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NATIONAL RESEARCH COUNCIL  
CANADA

DIVISION OF BUILDING RESEARCH

## LOCAL CLIMATE IN THE OTTAWA REGION: 1954

BY

ANALYZED

D. W. BOYD

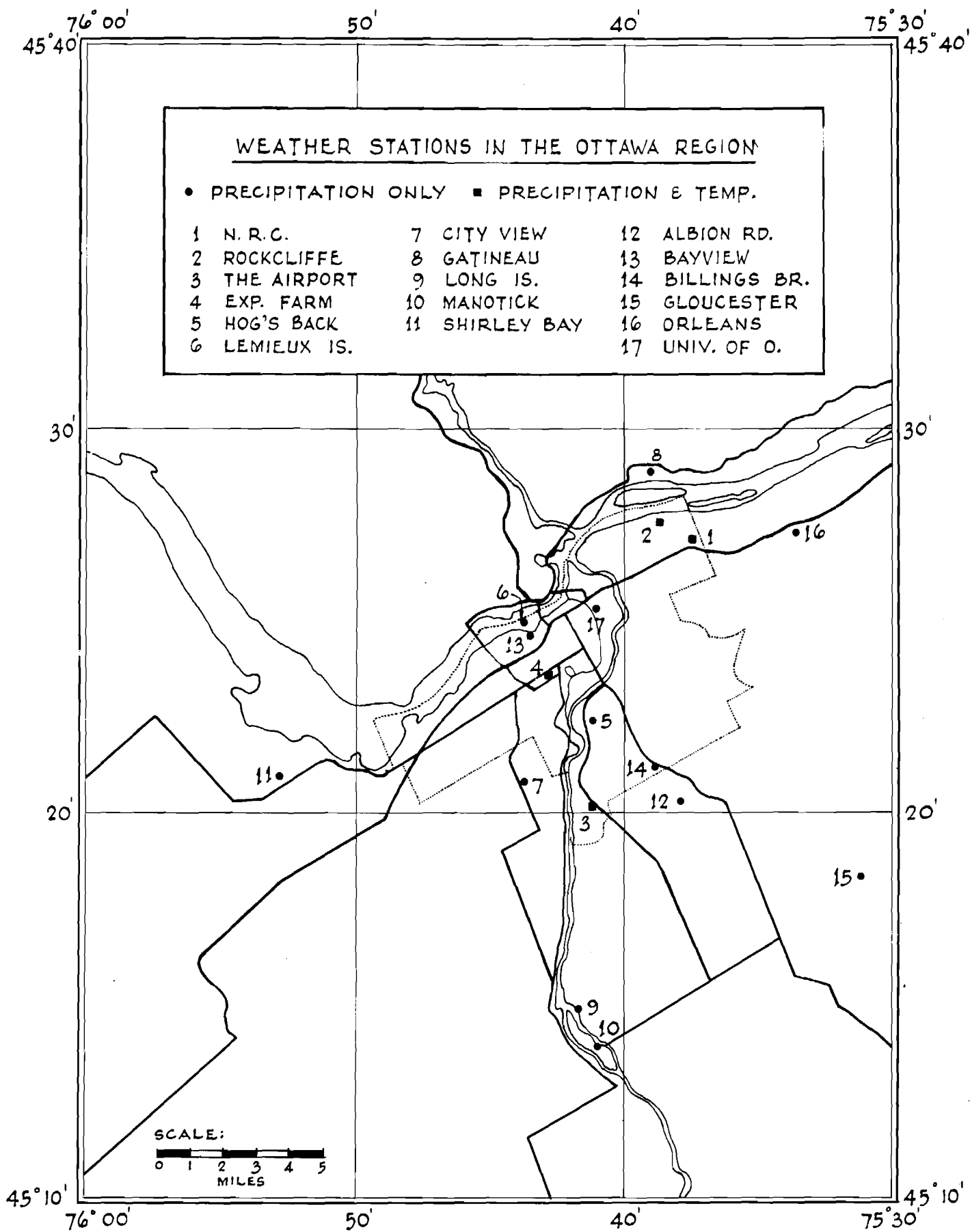
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OTTAWA

JULY 1955

DBR REPORT NO. 70

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NATIONAL RESEARCH COUNCIL  
CANADA

LOCAL CLIMATE IN THE OTTAWA REGION: 1954

by

Donald W. Boyd

ANALYZED

Report No. 70  
of the  
Division of Building Research  
Ottawa

July 1955

## PREFACE

This report is a further record of the detailed studies being made of the climate of the Ottawa region by the Division of Building Research in connection with its over-all investigation of climate in relation to building.

The author, Donald W. Boyd, serves as full-time climatologist to the Division, being seconded to this post from his official position with the Meteorological Division of the Department of Transport by kind permission of Mr. Andrew Thomson, Controller. This very close liaison between the two Divisions is a continuing source of satisfaction to the Division of Building Research.

The Division is most grateful to the volunteer observers in the Ottawa district whose work has made the preparation of this report possible. It is hoped that when they see this record of the consolidated results, they will feel encouraged and realize that their own individual observations are greatly assisting in the development of a clear picture of the climate of the Ottawa region.

Ottawa  
July 1955

R. F. Legget,  
Director.

# LOCAL CLIMATE IN THE OTTAWA REGION: 1954

by

Donald W. Boyd

## INTRODUCTION

In 1954 there were ten weather stations in the Ottawa region that sent reports to the Meteorological Division of the Department of Transport every month. Three of these reported wind, five reported temperatures and nine reported precipitation for each of the twelve months. Seven other stations were in operation for parts of the year but did not report every month.

The locations of all these stations are indicated on the map in Appendix A. Some notes about their names, observers and exposures are contained in this Appendix.

Each part of this report deals with a single weather element and is based on the observations taken at all those stations whose records of that element are complete or nearly complete. It is very difficult to use incomplete records because some estimate must be made for the missing data. One day or one month can not be just "left out" because averaging the remaining data is the same as assuming that the missing value is the same as the average. A better estimate can usually be made. In many cases of missing observations it is the observer himself who is best able to make a good estimate, but too frequently he does not bother. Instead, a clerk at the climatological office carefully averages the remaining observations and unconsciously makes the assumption that the missing day was an "average" one.

During 1953 the Climate Services of the Meteorological Division computed the average monthly temperatures and precipitations for the 30-year period, 1921 to 1950 inclusive, for all the Canadian stations that were reporting throughout this period. These 30-year averages are called

normals. The only station in the Ottawa region with normals for this standard period is the Experimental Farm. In Report 46 (of the Division of Building Research, NRC) for 1953, and in this report for 1954 the observations and the normals for the Farm are compared, to show how the current year differed from normal. In Report S-36 for 1952 the old normal temperatures and precipitations (based on observations from 1872 to 1937 from more than one station) were compared with the averages for 1952 of four stations.

## PART ONE: TEMPERATURE

Four Ottawa stations read and reset maximum and minimum thermometers at least twice a day, at 0730 and 1930 E.S.T., or as close to these times as is practical. The minimum temperature reported for the day is the lower of the two (or the lowest of the four) readings taken on that calendar day. In other words it is the lowest temperature in the 24-hour period ending at the time of the evening observation. The maximum temperature reported for the day is the higher of the readings taken in the evening and the next morning (or the highest of the four readings ending with the one at 0730 E.S.T.). Thus it is the highest temperature in the 24-hour period which does not end until the time of the observation the following morning. At Bayview the actual temperature is read each hour. The minimum temperature is the lowest of the 25 readings beginning and ending at 2000 E.S.T. and the maximum temperature is the highest of the 25 readings beginning and ending at 0800 E.S.T.

### Extreme Temperatures

Temperature reports from all the stations at Ottawa (including some which are now closed but whose observations go back as far as 1872) have been searched, and the highest and lowest temperatures ever reported in each month have been selected. These long term extremes are tabulated in the first and last lines of Table I.

The rest of Table I is based entirely on the daily maximum and minimum temperatures observed in 1954. Four different values are tabulated for each station and for each month. The first and last groups, the monthly maximum and the monthly minimum, are, respectively, the highest of the daily maximum temperatures and the lowest of the daily

minimum temperatures in each month. The second and third groups, the mean daily maximum and the mean daily minimum, are the averages for the month of the daily maximum and minimum temperatures, respectively.

No new long-term monthly maximum or minimum temperature records were set or equalled during 1954. The nearest approach to a long-term maximum record was the 50 degrees reported by Bayview in February and the nearest to a minimum record was the 38 degrees at the Experimental Farm in August. Each of these was four degrees from the corresponding record.

### Mean Temperatures

The mean temperature for a day is often defined as the average of the maximum and minimum. Hence the monthly mean temperatures are the averages of the monthly mean daily maxima and minima. These monthly means are shown in Table II. Since the values for Bayview were obtained in a different way (from hourly readings of an ordinary thermometer instead of from maximum and minimum thermometers), they have not been used in computing the average mean temperatures for the region.

The second section of Table II lists the differences between the mean temperatures for the individual stations and the average mean temperature for the region in 1954. N.R.C. and Rockcliffe reported temperatures above the average in every month but never more than one degree above average. The Experimental Farm and the Airport at Uplands were consistently below the average, with the exception of the Farm in January, and the differences were all less than one degree.

The differences from the average for the whole year for these four stations are listed below, together with the corresponding differences in the two previous years.

	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>Average</u>
N.R.C.	0.3	0.2	0.4	0.3
Rockcliffe	0.5	0.5	0.7	0.6
Airport	-0.5	-0.3	-0.6	-0.5
Exp. Farm	-0.3	-0.3	-0.4	-0.3

In all three years Rockcliffe was the warmest, N.R.C. second, the Experimental Farm third, and the Airport the coldest except in 1953 when it was the same as the Farm. Such consistent values are not likely to be the result of chance: they probably represent real differences in the local climates of these four stations.



The monthly mean temperatures at Bayview are all about three degrees higher than the average of the other four stations. In view of the small differences among the other stations it seems doubtful that these three degrees are entirely due to a difference in the local climate. Part of the differences may be the result of differences in the methods of obtaining the mean temperatures. Bayview is in an urban district; the other stations have suburban or even rural surroundings, and hence somewhat higher temperatures would be expected at Bayview.

The monthly mean temperatures at the Experimental Farm in 1954 are compared with the normal mean temperatures in the last section of Table II. The differences from normal for the Farm will be very close to the differences from normal in other parts of the region because of the relatively constant differences between the mean temperatures at the Farm and at the other stations. The two previous years, 1952 and 1953, were three or four degrees above normal. In 1954 the average was back very close to normal with about half the months warmer than normal and the rest colder. January was cold but February more than made up for it by being 9.5 degrees above normal. The spring months were very close to normal, the summer rather cool and the autumn a little warmer than usual.

#### Daily Temperatures at N.R.C. and Rockcliffe

In the reports for the last two years a detailed study has been made of the daily maximum and minimum temperatures at N.R.C. compared to those at Rockcliffe. The 1953 results and the results of a similar study of the 1954 observations are plotted in Figs. IA and IB. Each plotted point represents the mean value of about 15 readings of the maximum (or minimum) temperature at Rockcliffe and the mean value of the corresponding differences between the maxima (or minima) at N.R.C. and Rockcliffe.

The 1952 study suggested that the rather protected position of the observing station at Rockcliffe resulted in somewhat higher maxima at that station in warm weather and slightly lower minima in cold weather. The concentration of points for both 1953 and 1954 below the zero difference line for maximum temperatures over 55°F in Fig. IA confirms the first suggestion that Rockcliffe maxima are higher than those at N.R.C. in warm weather. The plotted points for minimum temperatures below zero in Fig. IB are too few to be conclusive.

## PART TWO: PRECIPITATION

Measurements of rainfall and snowfall are made two or four times a day at most of the Ottawa stations at the same times as the thermometers are read. The precipitation day is the same as the maximum temperature day. That is, the total precipitation for the day is the sum of all the amounts which fall from 7.30 E.S.T. in the morning until the 7.30 observation on the morning following the day for which they are reported.

### Total Precipitation

Nine stations in the Ottawa region reported rain and snow for every month in the year 1954. The monthly total precipitations (i.e. the depths of snow divided by ten, plus the actual rainfalls) for these stations are tabulated in Table III. Two other stations, that missed only one or two months, were also used in computing an average for the region. The amounts for the missing months had to be estimated. These estimates are not reliable as values of total precipitation for those particular stations in those particular months, but they do lead to more reliable values for the total precipitations for the year and the averages for the region. The available data for six other stations, with less than ten months' records, are also given at the bottom of Table III.

Table IV lists the differences between the total precipitations at the individual stations and the average for the region in 1954. In the reports for 1952 and 1953 it was remarked that the summer precipitation showed more variations from station to station than the winter precipitation. This is not borne out by the differences for 1954. Differences from the average of over an inch occurred in each of February, March, June, September and December. The most consistent precipitation in 1954 was in July and in October. The difficulty of measuring snow accurately may have some bearing on these large differences, and, of course, larger variations would be expected this year because of the greater number of stations.

On the total for the year the two airports (Rockcliffe and Ottawa Airport) head the list with more than three inches above the average for the eleven stations. Shirley Bay is the lowest with four inches below the average. No simple precipitation pattern for the region is suggested by these figures, probably because it is masked by larger random variations.

There are more data, of course, for the first four stations. If the total annual precipitation for these four is

averaged and subtracted from the individual readings, for each of the last three years, the following values are obtained:

	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>Average</u>
N.R.C.	-0.86	-2.66	-2.24	-1.92
Rockcliffe	1.25	1.90	2.33	1.83
Airport	1.19	0.12	2.23	1.18
Exp. Farm	-1.59	0.65	-2.31	-1.08

These are not as consistent as the corresponding temperature differences, but the average differences of almost two inches probably mean that N.R.C. is drier and Rockcliffe wetter than the city as a whole. The average differences of just over an inch at the Experimental Farm and Ottawa Airport may not be significant. They show at least that several years records will be needed to show a consistent pattern for ten or more stations.

The monthly total precipitations at the Experimental Farm in 1954 are compared with the normal total precipitations in the lower section of Table IV. The year as a whole was fairly wet with more than four inches above the normal precipitation. This excess was spread fairly evenly amongst the months of April, August, September, November and December all of which were between one and two inches above normal. March was relatively dry, but perhaps the best remembered month will be the dry July when less than half the normal rainfall occurred.

### Snowfall

During the winter of 1954-55 there was ten stations in the Ottawa region that reported snow every month. Three additional stations had incomplete snowfall records: two were established after the first snowfall, the other one did not report in March or April. The monthly snowfalls and the totals for the winter are shown in Table V, including estimates for the missing reports.

As in the previous winter the snowfall at the two airports was considerably heavier than at most of the stations. It has been suggested that the drifting at such exposed locations may tend to increase the measured snowfall, but this is open to question. It was noted last year that stations far from the Ottawa River had somewhat lighter snowfalls and again this winter the reports from City View, Long Island and Manotick are below the average for all thirteen stations.

The normal monthly and winter snowfall at the Experimental Farm and this winter's differences from normal

are shown at the bottom of Table V. The total snowfall for the winter was only 3.4 inches above normal but much of the snow was concentrated in December and March. However, the 31.3 inches in December was far from being a record: 38.8 inches was reported by the Experimental Farm as recently as December 1942.

### PART THREE: WIND

Three of the Ottawa stations have cup anemometers which record the number of miles of wind in each hour, and the prevailing direction for the hour. The data in Tables VI and VII are all based on these hourly wind speeds and directions.

Table VI shows the percentages of hours and of miles and the mean speeds of the winds from each of the eight directions for the two airports and for N.R.C. In 1954 west winds were the most frequent in Ottawa on the basis of hours or of miles, and northwest winds came second. The differences in frequencies between stations seem to be mostly random. The very frequent west winds at N.R.C. in 1953 were replaced by only very slightly above average frequency in 1954. The very infrequent south winds at Rockcliffe in 1953 were replaced by more than average frequency in 1954.

The wind rose in Fig. 2 shows how the direction frequencies in 1954 at Ottawa Airport differed from the normal, which is based on only seven years records. West and northwest winds were slightly more frequent than normal and southwest winds were less frequent. The other directions were either normal or fairly infrequent.

The mean wind speeds for each direction shown in the last section of Table VI are much more consistent than the frequencies. Winds from the northwest, west and southwest averaged almost 10 m.p.h. in both 1953 and 1954. East winds were almost average at about 8 m.p.h. both years and the rest were relatively light. At Ottawa Airport the strongest average in both years was over 11 m.p.h. from the east.

The mean wind speeds for each month in 1954 with their averages and the differences from the averages are listed in Table VII. As usual, the stronger winds (8.5 m.p.h. and over) occur in the winter and early spring and the lighter winds in the warmer seasons. The differences from the averages are quite similar to those for 1953, except in December when the wind speeds were rather unusual. In the other months N.R.C.

winds were always from 0.5 to 1.5 m.p.h. below the average. The Rockcliffe winds were all less than one m.p.h. below the average and the Airport winds were mostly between 1 and 2 m.p.h. stronger than the average.

### CONCLUSION

Changes in the monthly values of temperature and precipitation can be concisely presented by means of a hythergraph (Fig. 3). The position of each month on the graph is determined by its mean temperature and its total precipitation. The normal values for the Experimental Farm have been plotted in small circles in the last figure and the actual values in 1954 are at the points of the arrows. Thus each arrow indicates by its length and direction the departure of that month from the normal precipitation and temperature. Arrows pointing to the left indicate dry months such as July and March and those to the right indicate wet months. Arrows sloping upwards are warm months such as February. Those sloping downwards like July and September are cool.

It can be seen that the year as a whole was quite wet. The year 1952 was similarly wet but 1953 was drier. From the hythergraph it is also evident that the mean temperature for the year 1954 as a whole was very close to normal, whereas 1952 and 1953 were three or four degrees above normal.

No extreme temperature records were established in 1954. As in previous years the Airport and the Experimental Farm were somewhat cooler on the average than Rockcliffe or N.R.C. The significant difference in local climate which can occur between stations only about a mile apart is illustrated by Fig. 1 A.

No simple pattern of total precipitation is yet apparent from the single year's data for eleven stations nor from three years' data for four stations. However, the snowfall reports for two winters suggest that the snowfall may be somewhat heavier near the Ottawa River.

## APPENDIX A

Weather stations within the limits of a city are generally given the name of the city followed by some other name, in brackets, to indicate the section of the city in which the station is located. In the body of this report the name "Ottawa" and the brackets have been omitted, but the full names are used in the following list. In Meteorological Division publications the name "Airport" is abbreviated to "A".

Ottawa (N.R.C.) is at the Montreal Road Laboratories of the National Research Council. The thermometer screen and rain gauge were moved a few hundred yards in July 1954 from an elevation of 332 feet to 320 feet above sea level. The observations are taken twice a day by personnel of the Division of Building Research.

Rockcliffe (Airport) is only 1.1 miles northwest of the N.R.C. station but it is more than 100 feet lower. The elevation is only 204 feet above sea level. Weather observations are taken every hour by personnel of the R.C.A.F.

Ottawa (Airport) is at Uplands at an elevation of 357 feet above sea level. Weather observations are taken every hour by personnel of the Meteorological Division of the Department of Transport.

Ottawa (Experimental Farm) is at the Central Experimental Farm at an elevation of 260 feet. The observations are taken twice a day by personnel of the Department of Agriculture.

Ottawa (Hog's Back) is at the home of Dr. A.R.G. Elmslie near Riverside Drive.

Ottawa (Lemieux Island) is at the Ottawa Water Purification and Pumping Station. The observations are taken by personnel of the City Water Works Department.

City View is at Borden's Ottawa Dairy Farm on the Merivale Road.

Gatineau is at the mills of the Canadian International Paper Company at Gatineau, Quebec.

Long Island is at the Long Island Locks on the Rideau Canal. The observations are taken by personnel of the Canal Services Branch of the Department of Transport.

Manotick is at the home of Dr. N.L. Nicholson on Long Island.

Shirley Bay is at the Department of Transport Ionosphere Station at Shirley Bay.

Ottawa (Albion Road) is at the Radio Field Station of the National Research Council on the Albion Road. The observations are taken by personnel of the Division of Radio and Electrical Engineering.

Ottawa (Bayview) is on the property of the City of Ottawa Engineering Department on Bayview Road. Observations are taken by the Engineering Department using their own instruments.

Ottawa (Billings Bridge) is at the home of Mr. B. Cornwall on the Metcalfe Road.

Ottawa (University of Ottawa) is at the south end of the University of Ottawa Oval. The Institute of Geography are responsible for the observations.

Gloucester is at H.M.C.S. Gloucester, southeast of Ottawa. The observations are taken by personnel of the Royal Canadian Navy.

Orleans (Vehicle Proving Ground) is at the Proving Ground of the Vehicle Development Branch of the Department of National Defence near the Montreal Road.

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>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Year</u>
<u>Long Term Maximum</u>													
	54	54	80	87	95	98	101	100	102	87	75	61	102
<u>Monthly Maximum in 1954</u>													
N. R. C.	37	45	47	78	80	84	86	89	76	76	59	37	89
Rockcliffe	38	47	47	79	79	85	88	90	77	76	58	37	90
Airport	37	44	46	79	77	85	88	89	78	76	59	36	89
Exp. Farm	37	45	46	77	76	83	86	88	77	76	58	36	88
Bayview	40	50	46	80	82	86	92	92	77	77	60	46	92
Univ. of O.	--	--	--	--	--	--	--	--	--	77	58	36	--
<u>Mean Daily Maximum in 1954</u>													
N. R. C.	15.4	30.9	32.7	51.7	64.4	73.5	76.7	74.7	63.1	57.0	42.0	26.0	
Rockcliffe	15.2	31.1	33.2	52.2	64.5	74.2	77.6	75.4	63.7	57.3	41.8	25.9	
Airport	14.3	29.8	31.9	51.1	63.8	73.2	76.9	74.7	63.2	56.5	41.5	25.4	
Exp. Farm	14.9	30.0	32.2	50.3	63.3	73.0	76.5	74.4	63.3	56.5	41.3	25.5	
Bayview	17.1	33.0	34.6	53.2	66.5	76.3	79.7	77.3	65.8	59.0	43.4	28.1	
Univ. of O.	----	----	----	----	----	----	----	----	----	58.3	42.1	26.1	
<u>Mean Daily Minimum in 1954</u>													
N. R. C.	0.0	15.5	19.1	32.8	44.0	57.0	57.6	55.2	48.8	42.3	31.0	12.7	
Rockcliffe	-0.5	14.6	19.2	32.3	43.8	57.3	58.1	56.1	49.4	42.9	31.6	14.1	
Airport	-1.0	14.5	17.5	31.4	42.4	55.7	55.7	54.0	47.6	40.6	29.8	11.3	
Exp. Farm	-0.3	14.3	18.1	32.1	42.6	56.3	55.7	53.7	48.0	41.1	30.5	11.7	
Bayview	3.2	18.6	22.6	35.8	47.2	60.1	61.6	59.1	51.6	45.6	33.8	16.8	
Univ. of O.	----	----	----	----	----	----	----	----	----	43.1	30.8	15.6	
<u>Monthly Minimum in 1954</u>													
N. R. C.	-20	-20	5	5	32	49	49	42	37	29	17	-7	-20
Rockcliffe	-23	-24	6	4	32	50	48	44	39	31	18	-5	-24
Airport	-21	-21	4	2	30	47	45	43	35	26	17	-7	-21
Exp. Farm	-23	-25	6	3	31	48	45	38	35	27	18	-9	-25
Bayview	-16	-14	7	7	37	50	50	48	40	32	19	-4	-16
Univ. of O.	--	--	--	--	--	--	--	--	--	30	18	-3	--
<u>Long Term Minimum</u>													
	-34	-35	-34	-5	21	33	38	34	24	9	-23	-38	-38



TABLE II  
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>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Year</u>
<u>Mean Temperature in 1954</u>													
N. R. C.	7.7	23.2	25.9	42.3	54.2	65.2	67.2	64.9	56.0	49.6	36.5	19.4	42.7
Rockcliffe	7.4	22.8	26.2	42.2	54.2	65.8	67.8	65.8	56.6	50.1	36.7	20.0	43.0
Airport	6.6	22.2	24.7	41.2	53.1	64.4	66.3	64.4	55.4	48.6	35.6	18.4	41.7
Exp. Farm	7.6	22.2	25.2	41.2	53.0	64.6	66.1	64.0	55.6	48.8	35.9	18.6	41.9
Average	7.3	22.6	25.5	41.7	53.6	65.0	66.8	64.8	55.9	49.3	36.2	19.1	42.3
Bayview	10.2	25.8	28.6	44.5	56.8	68.2	70.6	68.2	58.7	52.3	38.6	22.4	45.4
Univ. of O.	----	----	----	----	----	----	----	----	----	50.7	36.4	20.9	----
<u>Differences from the 1954 Average</u>													
N. R. C	0.4	0.6	0.4	0.6	0.6	0.2	0.4	0.1	0.1	0.3	0.3	0.3	0.4
Rockcliffe	0.1	0.2	0.7	0.5	0.6	0.8	1.0	1.0	0.7	0.8	0.5	0.9	0.7
Airport	-0.7	-0.4	-0.8	-0.5	-0.5	-0.6	-0.5	-0.4	-0.5	-0.7	-0.6	-0.7	-0.6
Exp. Farm	0.3	-0.4	-0.3	-0.5	-0.6	-0.4	-0.7	-0.8	-0.3	-0.5	-0.3	-0.5	-0.4
Bayview	2.9	3.2	3.1	2.8	3.2	3.2	3.8	3.4	2.8	3.0	2.4	3.3	3.1
Univ. of O.	----	----	----	----	----	----	----	----	----	1.4	0.2	1.8	----
<u>Experimental Farm Mean Temperatures</u>													
1954	7.6	22.2	25.2	41.2	53.0	64.6	66.1	64.0	55.6	48.8	35.9	18.6	41.9
Normal	12.0	12.7	25.2	40.5	54.2	64.1	68.6	66.4	58.4	46.1	33.0	17.4	41.6
Diff. fr. Normal	-4.4	9.5	0.0	0.7	-1.2	0.5	-2.5	-2.4	-2.8	2.7	2.9	1.2	0.3

TABLE III  
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>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Year</u>
<u>Total Precipitation in 1954</u>													
N. R. C.	3.34	2.09	2.69	4.42	2.66	3.61	1.59	3.38	4.91	2.45	3.80	4.36	39.30
Rockcliffe	3.18	2.84	2.65	4.95	3.28	4.07	1.81	3.71	5.27	2.78	4.38	4.95	43.87
Airport	3.30	3.34	3.07	4.58	3.23	3.91	1.60	3.72	4.81	2.59	4.33	5.29	43.77
Exp. Farm	2.93	2.45	1.81	4.06	2.94	3.67	1.61	4.09	4.91	2.42	4.13	4.21	39.23
Hog's Back	2.72	2.76	3.52	4.22	2.74	3.55	1.57	3.51	4.89	2.36	4.27	4.08*	40.19
Lemieux Is.	3.34	2.78	2.02	4.97	3.41	3.64	1.31	4.43	4.82	2.45	4.12	4.27	41.56
City View	3.04	3.83	2.58	3.81	2.71	3.48	1.43	4.05	5.03	2.28	3.45	4.00	39.69
Gatineau	2.69	3.10	2.54	4.94	2.91	4.45	1.65	3.61	4.63	2.95	4.37	3.43	41.27
Long Is.	2.15	3.28	2.33	3.66	3.47	4.22	1.63	4.24	5.94	3.02	4.43	3.75	42.12
Manotick	1.96	2.36	2.62	3.62	2.01	5.31	1.70	4.57	5.15	2.68	4.47	3.19	39.64
Shirley Bay	2.55*	1.91	1.24	3.84*	3.00	4.51	2.37	4.49	3.68	2.04	3.09	3.89	36.61
Average	2.84	2.79	2.46	4.28	2.94	4.04	1.66	3.98	4.91	2.55	4.08	4.13	40.66
Albion Rd.	----	----	----	----	3.14	4.52	1.44	3.69	5.21	2.55	4.29	----	
Bayview	----	----	----	5.26*	3.34	4.25	1.33	4.55	6.31	2.81	4.52*	----	
Billings Br.	2.52*	----	1.92	4.49	3.48	4.60	1.56	3.63	5.06*	2.48	----	----	
Univ. of O.	----	----	----	----	----	----	----	----	----	2.87	3.50	3.65	
Gloucester	----	----	----	----	----	3.68	1.46	4.62	4.48	2.52	4.05	4.30	
Orleans	4.23	1.98	0.73	2.95	2.90	4.07	1.39	2.42	----	----	----	----	

\* estimated or partly estimated

- no report or incomplete

TABLE IV

PRECIPITATION DIFFERENCES

	<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>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Year</u>
<u>Difference from the 1954 Average</u>													
N. R. C.	.50	-.70	.23	.14	-.28	-.43	-.07	-.60	0	-.10	-.28	.23	-1.36
Rockcliffe	.34	.05	.19	.67	.34	.03	.15	-.27	.36	.23	.30	.82	3.21
Airport	.46	.55	.61	.30	.29	-.13	-.06	-.26	-.10	.04	.25	1.16	3.11
Exp. Farm	.09	-.34	-.65	-.22	0	-.37	-.05	.11	0	-.13	.05	.08	-1.43
Hog's Back	-.12	-.03	1.06	-.06	-.20	-.49	-.09	-.47	-.02	-.19	.19	-.05*	-0.47
Lemieux Is.	.50	-.01	-.44	.69	.47	-.40	-.35	.45	-.09	-.10	.04	.14	0.90
City View	.20	1.04	.12	-.47	-.23	-.56	-.23	.07	.12	-.27	-.63	-.13	-0.97
Gatineau	-.15	.31	.08	.66	-.03	.41	-.01	-.37	-.28	.40	.29	-.70	0.61
Long Is.	-.69	.49	-.13	-.62	.53	.18	-.03	.26	1.03	.47	.35	-.38	1.46
Manotick	-.88	-.43	.16	-.66	-.93	1.27	.04	.59	.24	.13	.39	-.94	-1.02
Shirley Bay	-.29*	-.88	-1.22	-.44*	.06	.47	.71	.51	-1.23	-.51	-.99	-.24	-4.05
Albion Rd.	--	--	--	--	.20	.48	-.22	-.29	.30	0	.21	--	--
Bayview	--	--	--	.98*	.40	.21	-.33	.57	1.40	.26	.44*	--	--
Billings Br.	-.32*	--	-.54	.21	.54	.56	-.10	-.35	.15*	-.07	--	--	--
Univ. of O.	--	--	--	--	--	--	--	--	--	.32	-.58	-.48	--
Gloucester	--	--	--	--	--	-.36	-.20	.64	-.43	-.03	-.03	.17	--
Orleans	1.39	-.81	-1.73	-1.33	-.04	.03	-.27	-1.56	--	--	--	--	--

Experimental Farm Total Precipitations

1954	2.93	2.45	1.81	4.06	2.94	3.67	1.61	4.09	4.91	2.42	4.13	4.21	39.23
Normal	2.67	2.20	2.81	2.62	2.84	3.43	3.53	2.97	3.12	2.70	2.97	3.03	34.89
Diff. fr. Normal	0.26	0.25	-1.00	1.44	0.10	0.24	-1.92	1.12	1.79	-0.28	1.16	1.18	4.34

\* estimated or partly estimated

- no report or incomplete

TABLE V

SNOWFALL

	1954			1955				Winter
	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>Total</u>
<u>Snowfall in 1954-55</u>								
N. R. C.	0	2.0	41.3	11.1	14.4	17.1	T	85.9
Rockcliffe	0	2.8	41.6	16.1	18.5	28.8	T	107.8
Airport	0	9.8	40.0	14.0	15.8	28.4	0.1	108.1
Exp. Farm	0	0.5	31.3	14.8	15.2	22.1	0	83.9
Lemieux Is.	0	0.2	37.5	11.5	16.8	22.6	0	88.6
City View	0	1.0	25.0	12.2	12.7	28.0	0	78.9
Gatineau	0	0.5	34.0	23.0	20.3	26.5	0	104.3
Long Is.	0	1.0	24.5	10.0	12.5	12.2	0	60.2
Manotick	0	2.7	30.0	12.8	16.5	20.4	T	82.4
Shirley Bay	0	0.5	36.5	11.2	14.6	22.0	T	84.8
Univ. of O.	0	0.2	31.5	13.4	13.4	20.3*	T*	78.8
La Salle	0	2.1*	42.7	11.8	13.5	17.5	T	87.6
Beckwith	0	2.6*	42.5*	16.3	18.8	29.9	0.1	110.2
Average	0	2.0	35.3	13.7	15.6	22.7	T	89.3
<u>Experimental Farm Snowfalls</u>								
1954-55	0	0.5	31.3	14.8	15.2	22.1	0	83.9
Normal	0.6	7.1	18.0	18.7	16.9	14.4	4.8	80.5
Diff. from Normal	-0.6	-6.6	13.3	-3.9	-1.7	7.7	-4.8	3.4

T: Trace of less than 0.1

\*: Estimated

TABLE VI

WIND DIRECTIONS

	<u>N</u>	<u>NE</u>	<u>E</u>	<u>SE</u>	<u>S</u>	<u>SW</u>	<u>W</u>	<u>NW</u>	<u>CAIM</u>
<u>Percentage of Hours of Wind from each Direction in 1954</u>									
N. R. C.	9	8	18	7	9	13	21	15	*
Rockcliffe	9	14	15	3	17	6	20	15	1
Airport	6	10	15	7	11	12	18	21	*
Average	8	11	16	6	12	10	20	17	*
<u>Percentage of Miles of Wind from each Direction in 1954</u>									
N. R. C.	8	8	16	5	6	13	24	20	
Rockcliffe	9	13	11	2	15	7	23	20	
Airport	4	10	17	6	11	13	18	21	
Average	7	10	15	4	11	11	22	20	
<u>Mean Wind Speed from each Direction in 1954</u>									
N. R. C.	7.0	7.3	7.0	6.3	5.3	7.9	8.5	10.3	
Rockcliffe	7.9	7.2	6.0	5.1	7.2	10.5	9.7	10.9	
Airport	7.4	9.3	11.5	9.1	9.7	10.8	9.8	10.0	
Average	7.4	7.9	8.2	6.8	7.4	9.7	9.3	10.4	

\* Less than 1%

TABLE VII

WIND SPEEDS

Jan. Feb. Mar. Apr. May June July Aug. Sep. Oct. Nov. Dec. Year

Mean Wind Speed in 1954

N. R. C.	7.3	7.2	8.9	8.8	7.6	7.1	6.7	7.1	7.4	7.7	8.3	9.1	7.7
Rockcliffe	8.3	8.0	10.2	8.9	7.8	7.4	7.2	7.7	8.0	7.4	8.5	8.6	8.2
Airport	9.9	10.7	12.0	11.3	9.4	9.5	8.3	9.1	9.8	9.6	10.4	9.3	9.9
Average	8.5	8.6	10.4	9.7	8.3	8.0	7.4	8.0	8.4	8.2	9.1	9.0	8.6

Differences from the 1954 Average

N. R. C.	-1.2	-1.4	-1.5	-0.9	-0.7	-0.9	-0.7	-0.9	-1.0	-0.5	-0.8	0.1	-0.9
Rockcliffe	-0.2	-0.6	-0.2	-0.8	-0.5	-0.6	-0.2	-0.3	-0.4	-0.8	-0.6	-0.4	-0.4
Airport	1.4	2.1	1.6	1.6	1.1	1.5	0.9	1.1	1.4	1.4	1.3	0.3	1.3

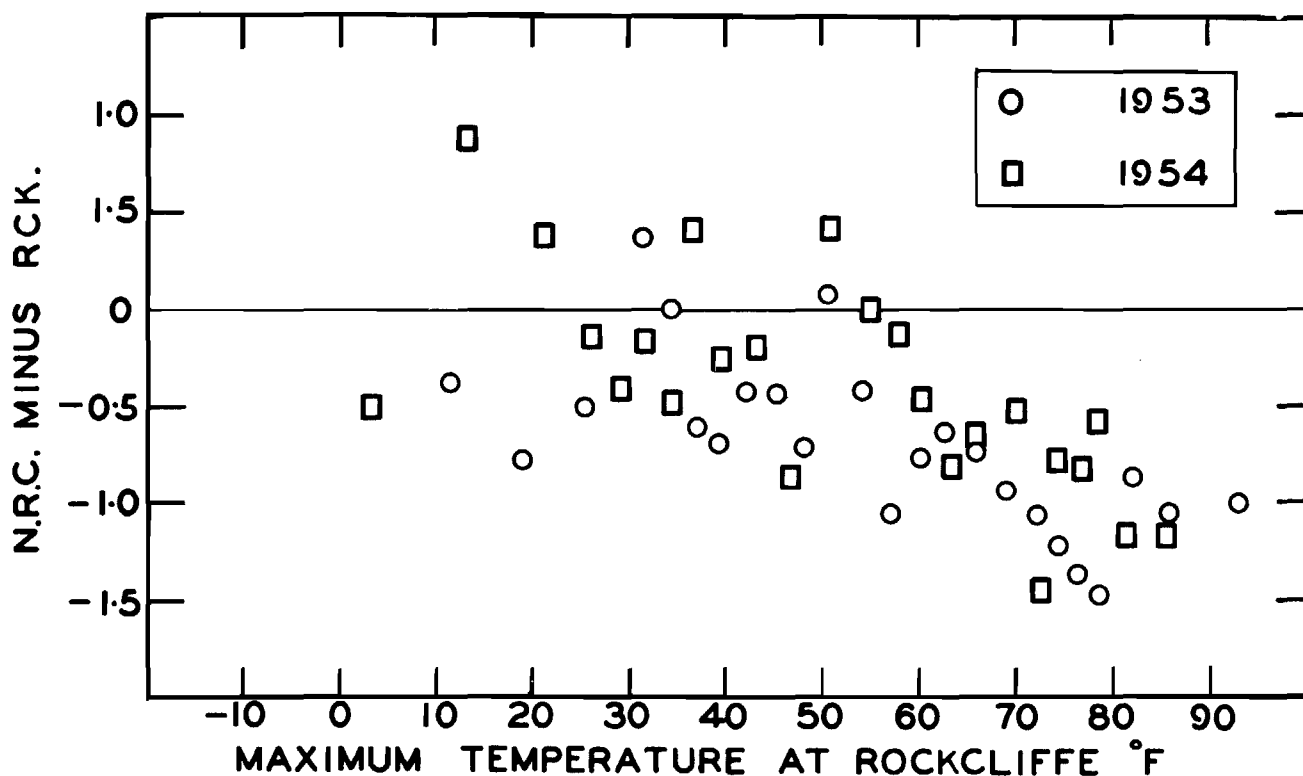


FIGURE 1A

DIFFERENCES OF MAXIMUM TEMPERATURES

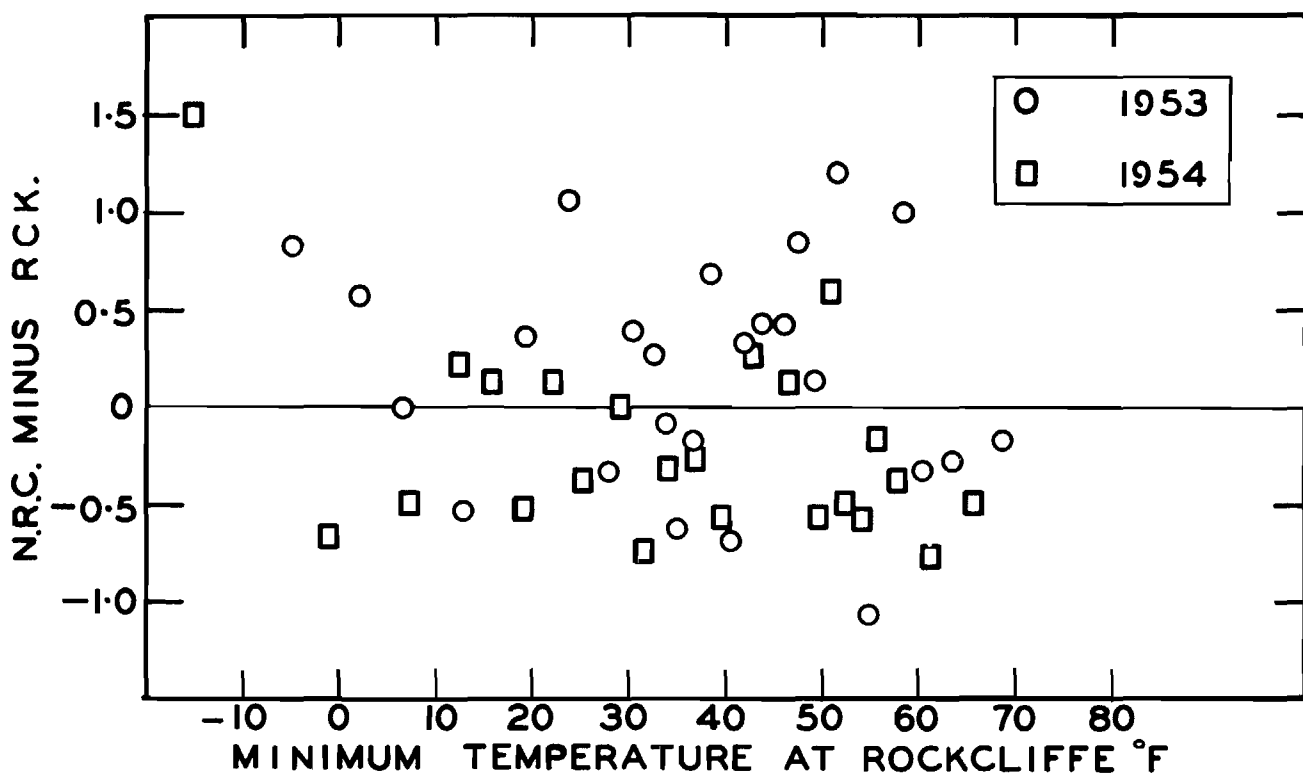


FIGURE 1B

DIFFERENCES OF MINIMUM TEMPERATURES

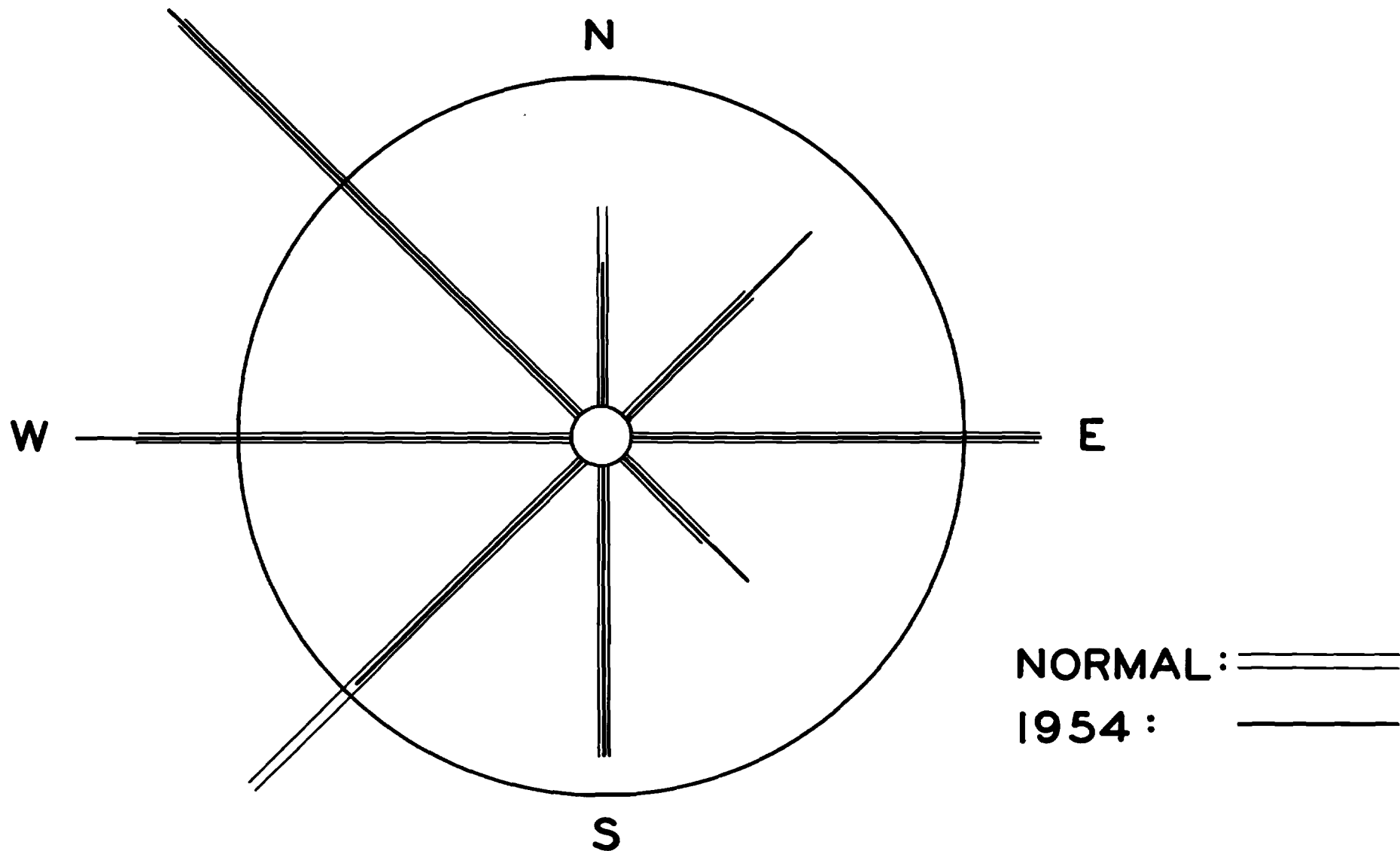
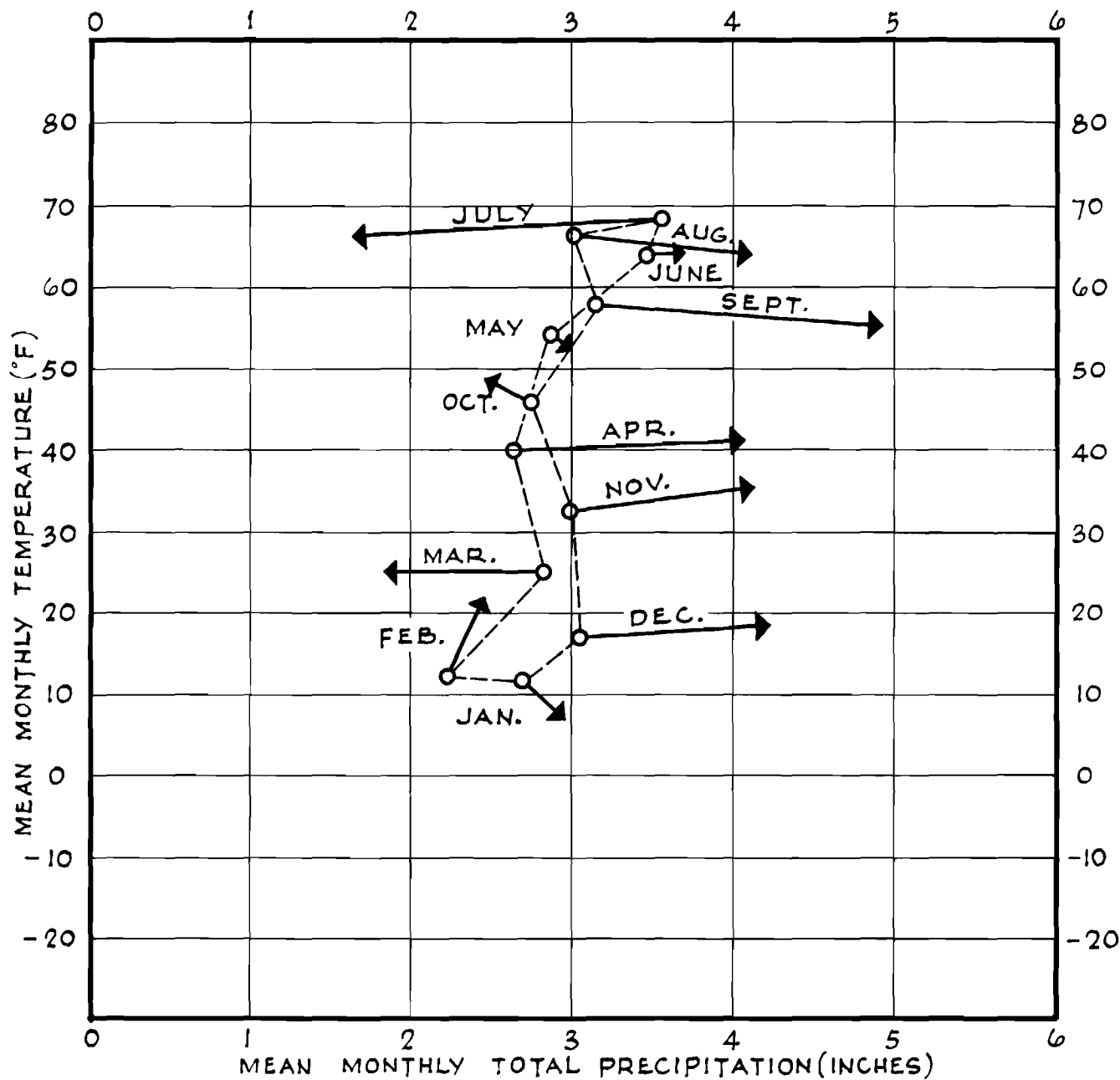


FIGURE: 2 PERCENTAGE OF WIND FROM  
EACH DIRECTION AT OTTAWA AIRPORT.



**FIGURE 3**

**HYTHERGRAPH FOR OTTAWA, EXP. FARM**

1954 COMPARED TO AVERAGE FOR 1921-1950

NORMAL      1954

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