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NATIONAL RESEARCH COUNCIL
CANADA

LOCAL CLIMATE IN THE VANCOUVER REGION: 1954

by
Donald W. Boyd

A joint contribution with the Meteorological
Division, Department of Transport.

Report No. 103
of the
Division of Building Research

Ottawa

August 1956



WEATHER STATIONS IN THE VANCOUVER REGION

PREFACE

The work of the Division of Building Research continues to show the vital importance which climate plays in all building work in Canada. In its studies of local building problems, the Division became acquainted at an early stage in its development with the special significance of local variations of climate.

Accordingly, one of the first tasks undertaken by the climatologist who works as a member of the DBR staff on loan from his regular position with the Meteorological Division of the Department of Transport was a detailed study of the local climate of the Ottawa region, with particular reference to variations within the general Ottawa area.

Three such annual reports have been prepared and they have proved of such interest and of obvious value that the Division intends to extend these studies of local climate, in close co-operation with the Meteorological Division.

This report represents the first of what is hoped will be a second annual series of such local studies. It deals with the Vancouver city area and, as will be seen, reveals most surprising differences within this important region, particularly with regard to precipitation.

It has already been pointed out to the Division that it was perhaps unfortunate that these studies should have started during the year 1954 when the normally excellent weather of Vancouver was slightly varied by rather more rainfall than is usually admitted for this western Canadian city. The report, however, is entirely factual and its conclusions are in no way meant to be any reflection upon the generally accepted popular view of Vancouver's weather. It is hoped that the report will prove useful in the Vancouver area. Further copies will be gladly supplied by the Division on request.

Finally, it is a pleasure to add the appreciation of the Division of Building Research to that of the Meteorological Division for the excellent work done by all those responsible for the local meteorological records upon which alone such a report as this can be based.

Ottawa

August 1956

Robert F. Legget,

Director.

LOCAL CLIMATE IN THE VANCOUVER REGION: 1954

by

Donald W. Boyd

INTRODUCTION

The great differences in topography between the delta of the Fraser River and the mountains north of Burrard Inlet result in remarkable differences in precipitation amounts over distances of only a few miles. The weather observations taken in 1954 in this interesting area form the basis of this report.

The map which forms the frontispiece shows the locations of twenty weather stations in or near the City of Vancouver. The region extends from the Strait of Georgia eastward to Port Coquitlam and from the international boundary northward for about ten miles beyond Burrard Inlet. Sixteen stations within this region sent monthly reports of precipitation to the Canadian Meteorological Services throughout 1954. Six of them also reported temperature but the only complete wind observations were from Vancouver Airport. Notes on the locations of these stations are given in the appendix.

The value of a discussion of weather observations is greatly increased if the current reports can be compared with average and extreme conditions covering a relatively long period in the past. During 1953 the Climatological Service computed the average monthly temperatures and precipitations for the thirty year period, 1921 to 1950 inclusive, for all the Canadian stations that were reporting throughout this period. These thirty-year averages are called standard normals. New Westminster is the only station in the region with standard normals of both temperature and precipitation, but Steveston (or Garry Point) has normals based on twenty-nine years. Deer Lake (north of Ioco) and Vancouver City Office (now the Port Meteorological Office (P.M.O.)) have standard precipitation normals. Most of the other stations have normals based on periods of between 20 and 30 years.

PART ONE: TEMPERATURE

Temperature records at New Westminster go back to 1888, and three other stations had opened before 1900. The temperature reports from all the stations in the region from the time they opened until 1950 were searched for record high and low temperatures. The maximum and the minimum temperatures reported in each month by any station in the region are shown in the top and bottom sections of Table I. New Westminster has reached 99°F. in both June and July and temperatures of 60°F. or higher have been reported somewhere in the region in every month of the year. The

coldest temperatures reported are 6° below zero at Coquitlam Lake in January and at Ladner in February. July and August are the only months in which the temperature has never fallen below freezing, and even in those months it has come close to freezing at Ladner.

In 1954 no new maximum temperature records were set, in fact none of the monthly maxima came closer than seven degrees to the previous records. In the summer months the highest temperatures remained about twenty degrees below the corresponding records. The second section of Table I shows the highest temperature reported in each month of 1954 at each of the six stations that reported throughout the year and at Mosquito Creek starting when it opened in April.

The third section of Table I shows a new record minimum temperature in May. Ladner's temperature dropped to 24° and Steveston's to 26° on May 1st, 1954; both below the previous minimum of 27° for May. April and July were also cold months in this sense. The 1954 temperatures at Ladner came within one or two degrees of the minima.

Table II gives the means of the daily maximum and minimum temperatures for each station in each month. On the basis of mean maximum temperatures New Westminster is most frequently the warmest and Coquitlam Lake the coolest. On the basis of mean minimum temperatures Ladner is most frequently the coldest and Vancouver Airport the mildest.

The mean temperatures in Table III are the averages of the daily maximum and minimum temperatures. The normal mean temperatures in the first part of the table are the averages of as many years' data as are available in the period from 1921 to 1950 inclusive. The number of years used for each station is given in the column on the extreme right. It will be noted that White Rock and New Westminster are equally warm for the year as a whole but that New Westminster shows a greater range of temperature between summer and winter, because it is further inland. Coquitlam Lake is the coolest station because of its greater altitude.

The mean values for 1954 in the lower portion of Table III are mostly a little lower than the corresponding normal values. The mean temperature for the whole year at each station is shown at the right of the monthly means and at the extreme right, the differences of the annual mean from the normal annual mean. All six stations were cooler than normal in 1954 and at Ladner and White Rock the departures from normal were three degrees or more. At the foot of the table the averages of the six stations are given for each month and the departure of these averages from the average normals. November was the only month that was much warmer than normal. Six of the first eight months were quite cool, ranging from 4.8 to 3.5 degrees below normal. The year as a whole was 2.0 degrees colder than normal.

PART TWO: PRECIPITATION

The monthly and annual rainfalls in 1954 at each of nineteen stations are listed in Table IV and the corresponding snowfalls in Table V. Monthly averages for the sixteen stations that reported throughout the year are listed at the bottoms of the tables.

Most of these stations have been reporting rain and snow for over twenty years, and hence normal values can be computed. Rather than treating rain and snow separately, however, the normal total precipitation (one tenth the snow depth plus the rain) has been tabulated for fifteen stations in Table VI. Reidville, which opened in 1953, and the three stations which opened in 1954 have, of course, been omitted.

The normal annual total precipitations show a remarkable variation for such a small area. White Rock and the stations in the delta area, Ladner, Steveston and Vancouver Airport have from 30 to 40 inches of precipitation each year on the average. Over the higher land between the Fraser River and Burrard Inlet annual precipitations at Vancouver City Hall and P.M.O., Brockton Point, New Westminster and Burquitlam range from about 50 inches to over 60 inches. North of the Inlet the annual total increases rapidly from near 70 inches at Hollyburn and Deer Lake to over 100 at Buntzen Lake, Coquitlam Lake and Capilano Intake and to 132 inches at Seymour Falls.

Table VII shows that the same general pattern of precipitation prevailed in 1954. The monthly and annual total precipitations for 1954 are listed in this table for the same fifteen stations except that west Vancouver replaces Hollyburn. The stations in the delta area all reported about 42 inches. About 70 inches fell near Burrard Inlet and over 160 inches at Seymour Falls and Coquitlam Lake. These amounts are all somewhat above normal. The column at the extreme right expresses the annual total for each station as a percentage of the normal annual total given in the preceding table. At the bottom of the table the monthly and annual averages for the fifteen stations and these averages expressed as percentages of the average normals are given. March and October were much drier than normal while November and August each had over twice the normal precipitation.

PART THREE: WIND

Vancouver Airport was the only station in the region that reported winds throughout the year 1954. Some wind observations were also made at a proposed airport site in Surrey but these observations are not included in this report.

The published normal wind speeds and direction frequencies for Vancouver Airport are based on only ten years of observations. Nineteen years are now available and so a completely new set of wind normals was computed. These new 19-year normals and the corresponding wind speeds and direction frequencies for 1954 are listed in Table VIII.

The normal monthly mean wind speeds show little variation through the year. There is a slight increase to a peak in March and then a gradual decrease to a minimum in September. In 1954 winds were considerably stronger than normal in January, February and April but lighter in March.

The two central portions of Table VIII show that about one third of the wind at Vancouver Airport comes from the east. This is true whether the number of hours or the number of miles is considered. The year 1954 was no exception in this respect. Southeast winds are also quite common but were somewhat less frequent in 1954 and northwest winds were much less frequent than normal. Northeast and west winds were more frequent in 1954.

The lowest portion of Table VIII shows that winds from most directions were stronger than normal during 1954. Northwest winds, however, averaged less than half their normal speed.

SUMMARY

The Vancouver region is unusually well supplied with weather stations that have been reporting for a considerable number of years. Most of these stations were still open in 1954 and it was indeed gratifying to find so many with complete reports for the whole year.

Perhaps the best way to summarize the temperature and precipitation data contained in the tables is to present a hythergraph showing both the normal conditions and those in 1954. The data used to prepare Fig. I are taken from the four "average" lines in Tables III, VI and VII. This hythergraph shows at a glance that January was cold and wet. February and November were mild and wet. March and October were cool and dry and the summer months cool and somewhat wetter than normal. December was so close to normal that it was difficult to show it on this scale.

The hythergraph, of course, does not tell the whole story. It does not show that maximum temperatures remained well below record values throughout the year, nor that a new record minimum temperature of 24° for May was set at Ladner. Nor does it show that the mean temperature for the whole year was two degrees below normal and the total precipitation 16 per cent above normal.

The wind frequencies in the second portion of Table VIII were used to draw the wind rose in Fig. II. With both normal and 1954 values on the same graph the less frequent winds from the northwest and southeast are quite noticeable.

However, all these differences between the normal and the 1954 weather at Vancouver are dwarfed by the difference between 41.44 inches of precipitation at Ladner and 167.04 at Coquitlam Lake, less than 24 miles away. This difference is normal.

APPENDIX

List of stations in the Vancouver Region giving their latitudes, longitudes, elevations and notes on their locations.

Annacis Island	49° 11'	122° 56'	15 ft.
On the northern side of Annacis Island half a mile from the northeastern tip.			
Brockton Point	49° 18'	123° 07'	20 ft.
On the eastern tip of Stanley Park jutting northward into Burrard Inlet.			
Buntzen Lake	49° 22'	122° 52'	428 ft.
At the northern tip of Buntzen Lake (not at the settlement on Indian Arm).			
Burquitlam	49° 15'	122° 53'	200 ft.
At 523 North Road; formerly called Maillardville at a different location.			
Capilano Intake	49° 24'	123° 09'	480 ft.
On the east side of the Capilano River about a mile below the mouth of Sisters Creek.			
Coquitlam Lake	49° 23'	122° 48'	528 ft.
At the intake for the Buntzen tunnel on the west side of Coquitlam Lake.			
Deer Lake	49° 19'	122° 53'	160 ft.
At the southern tip of Deer Lake (also called Sasamat Lake), north of Ioco.			
Hollyburn	49° 20'	123° 09'	150 ft.
On Esquimalt Avenue near Eleventh Street; formerly on Duchess Avenue near Fifteenth Street at an elevation of about 40 feet.			
Hollyburn Ridge	49° 22'	123° 11'	2100 ft.
At a forest lookout tower $1\frac{3}{4}$ miles north of Burrard Inlet and midway between Cypress Creek and Brothers Creek.			
Ladner	49° 04'	123° 01'	4 ft.
Near the gate of the old Boundary Bay Airport, $3\frac{1}{2}$ miles east-southeast of Ladner.			
Mosquito Creek	49° 21'	123° 05'	1130 ft.
At the water intake on Mosquito Creek $3\frac{1}{2}$ miles north of the North Vancouver ferry dock.			
New Westminster	49° 13'	122° 54'	330 ft.
At 333 Arbutus Street on the southwestern side of Queens Park.			

Reidville	49° 07'	122° 51'	310 ft.
On Ewenson Road about a mile west of King George VI highway, south of Newton Station.			
Seymour Falls	49° 26'	122° 58'	674 ft.
At the dam at the southern end of the Balancing Reservoir on the Seymour River.			
Steveston	49° 08'	123° 11'	10 ft.
On the Steveston Highway near the No. 1 Road; formerly called Garry Point.			
Vancouver Airport	49° 11'	123° 10'	16 ft.
At Vancouver Airport on the south side of Sea Island.			
Vancouver City Hall	49° 16'	123° 07'	143 ft.
On the northeast corner of West 12th Avenue and Cambie Street.			
Vancouver P.M.O.	49° 17'	123° 07'	45 ft.
The Port Meteorological Office is on the north corner of Granville and West Hastings Streets. It is a continuation of the old Vancouver City weather station.			
West Vancouver	49° 20'	123° 10'	94 ft.
At the Municipal Hall on the northeast corner of Seventeenth Street and Esquimalt Avenue, near the old station of Hollyburn.			
White Rock	49° 02'	122° 50'	230 ft.
On the north side of Marine Drive just east of Nichol Road, about a mile west of White Rock.			

TABLE I

EXTREME TEMPERATURES

	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sep.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Year</u>
<u>Record Monthly Maxima</u>													
Ladner	69	--	--	--	--	--	--	--	--	--	--	60	--
New Westminster	--	64	73	82	91	99	99	96	94	--	--	60	99
Vancouver City	--	--	--	--	--	--	--	--	--	--	74	60	--
White Rock	--	--	--	--	--	--	--	--	--	84	--	--	--
<u>Monthly Maxima in 1954</u>													
Coquitlam Lake	48	46	56	60	74	76	76	73	70	62	56	48	76
Ladner	49	54	59	56	73	72	77	78	73	68	60	51	78
New Westminster	47	55	62	65	76	75	75	78	73	70	65	51	78
Steveston	49	54	57	56	74	72	73	74	70	67	62	52	74
Vancouver Airport	49	57	57	56	73	72	73	76	70	64	59	52	76
White Rock	48	56	61	61	72	72	72	69	73	66	64	53	73
Mosquito Creek	--	--	--	63	73	78	77	77	73	67	65	48	78
<u>Monthly Minima in 1954</u>													
Coquitlam Lake	14	23	20	26	28	38	44	46	36	30	30	20	14
Ladner	2	23	19	22	24	35	38	41	33	24	24	20	2
New Westminster	8	25	21	30	32	42	47	48	42	32	28	26	8
Steveston	4	24	19	27	26	37	41	41	32	26	24	20	4
Vancouver Airport	10	25	24	31	33	44	46	48	37	28	25	22	10
White Rock	11	25	24	30	29	40	43	46	37	29	28	24	11
Mosquito Creek	--	--	--	29	32	39	45	46	37	34	29	27	--
<u>Record Monthly Minima</u>													
Coquitlam Lake	-6	--	--	21	--	--	--	--	--	--	--	--	-6
Ladner	--	--	10	21	27	30	36	33	--	18	--	0	--
Steveston	--	-6	--	--	--	30	--	--	25	--	4	--	-6

TABLE II

MEANS OF DAILY EXTREME TEMPERATURES

	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sep.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>
<u>Monthly Mean Daily Maxima in 1954</u>												
Coquitlam Lake	34.9	41.8	45.6	47.4	60.8	60.5	65.8	63.5	62.2	53.1	49.3	40.9
Ladner	37.0	46.1	48.8	52.1	63.9	63.8	67.9	67.5	64.9	56.3	51.9	44.9
New Westminster	37.3	47.0	51.2	54.4	65.5	64.1	68.0	67.2	65.0	57.0	52.5	43.8
Steveston	36.9	46.0	48.2	52.0	62.8	63.8	67.8	68.1	64.6	55.8	52.9	45.3
Vancouver Airport	37.4	46.7	48.2	52.1	62.9	63.8	68.0	67.5	63.7	55.1	52.5	45.2
White Rock	37.1	46.7	48.8	50.7	61.0	60.8	64.0	63.4	62.8	55.8	52.6	45.3
Mosquito Creek	----	----	----	47.6	60.4	66.4	66.1	63.9	61.7	54.0	49.9	41.6
<u>Monthly Mean Daily Minima in 1954</u>												
Coquitlam Lake	26.4	31.7	28.8	33.9	41.5	45.4	48.7	51.5	48.8	41.3	41.2	33.4
Ladner	25.2	33.9	28.6	35.6	41.0	45.1	46.1	49.6	47.1	38.5	40.2	33.2
New Westminster	25.7	34.2	32.0	37.5	45.9	48.6	52.0	54.0	52.3	43.7	42.5	34.8
Steveston	27.1	34.7	29.6	37.1	42.9	46.3	48.6	51.2	48.7	39.4	41.2	34.8
Vancouver Airport	28.2	35.7	32.1	39.4	46.2	49.3	52.2	54.5	51.8	42.4	43.0	36.0
White Rock	27.2	35.6	31.1	38.1	44.1	47.6	49.6	52.0	49.7	42.3	42.6	35.5
Mosquito Creek	---	---	---	34.1	40.6	44.0	48.3	51.1	49.1	42.4	41.4	34.1

TABLE III
MEAN TEMPERATURES

	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sep.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Year</u>	<u>No. of Years</u>
<u>Normal Monthly Mean Temperatures</u>														
Coquitlam Lake	33.0	35.0	39.1	45.2	52.4	57.4	61.8	61.2	57.1	49.0	40.7	37.0	47.4	15
Ladner	38.3	41.4	45.0	49.4	54.9	59.8	62.4	63.0	55.8	50.6	44.0	39.2	50.3	13
New Westminster	36.4	39.4	44.0	49.7	56.0	61.0	64.9	64.6	59.3	51.4	43.4	38.6	50.7	30
Steveston	36.3	38.5	43.2	48.2	54.2	59.2	62.5	62.0	57.0	49.6	42.4	38.4	49.3	29
Vancouver Airport	35.8	39.2	43.2	48.7	54.4	59.4	63.4	62.4	57.8	50.2	42.8	39.0	49.7	13
White Rock	37.2	40.4	45.1	50.3	55.4	59.9	63.0	63.0	57.8	51.4	44.3	40.4	50.7	22
Average Normals	36.2	39.0	43.3	48.6	54.5	59.4	63.0	62.7	57.5	50.4	42.9	38.8	49.7	
<u>Monthly Mean Temperatures in 1954</u>														Diff. from Norm.
Coquitlam Lake	30.6	36.7	37.2	40.6	51.1	53.0	57.3	57.5	55.5	47.2	45.3	37.2	45.8	-1.6
Ladner	31.1	40.0	38.7	43.9	52.4	54.5	57.0	58.6	56.0	47.4	46.1	39.1	47.1	-3.2
New Westminster	31.5	40.6	41.6	46.0	55.7	56.4	60.0	60.6	58.6	50.4	47.5	39.3	49.0	-1.7
Steveston	32.0	40.3	38.9	44.5	52.9	55.1	58.2	59.6	56.6	47.6	47.0	40.1	47.7	-1.6
Vancouver Airport	32.8	41.2	40.2	45.8	54.6	56.6	60.1	61.0	57.8	48.8	47.8	40.6	48.9	-0.8
White Rock	32.2	41.2	40.0	44.4	52.6	54.2	56.8	57.7	56.3	49.0	47.6	40.4	47.7	-3.0
Averages in 1954	31.7	40.0	39.4	44.2	53.2	55.0	58.2	59.2	56.8	48.4	46.9	39.4	47.7	-2.0
Differences from Norm.	-4.5	1.0	-3.9	-4.4	-1.3	-4.4	-4.8	-3.5	-0.7	-2.0	4.0	0.6	-2.0	

TABLE IV
RAINFALL

	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sep.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Year</u>
<u>Monthly Rainfall in 1954</u>													
Brockton Point	5.75	7.45	2.48	3.79	2.29	3.01	2.27	4.55	4.35	3.06	15.86	8.81	63.67
Buntzen Lake	11.32	17.52	4.27	8.41	3.17	7.24	2.56	4.84	7.46	5.58	26.42	16.98	115.77
Burquitlam	6.54	6.96	1.85	4.26	2.05	3.10	1.73	4.38	4.50	3.16	17.26	9.85	65.64
Capilano Intake	11.98	16.63	4.69	9.90	3.71	4.99	3.53	3.91	8.40	8.00	25.06	17.98	118.78
Coquitlam Lake	15.84	24.68	6.94	12.12	5.30	8.80	5.34	5.03	8.69	9.46	33.54	23.15	158.89
Deer Lake	8.18	11.24	3.16	6.16	4.17	4.12	2.61	4.36	5.51	4.93	21.26	13.96	89.66
Ladner	3.93	3.36	1.38	1.81	1.54	1.95	0.89	3.08	4.18	1.45	10.96	4.22	38.75
New Westminster	5.56	6.91	2.53	4.20	2.47	3.34	2.03	4.99	4.03	2.80	15.24	8.51	62.61
Reidville	4.61	5.11	1.76	2.98	2.21	2.61	1.40	4.45	3.04	2.05	13.60	5.15	48.97
Seymour Falls	14.45	20.78	6.90	12.63	3.30	6.34	3.98	3.75	8.84	13.35	35.27	22.28	151.87
Steveston	4.11	3.93	1.70	1.90	1.30	2.23	0.94	2.87	1.89	1.89	11.20	4.73	38.69
Vancouver Airport	3.95	4.23	1.78	2.12	1.22	2.15	1.03	2.89	1.85	1.96	11.10	5.31	39.59
Vancouver City Hall	4.13	4.60	1.82	2.48	1.58	2.57	1.40	3.11	2.72	2.75	14.40	9.03	50.59
Vancouver P. M. O.	6.11	8.39	2.58	3.92	2.13	2.79	2.11	4.35	4.45	3.15	16.10	9.39	65.47
West Vancouver	7.40	8.58	2.62	3.72	2.75	3.19	1.97	4.14	4.28	3.40	18.51	10.08	70.64
White Rock	4.07	4.00	1.31	2.74	1.96	2.66	0.85	2.47	2.47	1.67	11.30	4.19	39.69
Mosquito Creek	----	----	----	5.97	3.64	5.23	2.85	4.98	8.05	5.82	26.10	15.49	----
Hollyburn Ridge	----	----	----	----	4.48	5.67	4.18	5.74	8.98	7.41	31.35	6.44	----
Annacis Island	----	----	----	----	----	----	----	----	----	1.99	13.79	6.74	----
Averages in 1954	7.37	9.65	2.99	5.20	2.57	3.82	2.16	3.95	4.79	4.29	18.57	10.85	76.21

TABLE V

SNOWFALL

Monthly Snowfall in 1954

	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sep.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Year</u>
Brockton Point	53.9	3.2	0.2	0	0	0	0	0	0	0	0	0	57.3
Buntzen Lake	31.8	1.5	0	0	0	0	0	0	0	0	0	0.5	33.8
Birquitlam	48.0	0	0	0	0	0	0	0	0	0	0	0	48.0
Capilano Intake	38.5	2.0	0	0	0	0	0	0	0	0	0	3.5	44.0
Coquitlam Lake	63.2	6.0	2.8	0	0	0	0	0	0	0	0	9.5	81.5
Deer Lake	40.5	4.0	2.0	T	0	0	0	0	0	0	0	0	46.5
Ladner	26.9	0	0	0	0	0	0	0	0	0	0	0	26.9
New Westminster	58.8	T	0.2	0	0	0	0	0	0	0	0	1.0	60.0
Reidville	49.0	T	0.1	0	0	0	0	0	0	0	0	1.0	50.1
Seymour Falls	68.0	7.0	2.0	2.0	0	0	0	0	0	0	0	11.0	90.0
Steveston	30.8	0	0.3	0	0	0	0	0	0	0	0	0	31.1
Vancouver Airport	31.8	T	0.2	T	0	0	0	0	0	0	0	T	32.0
Vancouver City Hall	29.5	0	T	0	0	0	0	0	0	0	0	0	29.5
Vancouver P. M. O.	38.9	0.1	0	0	0	0	0	0	0	0	0	0	39.0
West Vancouver	31.7	T	T	0	0	0	0	0	0	0	0	0	31.7
White Rock	24.1	T	1.0	0	0	0	0	0	0	0	0	0	25.1
Mosquito Creek	---	---	---	0.2	0	0	0	0	0	0	0	0.5	---
Hollyburn Ridge	---	---	---	---	T	0	0	0	0	1.1	T	103.3	---
Annacis Island	---	---	---	---	---	---	---	---	---	0	0	1.8	---
Averages in 1954	41.6	1.5	0.5	0.1	0	0	0	0	0	0	0	1.7	45.4

TABLE VI

NORMAL TOTAL PRECIPITATION

	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sep.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Year</u>	<u>No. of Years</u>
<u>Normal Monthly Total Precipitation</u>														
Brockton Point	7.92	6.14	5.87	3.88	2.91	2.29	1.62	1.56	3.10	7.20	7.18	9.74	59.41	25
Buntzen Lake	14.30	11.69	10.11	6.88	5.01	3.62	2.46	2.78	4.98	12.13	12.90	17.22	104.08	27
Birquitlam	8.91	7.12	6.65	4.21	3.41	2.58	1.62	1.83	3.47	7.90	7.83	10.28	65.81	25
Capilano Intake	16.87	13.72	12.71	8.40	5.62	4.20	2.89	2.86	5.91	15.43	16.14	20.77	125.52	27
Coquitlam Lake	16.06	14.53	13.16	9.22	6.51	3.82	2.49	3.23	5.88	14.05	15.61	19.40	123.96	20
Deer Lake	10.82	8.54	7.96	5.44	4.23	3.14	2.07	2.48	4.41	9.56	9.58	13.39	81.62	30
Ladner	4.84	2.72	2.44	1.61	1.35	1.13	0.87	1.12	2.15	3.41	3.82	4.82	30.28	14
New Westminster	7.59	5.90	5.19	3.58	2.78	2.22	1.32	1.60	3.09	6.34	6.51	8.94	55.06	30
Seymour Falls	16.52	14.61	14.01	9.78	6.28	4.53	3.20	2.85	6.35	16.48	16.83	20.97	132.41	23
Steveston	5.10	3.86	3.07	2.29	1.78	1.61	0.93	1.26	2.11	4.27	4.69	6.23	37.20	29
Vancouver Airport	4.73	5.05	3.71	2.63	2.00	1.53	1.19	1.23	1.90	4.86	5.17	6.50	40.50	13
Vancouver City Hall	7.28	5.41	4.82	3.18	2.33	1.85	1.24	1.42	2.69	5.89	5.83	8.30	50.24	27
Vancouver P. M. O.	7.92	6.04	5.25	3.63	2.71	2.13	1.36	1.63	3.15	6.59	6.89	9.53	56.83	30
Hollyburn	8.65	6.89	6.86	4.30	3.42	2.41	1.78	1.95	3.58	8.49	7.93	9.75	66.01	22
White Rock	5.25	4.43	3.86	2.57	2.13	1.93	1.21	1.16	2.28	4.45	4.80	6.12	40.19	22
Average Normals	9.52	7.78	7.04	4.77	3.50	2.60	1.75	1.93	3.67	8.47	8.78	11.46	71.27	

TABLE VII

ACTUAL TOTAL PRECIPITATION

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year	% of Norm.
<u>Monthly Total Precipitation in 1954</u>														
Brockton Point	11.14	7.77	2.50	3.79	2.29	3.01	2.27	4.55	4.35	3.06	15.86	8.81	69.40	117
Buntzen Lake	14.50	17.67	4.27	8.41	3.17	7.24	2.56	4.84	7.46	5.58	26.42	17.03	119.15	114
Burquitlam	11.34	6.96	1.85	4.26	2.05	3.10	1.73	4.38	4.50	3.16	17.26	9.85	70.44	107
Capilano Intake	15.83	16.83	4.69	9.90	3.71	4.99	3.53	3.91	8.40	8.00	25.06	18.33	123.18	98
Coquitlam Lake	22.16	25.28	7.22	12.12	5.30	8.80	5.34	5.03	8.69	9.46	33.54	24.10	167.04	135
Deer Lake	12.23	11.64	3.36	6.16	4.17	4.12	2.61	4.36	5.51	4.93	21.26	13.96	94.31	116
Ladner	6.62	3.36	1.38	1.81	1.54	1.95	0.89	3.08	4.18	1.45	10.96	4.22	41.44	137
New Westminster	11.44	6.91	2.55	4.20	2.47	3.34	2.03	4.99	4.03	2.80	15.24	8.61	68.61	125
Seymour Falls	21.25	21.48	7.10	12.83	3.30	6.34	3.98	3.75	8.84	13.35	35.27	23.38	160.87	121
Steveston	7.19	3.93	1.73	1.90	1.30	2.23	0.94	2.87	1.89	1.89	11.20	4.73	41.80	112
Vancouver Airport	7.13	4.23	1.80	2.12	1.22	2.15	1.03	2.89	1.85	1.96	11.10	5.31	42.79	106
Vancouver City Hall	7.08	4.60	1.82	2.48	1.58	2.57	1.40	3.11	2.72	2.75	14.40	9.03	53.54	107
Vancouver P. M. O.	10.00	8.40	2.58	3.92	2.13	2.79	2.11	4.35	4.45	3.15	16.10	9.39	69.37	122
West Vancouver	10.57	8.58	2.62	3.72	2.75	3.19	1.97	4.14	4.28	3.40	18.51	10.08	73.81	112
White Rock	6.48	4.00	1.41	2.74	1.96	2.66	0.85	2.47	2.47	1.67	11.30	4.19	42.20	105
Averages in 1954	11.66	10.11	3.12	5.36	2.60	3.90	2.22	3.91	4.91	4.44	18.90	11.40	82.53	116
% of Normal	123	130	44	112	74	150	127	203	134	52	215	99	116	

TABLE VIII

WIND SPEEDS AND DIRECTIONS

	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sep.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Year</u>
<u>Monthly Mean Wind Speeds at Vancouver Airport</u>													
Normal	8.1	8.3	8.9	8.6	8.4	8.0	7.6	7.5	7.3	7.6	8.0	8.5	8.1
In 1954	9.4	10.3	7.8	10.1	8.3	8.0	7.5	6.8	6.8	7.4	8.6	9.2	8.3
<u>Percentage of Hours of Wind from each Direction at the Airport</u>													
	N	NE	E	SE	S	SW	W	NW	Calm				
Normal	3	6	33	18	6	6	12	14	2				
In 1954	3	13	34	12	6	9	17	6	▼				
<u>Percentage of Miles of Wind from each Direction at the Airport</u>													
	N	NE	E	SE	S	SW	W	NW					
Normal	1	5	30	19	7	6	13	19					
In 1954	1	11	32	14	7	10	21	4					
<u>Mean Wind Speed from each Direction at the Airport</u>													
	N	NE	E	SE	S	SW	W	NW	All Directions				
Normal	3.7	6.2	7.4	8.4	8.9	7.9	8.9	10.9	8.1				
In 1954	3.6	7.4	7.8	9.7	9.8	8.4	10.6	5.3	8.3				

▼ Less than 1%

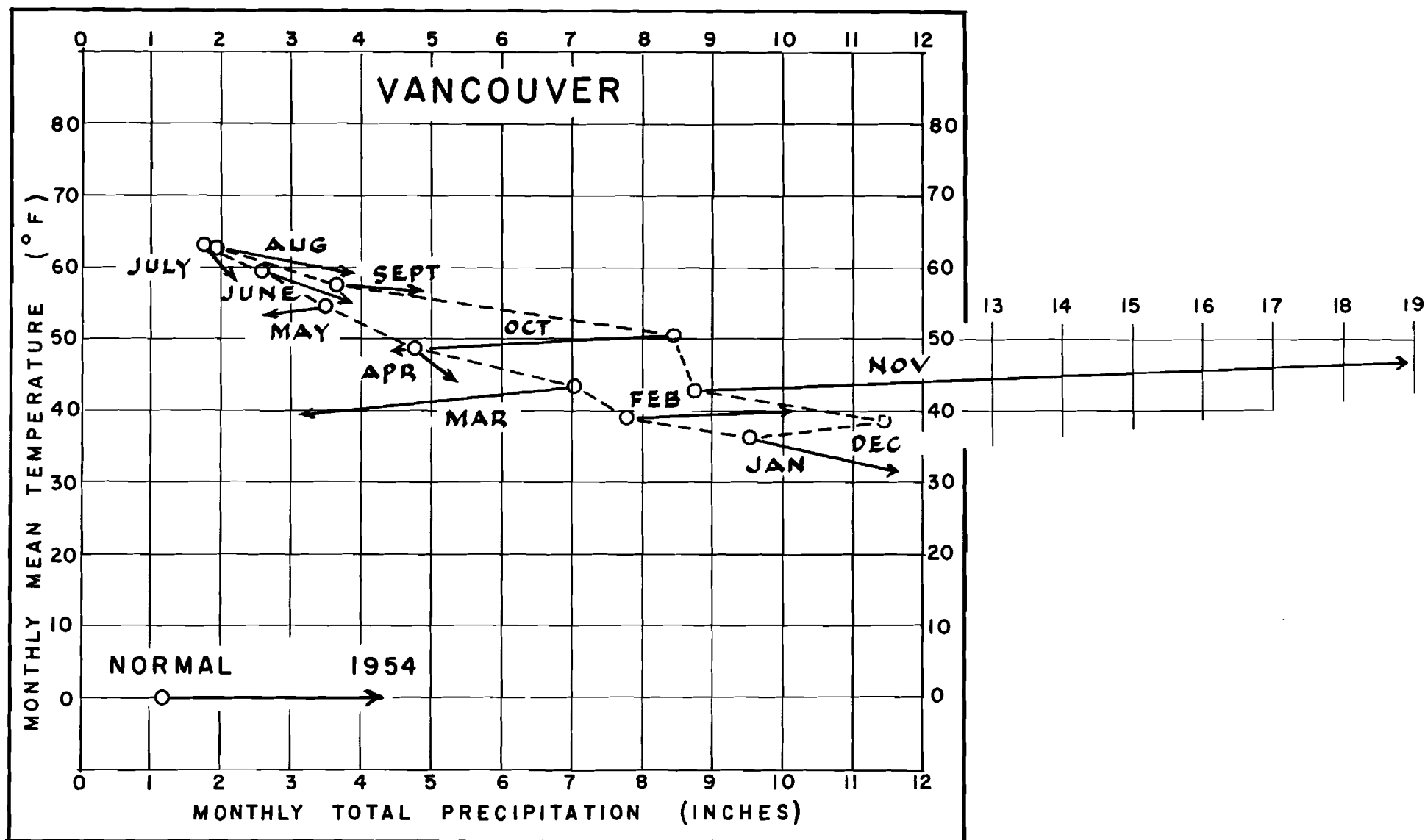


FIGURE 1

**HYTHERGRAPH COMPARING THE 1954 AVERAGE FOR SEVERAL STATIONS
WITH THE AVERAGES OF THE NORMAL VALUES**

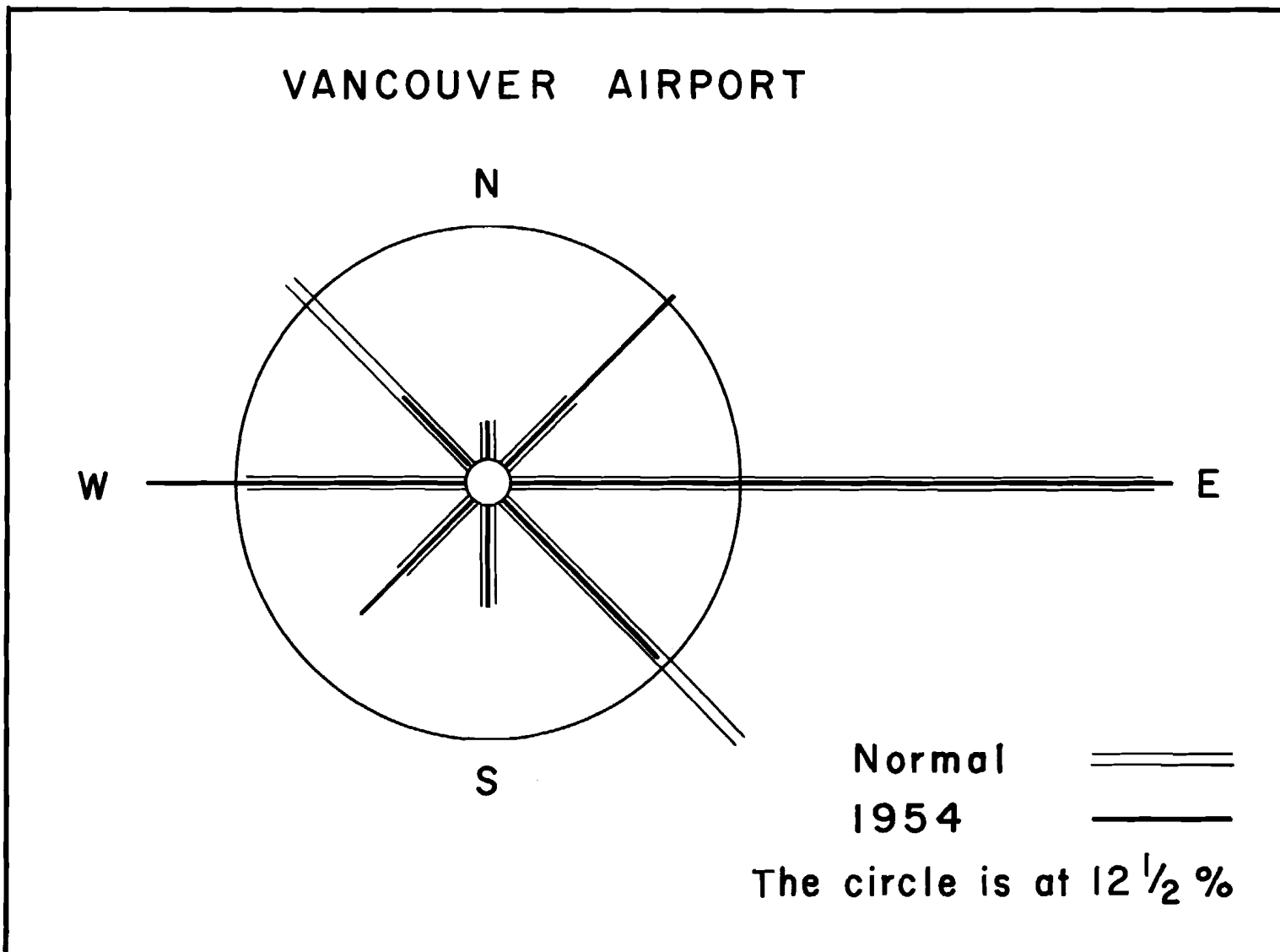


FIGURE 2

PERCENTAGE OF HOURS OF WIND FROM EACH DIRECTION