.m.	Mean.	8 p.m.	2 p.m.	8 p.m.	Mean Max.	Mean Min.	Monthly Mean.	Total Amount.	Depth of Snow.
	in.	in.	in.	in.	°	°	°	°	°	°	in.	in.
January .....	29·06	29·06	29·08	29·067	-2·6	-0·1	2·6	4·2	-10·2	-3·00	1·00	10·0
February .....	29·36	29·36	29·34	29·353	-13·1	-6·8	-8·4	-1·9	-18·1	-10·00	0·30	3·0
March .....	29·27	29·28	29·29	29·280	4·1	12·4	6·6	15·8	-2·9	6·45	0·82	8·2
April .....	29·14	29·14	29·14	29·140	31·6	42·7	34·0	45·4	24·0	34·70	0·20	0·5
May .....	29·13	29·12	29·12	29·123	47·8	59·9	49·3	62·2	39·9	51·05	0·56	2·5
June .....	29·19	29·18	29·18	29·183	53·6	63·3	54·7	64·7	42·4	53·55	2·49	0·5
July .....	20·09	29·08	29·08	29·083	62·2	68·9	59·8	71·8	50·6	61·20	1·22	—
August .....	29·13	29·11	29·12	29·120	59·1	65·5	56·0	68·1	48·8	58·45	3·52	—
September .....	29·09	29·08	29·09	29·087	48·0	54·9	45·8	59·3	40·5	49·90	2·19	2·5
October .....	29·25	29·24	29·24	29·243	24·7	28·3	24·3	31·0	20·2	25·60	0·83	8·3
November .....	29·24	29·23	29·24	29·237	2·9	6·4	2·4	11·0	-4·6	3·20	0·70	7·0
December .....	29·11	29·12	29·15	29·127	1·2	4·1	-0·2	9·5	-7·1	1·20	0·29	2·5

## OBSERVATIONS AT MOOSE FACTORY, H. B., 1898.

Latitude, N. 51° 16'. Longitude, W. 80° 56'. Height, 30·5 feet.

	MEAN PRESSURE AT 32°.				TEMPERATURE.						PRECIPITATION.	
	9 a.m.	2 p.m.	7 p.m.	Mean.	9 a.m.	2 p.m.	7 p.m.	Mean Max.	Mean Min.	Monthly Mean.	Total Amount.	Depth of Snow.
	in.	in.	in.	in.	°	°	°	°	°	°	in.	in.
January .....	29·96	29·92	29·96	29·947	-7·4	2·6	-2·9	8·6	-17·4	-4·40	—	—
February .....	30·13	30·10	30·14	30·123	-2·8	5·1	-0·7	10·1	-15·0	-2·45	—	—
March .....	30·00	29·95	29·97	29·973	16·2	25·5	20·0	31·2	3·7	-17·45	—	—
April .....	30·06	30·03	30·03	30·040	33·3	41·7	36·3	44·2	22·2	33·20	—	—
May .....	29·89	29·87	29·87	29·877	47·2	52·0	48·1	58·7	37·2	47·95	2·75	1·0
June .....	29·92	29·87	29·87	29·887	55·7	60·3	55·8	66·6	42·9	54·75	2·32	*
July .....	29·86	29·85	29·85	29·853	61·9	67·4	63·2	72·7	50·5	61·60	1·97	—
August .....	29·85	29·82	29·82	29·830	59·2	65·4	59·3	67·9	48·3	58·10	2·09	—
September .....	29·79	29·78	29·78	29·783	50·8	55·8	52·4	59·8	43·4	51·60	0·72	—
October .....	30·04	30·00	30·02	30·020	36·5	41·7	37·1	45·4	31·1	38·25	1·42	—
November .....	29·88	29·88	29·90	29·887	22·4	27·6	24·9	31·4	16·6	24·00	1·22	6·5
December .....	29·80	29·77	29·80	29·790	2·4	7·6	4·8	14·5	-5·3	4·60	—	—

## VOLUNTARY OBSERVERS.

Meteorological returns from voluntary observers for 1898, even from the most remote stations in Canada, now nearly all being in, the time seems opportune for a few remarks upon the work performed.

It would be hard to find a body of citizens who show more public spirit than the voluntary meteorological observer; in many cases, at the greatest inconvenience to himself, he will take at a regular set time, winter and summer, his series of observations, often foregoing other pleasures and calls upon his time in order to read his instruments at the appointed hour. In some instances these observations are taken twice or three times each day and in all weathers, after which they have to be checked and entered in their proper forms for mailing to the Central Office at Toronto. Without the aid of the voluntary observer it would be impossible to form a fair estimate of the climatic conditions of the country; and in a colony such as Canada where vast tracts are continually being opened up, a knowledge of these conditions is much sought after and is of much value to the incoming settler. The voluntary observers in Canada now number several hundred, the network of stations extending from the Atlantic to the Pacific and as far north as the Yukon District. There are many stations from which only rainfall observations are required, and although these are probably less interesting to the observer, they are extremely valuable, and the number of volunteers is continually increasing. The returns received for 1898 show undiminished interest in the work of observing and the efforts of the observers are much appreciated by the Meteorological Service.

R. F. STUPART,  
*Director.*

METEOROLOGICAL OFFICE,  
TORONTO, May 26th, 1899.

