AN ANALYSIS OF TEMPERATURE, LAPSE RATE,

AND

WIND IN THE LOWER 810' NEAR WINNIPEG

VOLUME II

by

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(For table of contents - see volume I)

TABLE 2.1

Analysed observations of Air Temperature in the Lower Atmosphere extending over at least one year.

(modified from Geiger, 1965)

Highest Levels Metres	Intermediate Levels Metres	Author	Place of Measurement	Period Analysed (Years)
265.0	177, 89, 6	Munn(I.J.C.1960)	Detroit,USA	2
150.0	51, 21	Baker et al(1969)	Minneapolis, U.S.A.	5
106.7	47, 15, 1	Best et al(1952)	Rye, England	3
87.7	57, 30, 12, 1	Johnson & Heywood (1935)	Leafield, England	5
76.0	Variable	Rink (1963)	Lindenberg, Germany	1
70.0	28, 13, 2	Frankenberger (1955)	Quickborn, Germany	1
61.0	46, 16, 1	Flower (1937)	Ismailia, Egypt	1
47.5	17, 1	Mal et al(1942)	Karachi, Pakistan	1
17.1	7, 1	Johnson (1929)	Porton, England	3

Table 2.2

Canadian Micrometeorological Tower Temperature Summary

VERTICAL TEMPERATURE DIFFERENCE BETWEEN 160 AND 20 FT — UNITS 0.1 DEGS F

TORONTO MET RES STN — TIME ZONE EST — NOVEMBER 1971

HOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MEAN
DAY 01	3	1-	0	2	6	16	25	20	0	8-	5-	5-	9-	8-	11-	7-	4-	1-	21	36	33	32	39	25	8
02	20	6	7	3-	4-	5-	2-	2	1-	1-	4-	10-	9-	9-	8-	4-	4-	2-	4-	4-	1	4	3-	1-	2-
03	2	1-	2-	4	13	10	8	14	3-	8-	9-	12-	11-	14-	13-	10-	7-	1	14	6	13	8	10	16	1
04	12	8	10	12	3	2	4	5	4-	10-	11-	10-	12-	15-	12-	9-	8-	2-	4-	8	7	11	7	15	0
05	11	6	20	19	23	32	54	40	10	5-	9-	15-	16-	13-	11-	8-	3-	0	2	4	5	7	12	2	7
06	2	1	4	7	5	4	0	1	3-	4-	6-	11-	6-	4-	7-	6-	6-	6-	6-	6-	6-	4-	1	2	2-
07	4	2-	2-	0	3-	3-	1-	2-	7-	11-	12-	11-	14-	15-	14-	10-	6-	2-	0	8	4	2	2	2	4-
08	4	8	5	10	4	6-	6-	4-	5-	10-	12-	9-	10-	9-	9-	7-	6-	3-	7	8	22	28	30	32	3
09	32	33	5	6	19	15	20	20	1-	4-	4-	7-	4-	4-	4-	4-	0	2-	3-	4-	4-	4-	3-	4-	4
10	3-	2-	4-	0	4	8	0	0	1	3	1-	7-	11-	12-	10-	7-	5-	4-	4-	4-	3-	4	1	0	2-
11	8	4	1	2	2-	1-	3-	4-	4-	8-	10-	10-	8-	9-	9-	8-	6-	3-	3-	3-	1-	0	1-	6	3-
12	2	2	4-	1-	0	2	11	9	8	6-	8-	12-	10-	9-	9-	7-	4-	0	6	5	12	6	10	14	1
13	0	12	12	8	11	10	9	8	8	6-	7-	6-	6-	8-	9-	7-	7-	6-	7-	6-	4-	4-	2-	4-	0-
14	5-	7-	8-	8-	8-	8-	8-	8-	8-	9-	10-	11-	10-	10-	10-	8-	8-	6-	4-	6-	6-	4-	5-	4-	7-
15	4-	6-	5-	5-	4-	4-	4-	3-	4-	4-	6-	5-	4-	3-	5-	5-	6-	6-	1-	8	16	8	3	5-	2-
16	0	3	2-	0	2-	2-	2-	4-	6-	8-	8-	9-	8-	7-	6-	6-	5-	2-	0	3-	5-	6-	6-	5-	4-
17	4-	4	1	4	4	4	2-	1	4-	11-	10-	15-	10-	9-	10-	8-	6-	2	7	12	22	31	42	42	4
18	55	61	54	32	22	15	28	28	24	6	2-	19	0	9-	8-	6-	0	3	11	6	13	18	5	6	16
19	1	4	4	2	2	2	2-	3-	2-	12-	3-	6-	7-	8-	6-	6-	6-	3-	3-	3-	4-	1-	5-	5-	3-
20	2-	6-	2-	3-	5-	3-	1	7	3-	8-	7-	9-	9-	8-	9-	7-	8-	4	5	7	8	6	4	3	2-
21	6	10	10	15	8	16	6	8	1-	2-	4-	4-	12-	11-	10-	9-	8-	6-	6-	6-	6-	6-	7-	6-	1-
22	6-	7-	6-	6-	6-	6-	5-	5-	7-	9-	16-	18-	19-	18-	19-	14-	7-	2	5	5	9	13	12	23	4-
23	33	24	18	24	43	36	33	41	40	13-	17-	19-	21-	20-	16-	12-	5-	0	4	3	1	3	6	3-	8
24	5-	0	7-	8-	6-	8-	7-	7-	7-	9-	11-	11-	11-	13-	10-	9-	6-	2-	4-	4-	4-	6-	6-	3-	7-
25	8	2	14	20	27	15	1	6	5	8-	7-	13-	13-	10-	14-	10-	4-	7	8	16	4	2	9	10	3
26	8	3	6	3	1-	3	10	7	4	5-	8-	9-	10-	11-	9-	6-	0	3	2	2	6	10	5	1	1
27	2	0	3	0	2-	2-	4-	2-	2	2-	6-	5-	5-	7-	7-	7-	6-	6-	4-	4-	2-	0	2	3	2-
28	4	1	7	4	1-	2-	0	2-	4-	5-	5-	9-	9-	8-	8-	7-	6-	2-	3-	2-	3	3	1-	4-	2-
29	4-	4-	4-	4-	5-	6-	7-	7-	6-	6-	8-	6-	3-	6-	6-	6-	4-	3-	6-	6-	6-	6-	6-	6-	5-
30	5-	4-	3-	2-	4-	5-	5-	5-	4-	6-	8-	10-	10-	12-	10-	6-	0	1	1-	4	6	8	11	6	3-
MEAN	6	5	4	4	5	4	5	5	1	6-	8-	9-	10-	10-	10-	8-	5-	1-	1	3	4	5	6	5	0

NEGATIVE SIGN PRINTS TO RIGHT OF VALUE
UNSIGNED VALUE = INVERSION

M = MISSING DATA

TAB 145 (TEMP)

Table 2.3

Canadian Micrometeorological Tower Wind Summary

WIND AT 150 FT — DIRECTION CODE LISTED BELOW — SPEED IN MPH

PRIMROSE LAKE DND — TIME ZONE MST — NOVEMBER 1971

HOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MEAN
DAY 01	M	M	M	M	M	M	M	M	M	M	M	M	M	M	711	716	718	720	720	719	724	819	820	818	19
02	822	817	818	824	822	820	819	821	824	826	820	814	817	821	819	820	816	815	816	817	817	816	115	211	19
03	211	209	213	314	314	311	214	209	308	404	403	404	404	407	407	410	410	411	415	411	414	411	412	411	10
04	312	314	212	215	219	220	223	222	227	124	127	126	120	122	119	126	124	122	122	119	122	119	120	118	21
05	815	115	113	816	816	815	820	817	824	822	125	817	820	116	123	820	820	816	816	112	815	115	116	114	17
06	112	115	109	113	113	112	808	806	804	804	607	608	608	608	609	612	612	514	517	520	519	518	518	518	12
07	515	516	515	517	515	518	515	516	516	516	514	513	516	416	415	514	513	413	510	511	509	610	610	710	14
08	610	714	716	618	719	620	722	722	721	618	718	615	612	612	612	613	616	618	616	613	612	610	608	606	15
09	704	611	303	409	514	515	513	408	416	414	515	513	510	408	504	405	307	410	411	413	513	415	414	520	11
10	420	412	420	517	521	524	623	622	721	720	715	712	717	820	715	712	716	712	713	714	716	814	710	810	17
11	112	604	714	714	714	712	815	810	809	704	608	610	605	606	610	608	508	900	507	513	517	412	516	517	10
12	514	514	513	513	510	507	606	404	410	412	507	506	608	508	608	705	606	609	608	711	712	711	708	710	9
13	708	705	610	707	604	503	505	302	504	508	408	404	408	307	408	406	508	409	408	403	404	406	409	406	6
14	408	510	510	509	510	610	610	610	610	709	710	707	713	715	710	711	711	812	818	815	816	817	819	814	12
15	814	816	815	812	815	812	814	812	809	810	808	812	812	812	807	808	807	708	709	712	712	613	615	617	12
16	615	514	513	514	518	518	519	519	517	515	512	514	610	613	610	612	611	612	610	609	711	812	811	812	13
17	810	812	813	114	114	114	114	112	115	809	110	812	113	106	805	808	806	806	806	806	704	705	707	711	10
18	712	613	612	613	616	612	612	613	613	616	615	613	616	615	618	622	523	525	625	618	717	716	814	713	16
19	716	719	718	722	820	822	817	822	821	816	812	815	111	110	807	810	105	110	204	306	306	306	202	704	13
20	106	208	306	210	308	204	302	102	105	102	702	702	610	610	611	611	609	612	716	717	717	716	716	614	9
21	612	612	614	517	518	518	519	520	518	521	520	520	522	522	523	524	524	524	522	516	502	406	507	709	17
22	718	722	720	818	817	716	717	717	716	820	822	822	826	827	826	8 M	8 M	8 M	8 M	8 M	8 M	822	833	825	21
23	825	822	822	820	116	120	815	816	116	122	122	119	120	116	111	112	115	216	220	220	314	311	313	314	17
24	314	315	311	3 M	3 M	3 M	3 M	3 M	3 M	4 M	3 M	4 M	406	308	405	407	408	408	410	409	410	408	407	306	9
25	307	308	307	408	409	409	307	407	307	307	307	405	304	303	303	306	309	309	313	411	411	410	410	510	8
26	510	409	509	506	509	510	512	410	406	409	407	405	408	410	408	407	408	411	414	415	414	414	416	415	10
27	310	309	309	308	307	307	310	309	406	405	505	506	406	507	406	408	409	510	511	510	512	512	511	512	9
28	510	511	511	511	510	512	510	510	511	510	510	511	510	508	508	508	508	509	510	509	510	508	508	506	10
29	507	508	509	508	507	506	507	507	507	506	507	508	508	506	505	506	505	604	604	704	704	705	705	705	6
30	706	704	704	707	705	605	705	604	604	606	606	606	606	606	607	607	607	608	608	708	708	709	708	708	6
MEAN	12	12	12	13	14	13	13	12	13	13	12	11	12	12	11	12	12	12	13	12	12	12	13	12	12

WIND DIRECTION CODED ON LEFT AS: N 1, NE 2, E 3, SE 4, S 5, SW 6, W 7, NW 8, CALM 9

M = MISSING DATA
M ON RIGHT = +100 MPH

TAB 145 (WIND)

Table 2.4

Canadian Micrometeorological Tower Wind and Temperature

Summary

TORONTO MET RES STN — WIND AND INVERSION FREQUENCY DATA — NOVEMBER 1971

	0 - 4 MPH									5 - 9 MPH								OVER 9 MPH								
	N	NE	E	SE	S	SW	W	NW	C	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	TOTAL
00-05 EST																										
ALL CASES	1		3	1		2	4	1	1	1	5	14	1	3	16	14	15	4	14	20	3	7	23	15	12	180
INVERSIONS	1		3			2	4	1	1	1	5	14	1	3	10	11	13		1	6	2	7	16	8	2	112
LARGE INVS						1						1	1													3
06-11 EST																										
ALL CASES		4	3	1		3	2	5		3	1	11	8	4	9	5	15	1	12	16	6	12	23	7	24	175
INVERSIONS		2	1					3		1	1	4	2	2	8	2	3			6	1	2	6		2	46
LARGE INVS																				1						1
12-17 EST																										
ALL CASES	1	1	2	3	5	1		1	1	2	1	13	11	3	5	7	7		4	8	19	8	9	33	25	170
INVERSIONS												1	2		2	2					4	1		1	3	16
LARGE INVS																										
18-23 EST																										
ALL CASES	1			2	3	3	1			2	15	11	2	12	11	17	6	10	9	13	9	7	15	12	19	180
INVERSIONS	1			1		2	1			2	8	7	1	6	10	17	5	5	1	5	9	4	4	7	10	106
LARGE INVS																										
TOTALS																										
ALL CASES	3	5	8	7	8	9	7	7	2	8	22	49	22	22	41	43	43	15	39	57	37	34	70	67	80	705
INVERSIONS	2	2	4	1		4	5	4	1	4	14	26	6	11	30	32	21	5	2	17	16	14	26	16	17	280
LARGE INVS						1						1	1							1						4

LAPSE RATE CATEGORIES ARE THOSE OF THE 160' TO 20' LAYER — WINDS ARE FOR THE 160' LEVEL — IAB 141

INVERSIONS INCLUDE ISOTHERMALS

LARGE INVERSIONS ARE THOSE GREATER THAN 5 DEGREES F

Table 2.5 Canadian Micrometeorological Towers.

Location	Exposure	Levels of Instrumentation, metres
Vancouver	Top of Bridge	80
Calgary	Urban	5, 60, 90
Edmonton	Urban	
Primrose Lake	Hilly Rural	45
Whiteshell	Rural	6, 25, 60
Winnipeg C.B.C.	Rural	10, 62, 124, 186, 250
Chalk River	Rural Valley	60
Hamilton	Urban	60
Ottawa	Suburban	6, 60
Sarnia(Courtright)	Rural	90
Sarnia (ORF)	Rural	6, 60
Toronto C.B.C.	Urban	
Toronto (Met. Res)	Rural	6,60
Toronto (Mimico)	Suburban	10, 90
Windsor	Rural	30
Montreal (Bot.Gdn)	Suburban	6, 60
Montreal C.B.C.	Top of Mt. Royal	
Glace Bay	Rural	10,52,72,105

TABLE 3.1

Percentage Frequencies of Air Masses affecting Winnipeg in July.

(After Bryson, Method 1)

Air Mass	% Frequency
Pacific Air	45
U.S. Air (mainly Pacific)	32
Arctic	12
Hudson's Bay	4
Total	93%

TABLE 3.2

Percentage Frequencies of Air Masses affecting Winnipeg in July.

(After Bryson-Scheme 2)

Air Mass	% Frequency	Trajectory
N. Rockies Pacific	39	Crosses Rockies in Montana & through Wyoming gap.
Canadian Rockies Pacific	24	Crosses Rockies into Alberta, especially Edmonton-Calgary area.
Yukon Pacific	15	Crosses Cordillera through the Liard Gap.
Maritime Tropical	15	North from Gulf of Mexico.
Eastern Arctic	6	Develops over Canadian Arctic Archipelago.
Total	99%	

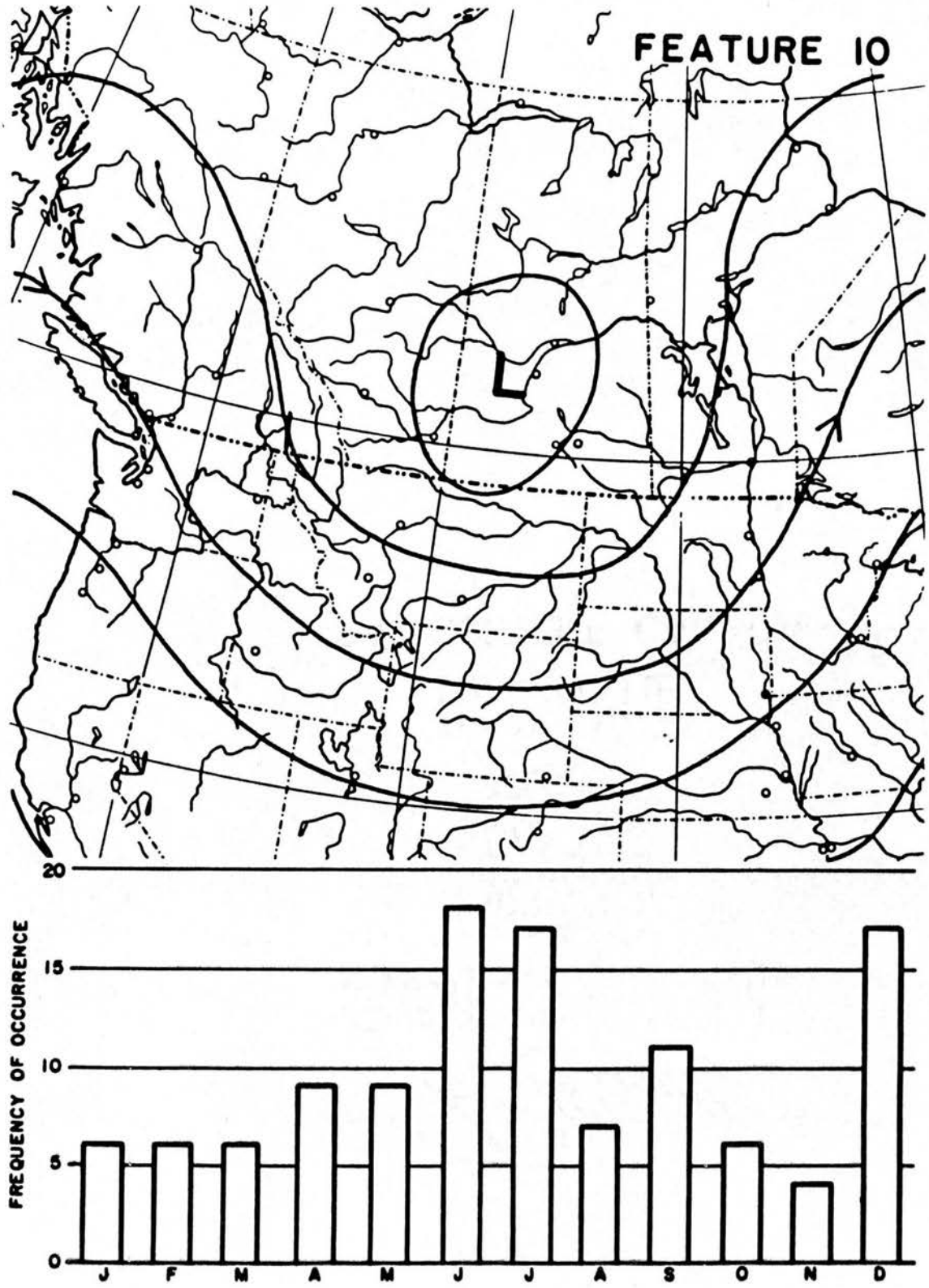


Figure 3.1

Prairie Provinces - Western Ontairio Low

(from Sands, 1966)

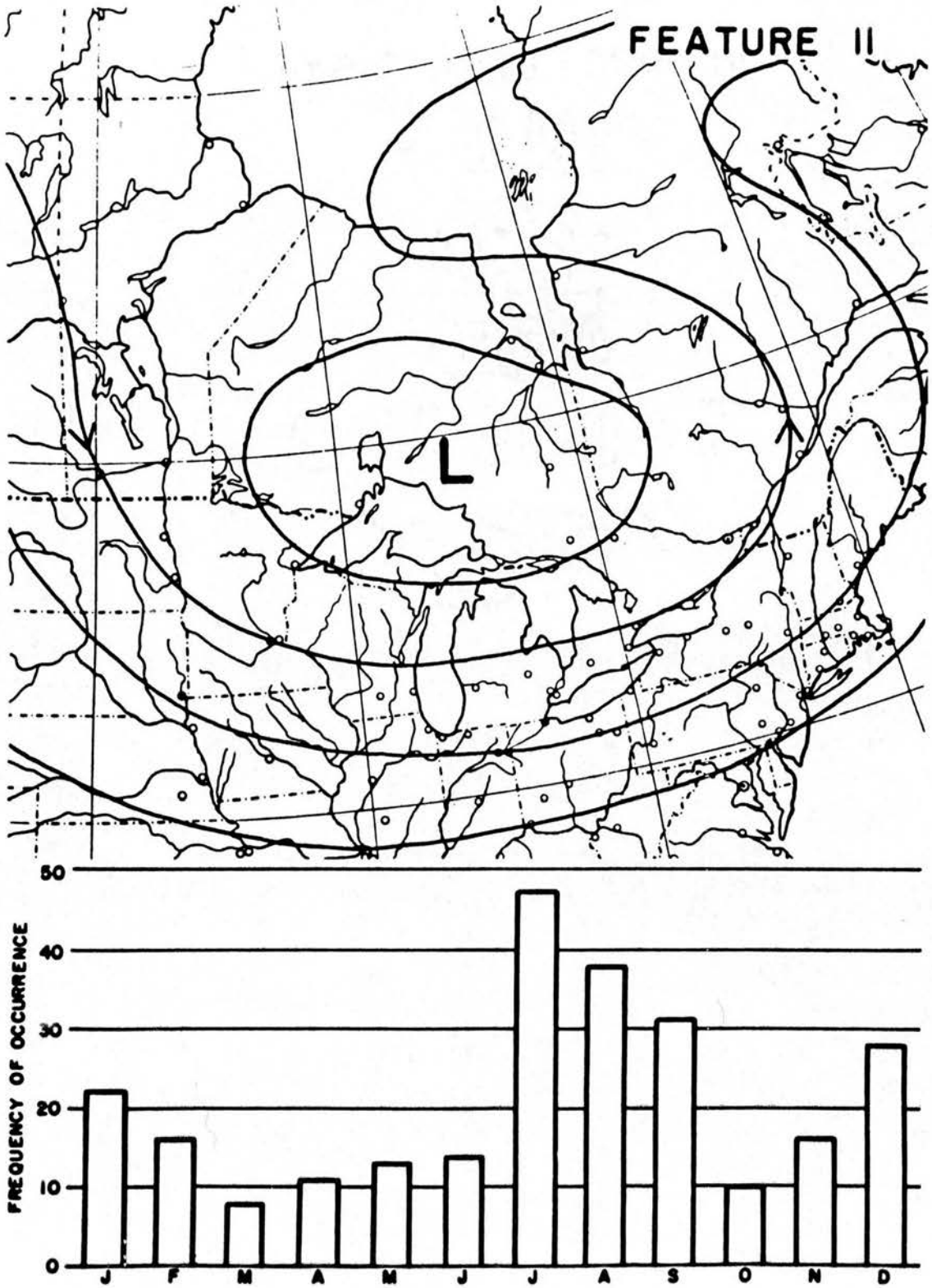


Figure 3.2

Oblong Low over Eastern Canada

(from Sands 1966)

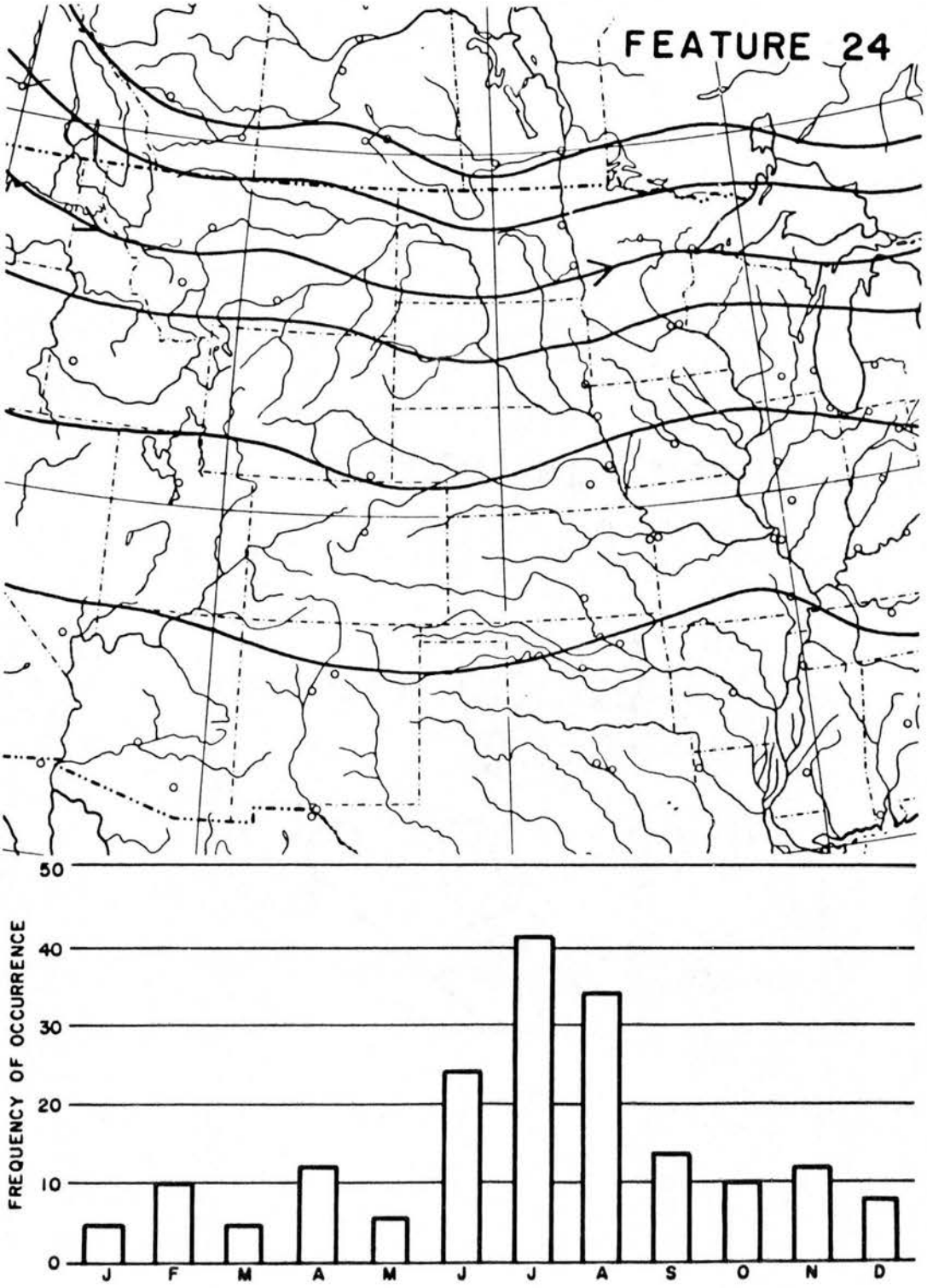


Figure 3.3

Short Wave Cyclonic Impulse over the Great Plains

(from Sands 1966)

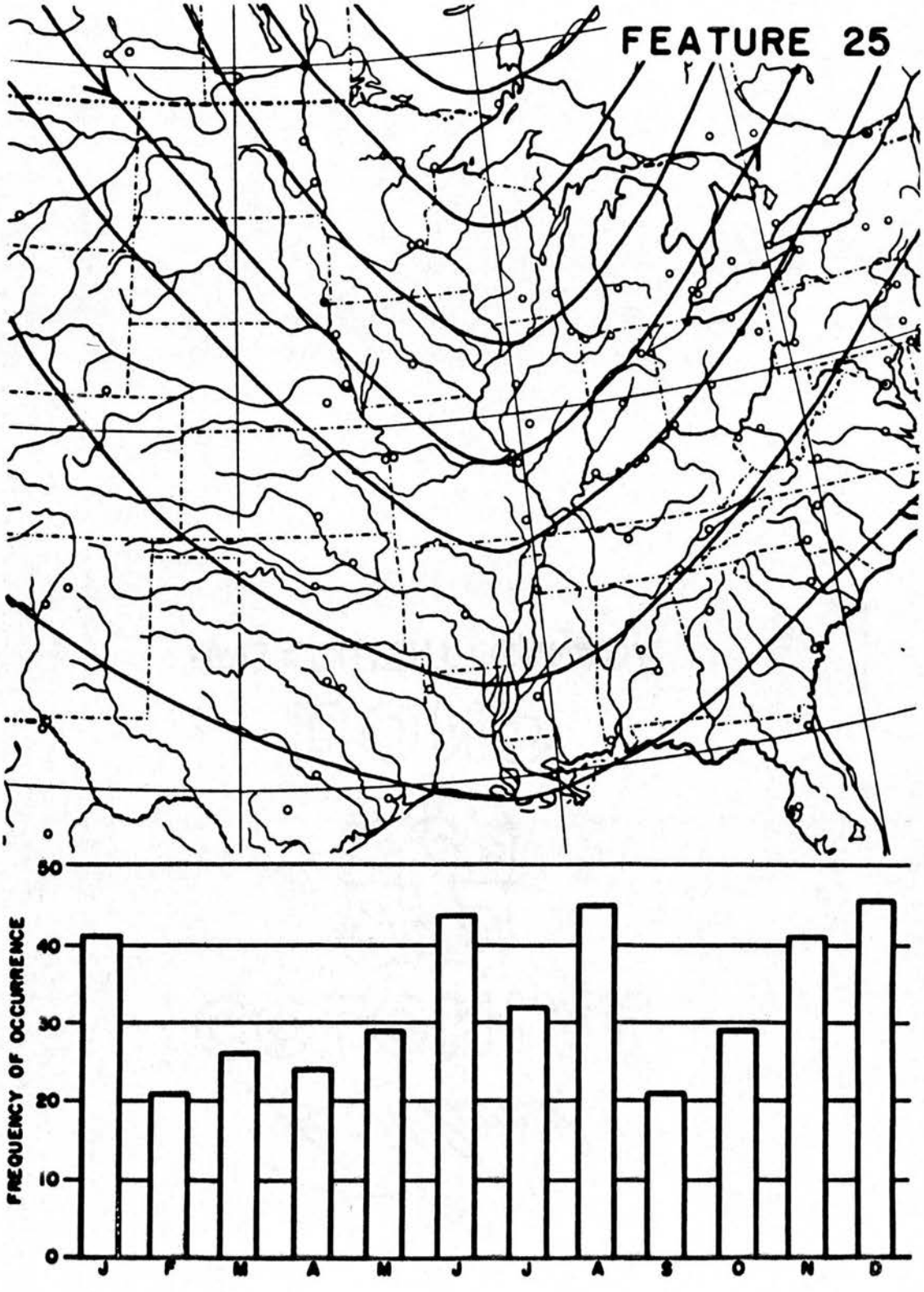


Figure 3.4

Central or Eastern U.S.A. Meridional Trough

(from Sands 1966)

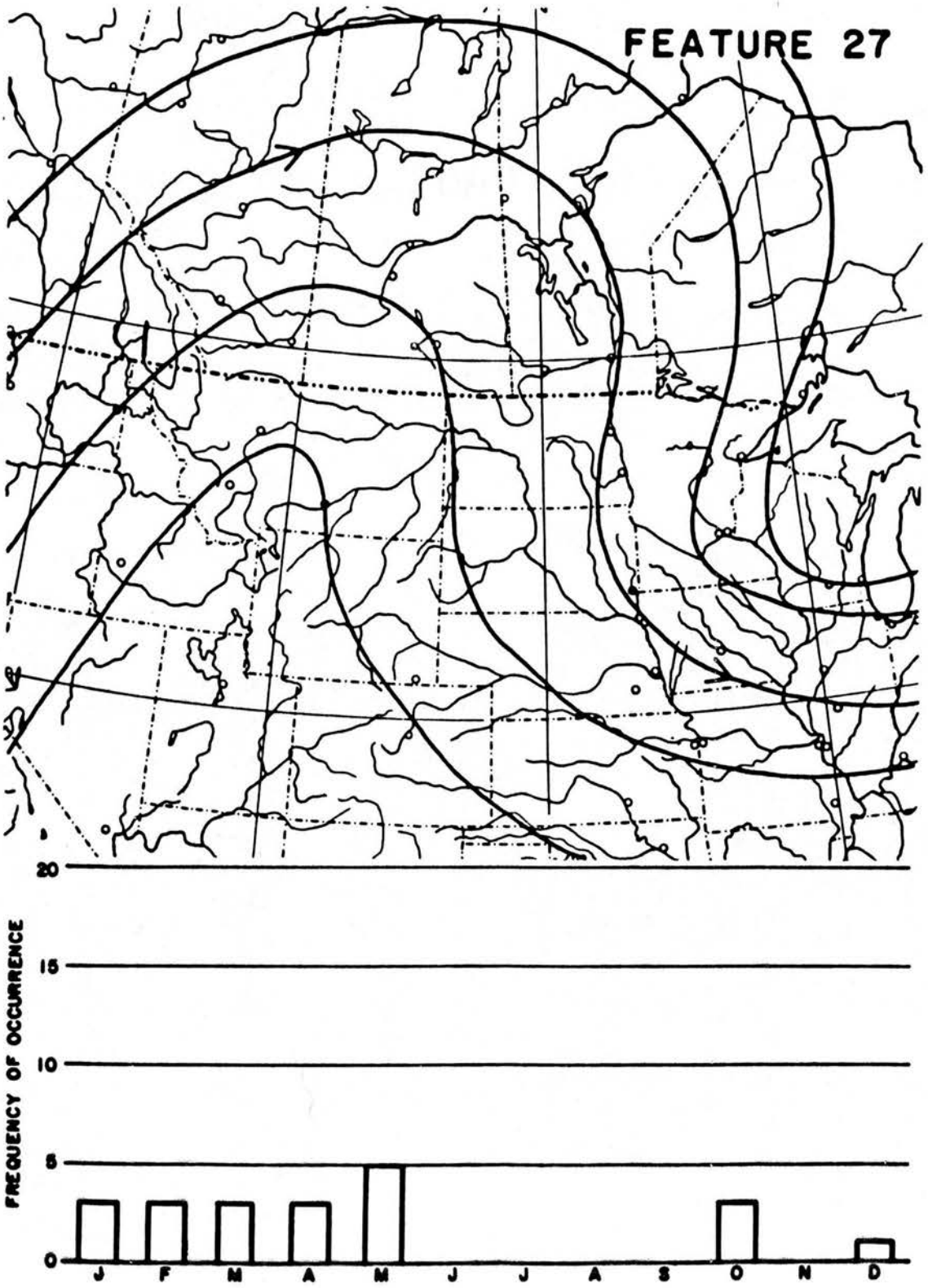


Figure 3.5

Minnesota - Dakota's Tilted Trough

(from Sands 1966)

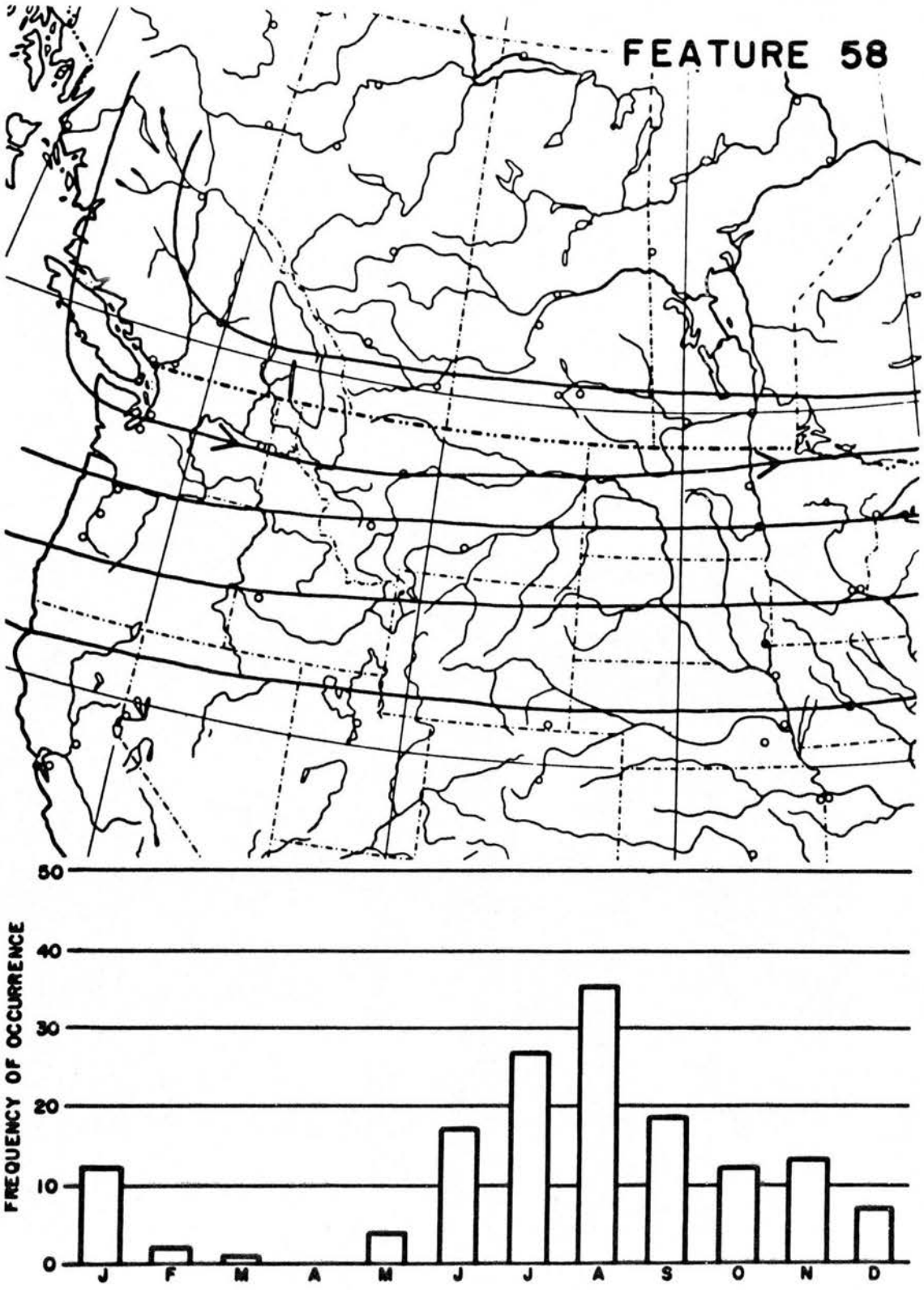


Figure 3.6

Westerly Flow - Northern U.S.A.

(from Sands 1966)

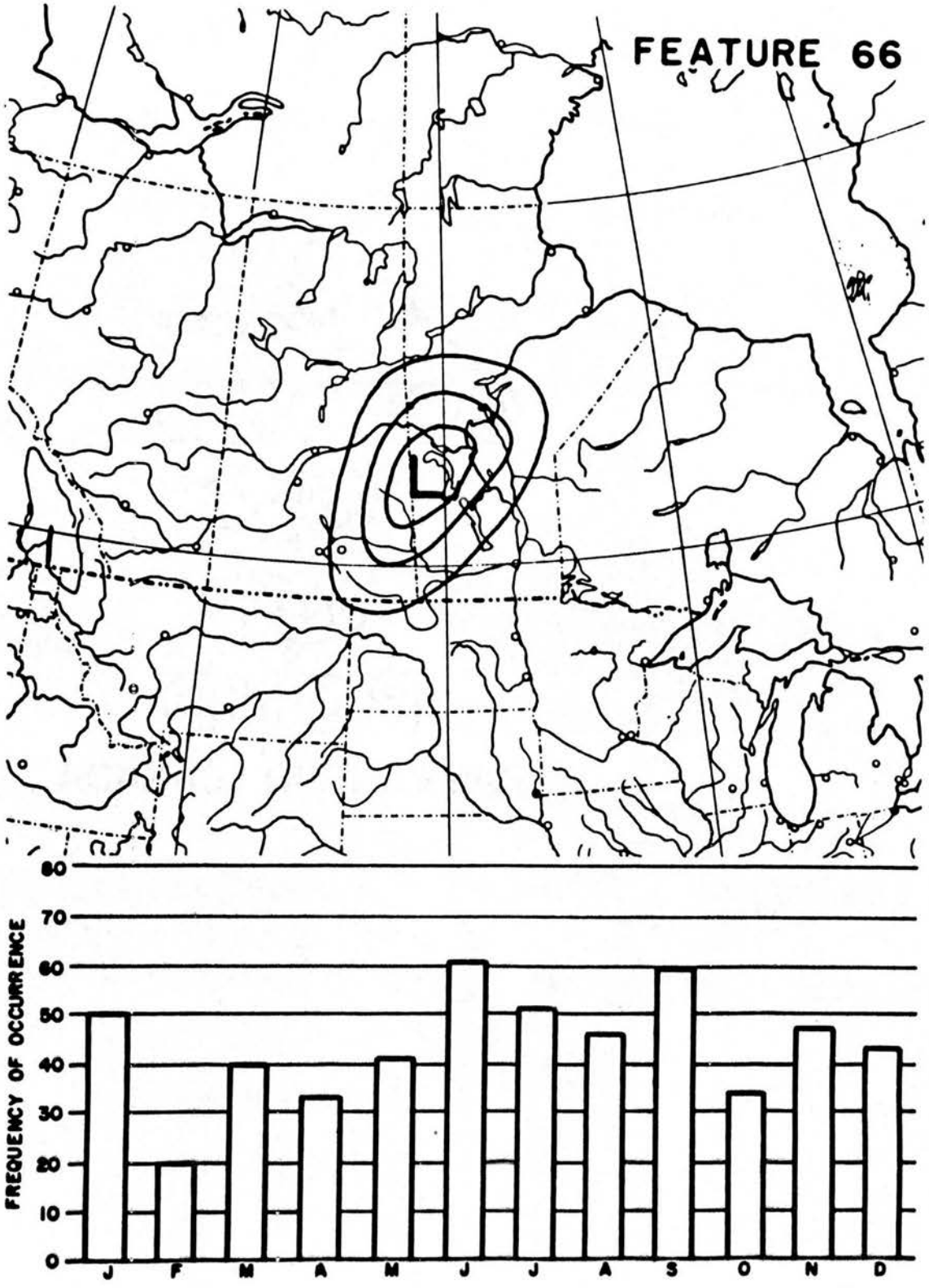


Figure 3.7

Alberta - Saskatchewan - Manitoba Low

(from Sands 1966)

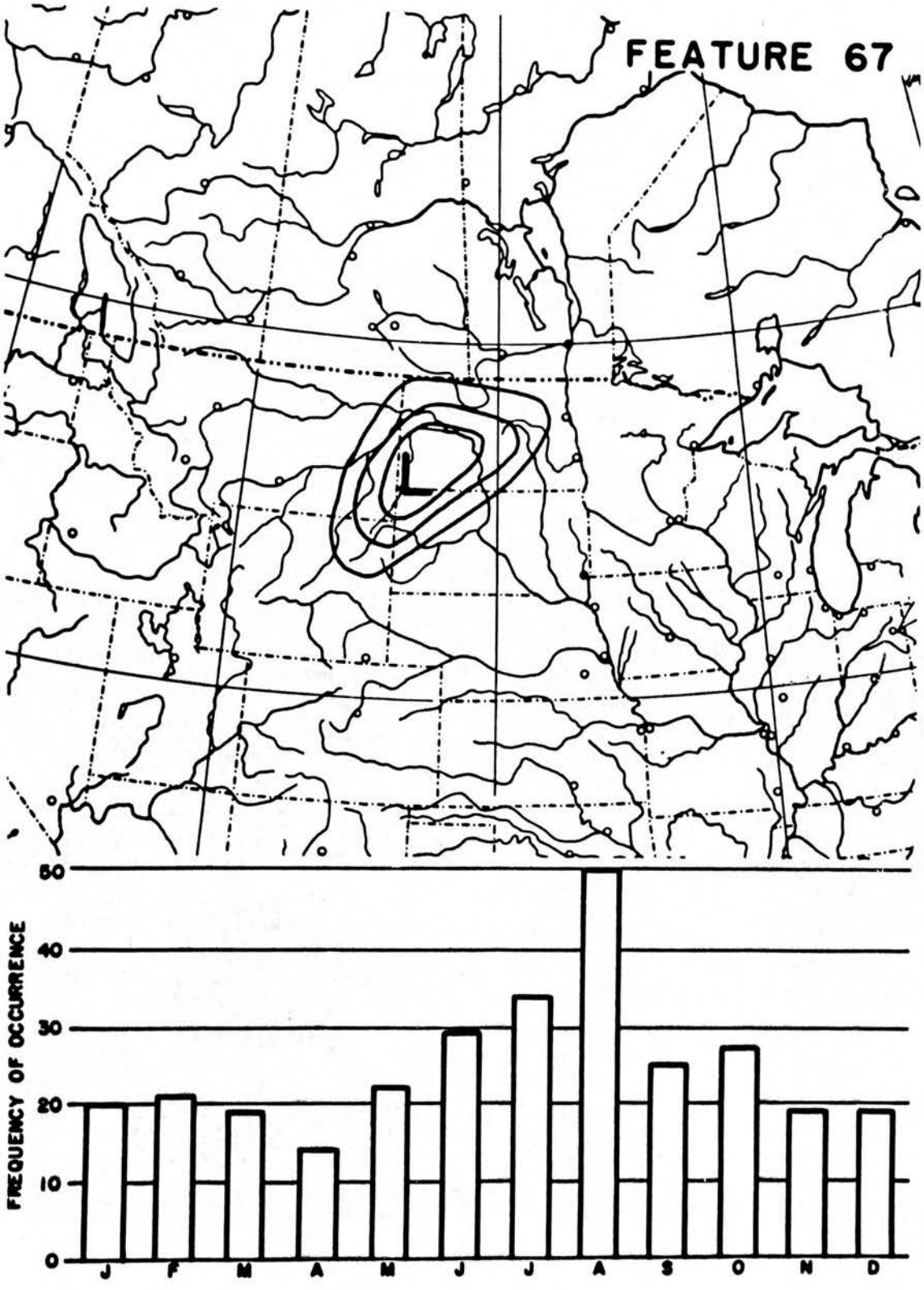
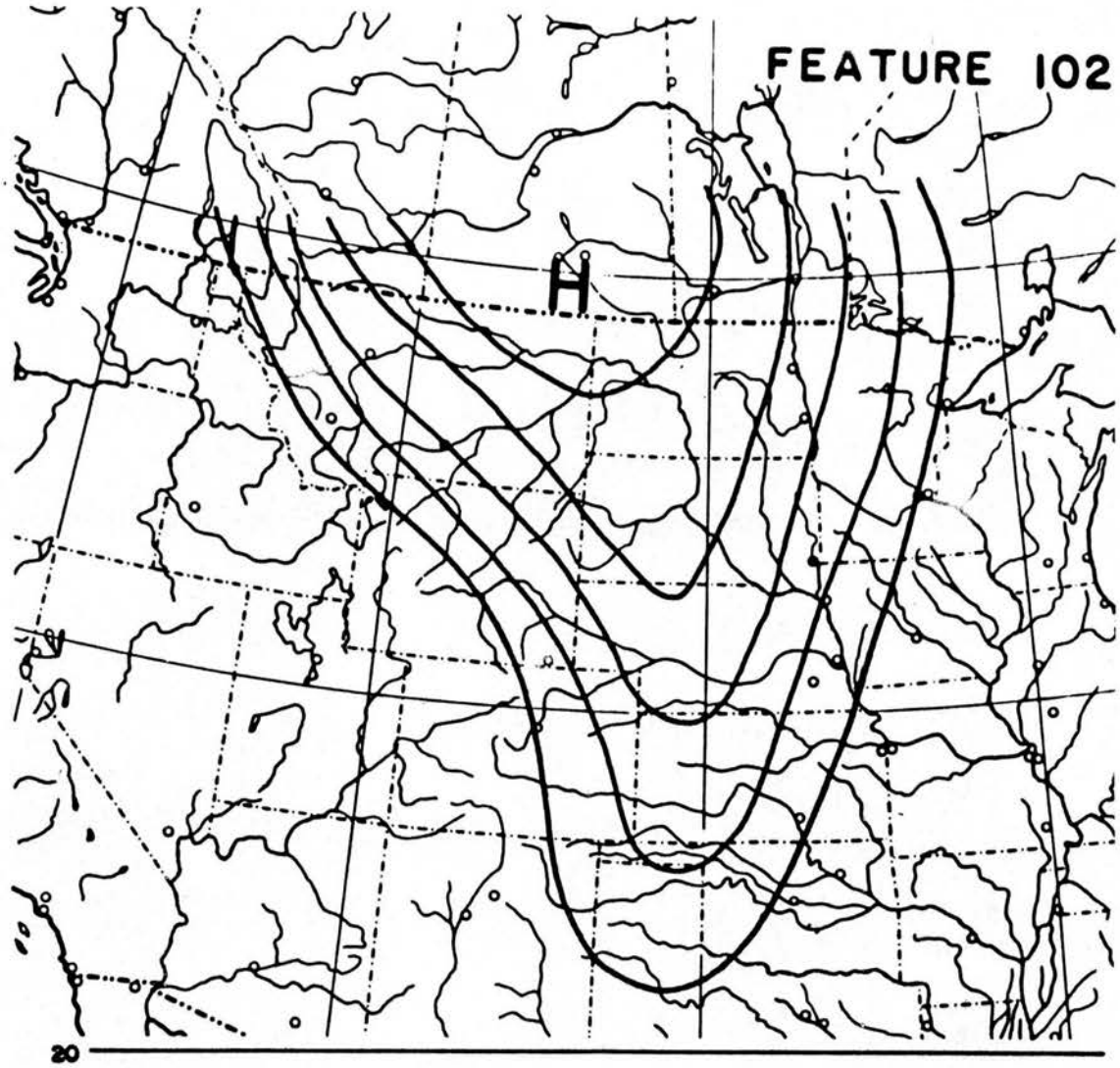


Figure 3.8

Alberta Low - Montana - Dakotas

(from Sands 1966)



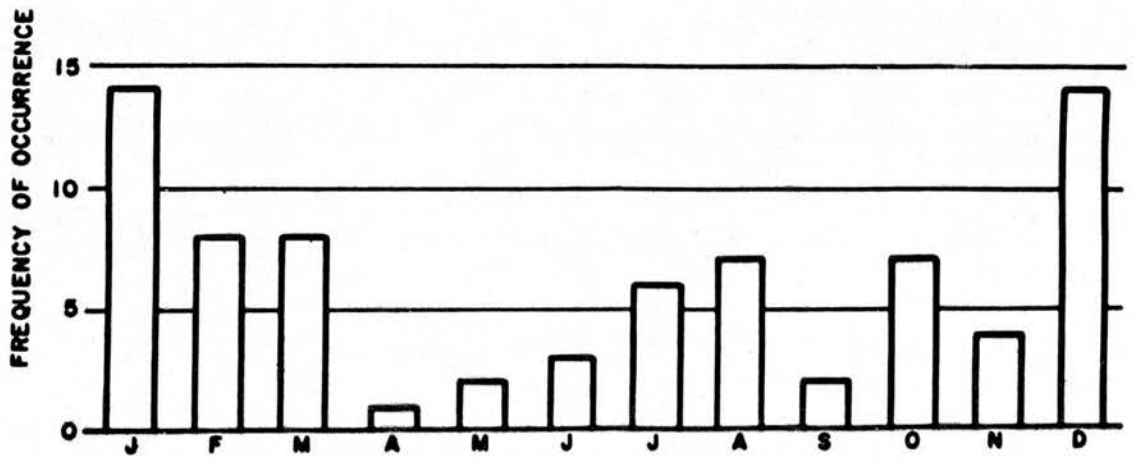


Figure 3.9

Surface Ridge East of Rockies

(from Sands 1966)

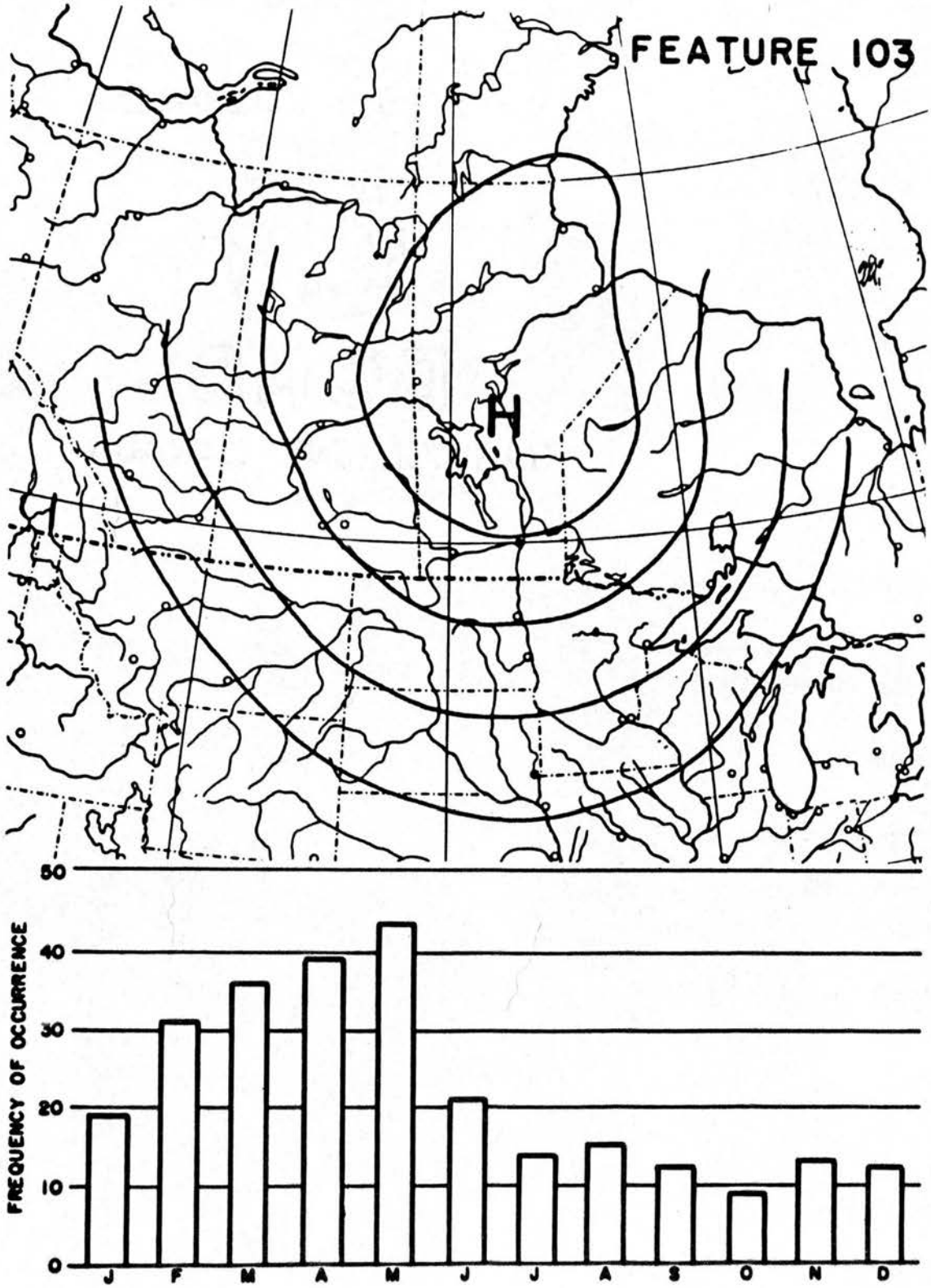


Figure 3.10

Central Canada Surface High

(after Sands 1966)

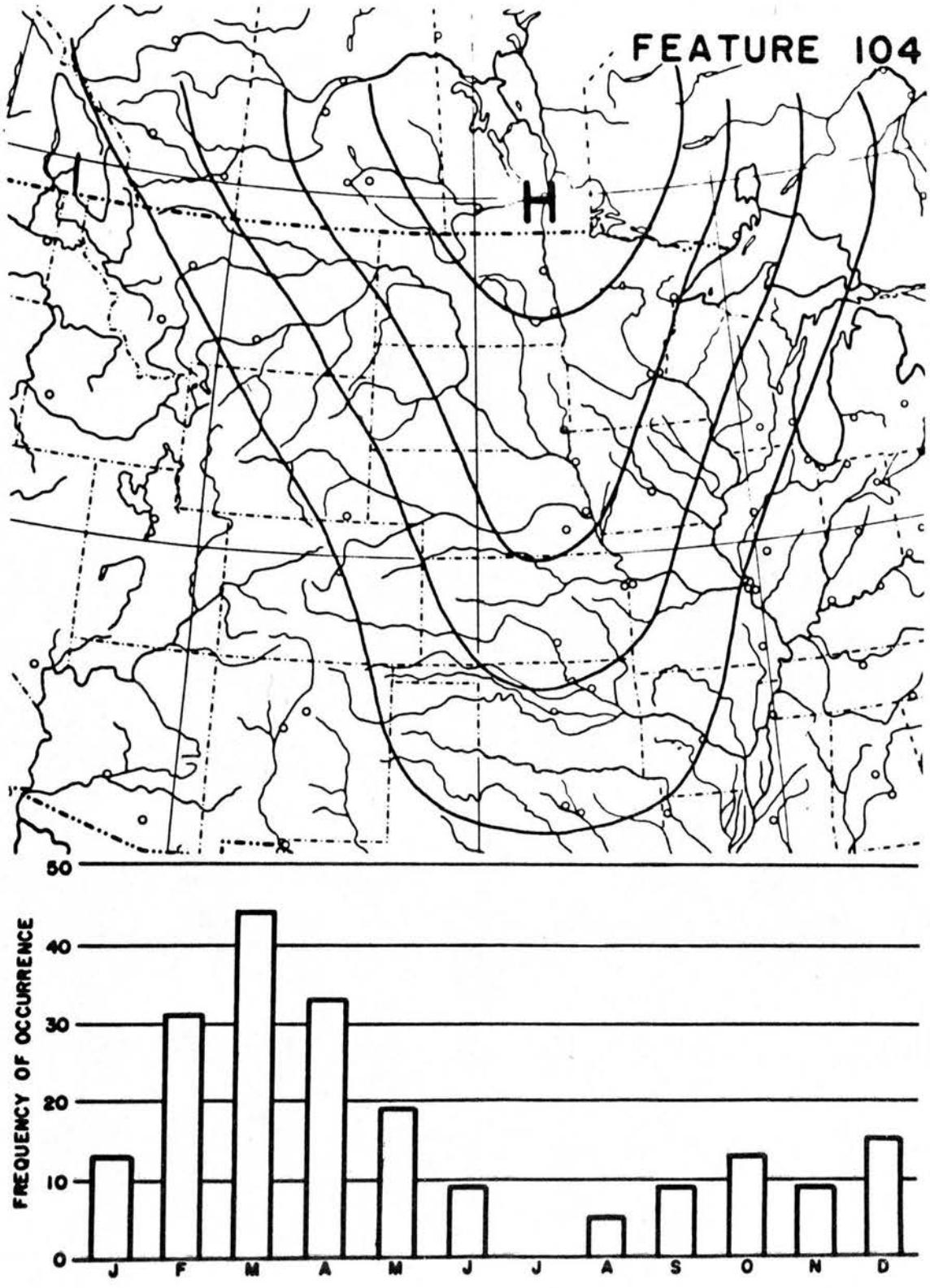


Figure 3.11

Surface Ridge from Central Canada extending into Southern Plains

(from Sands 1966)

Figure 3.12

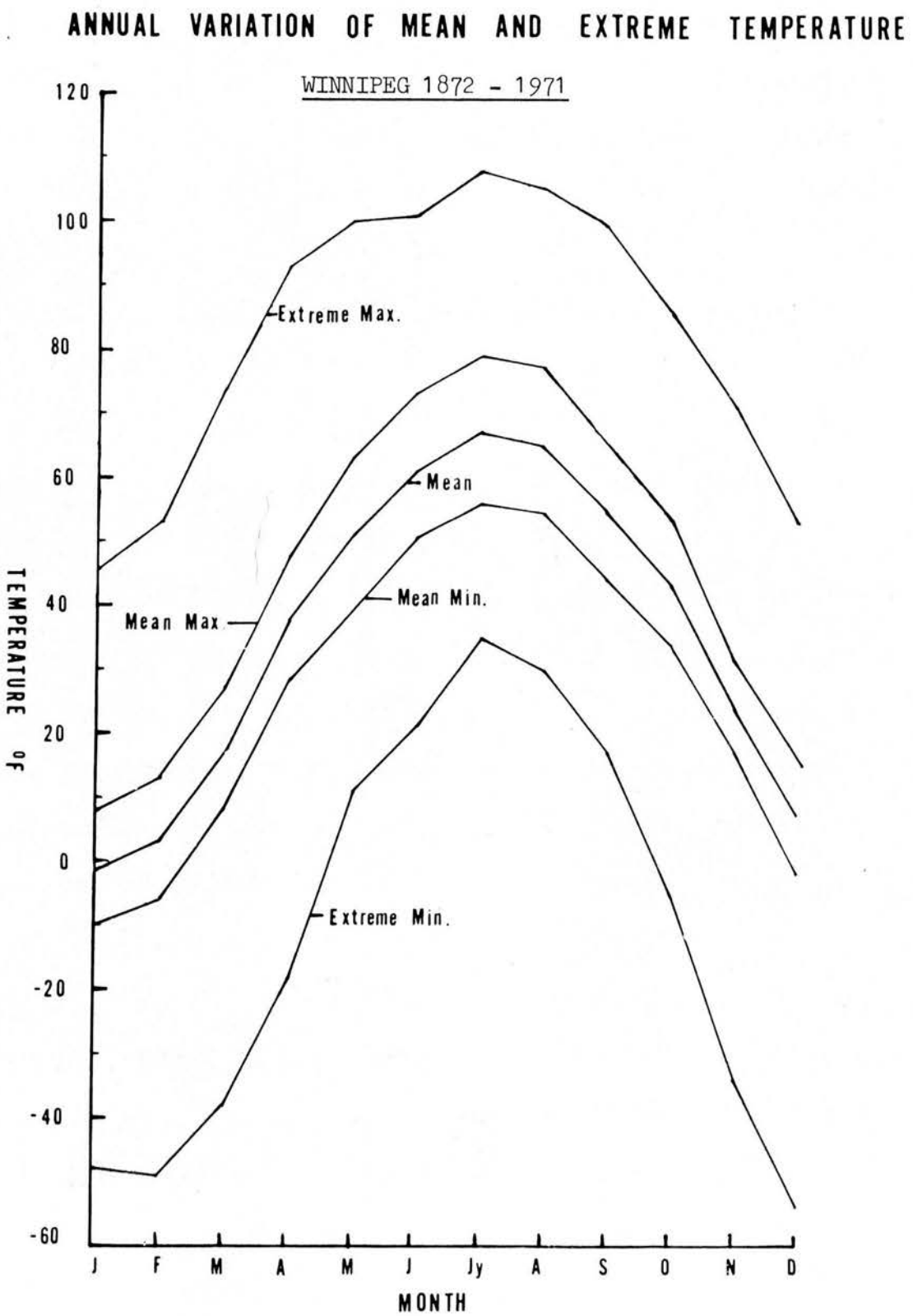

ANNUAL VARIATION OF MEAN AND EXTREME TEMPERATURE
WINNIPEG 1872 - 1971
120
100
80
60
40
20
0
-20
-40
-60
TEMPERATURE °F
Extreme Max.
Mean
Mean Max.
Mean Min.
Extreme Min.
J
F
M
A
M
J
Jy
A
S
O
N
D
MONTH

Table 3.3

ANNUAL METEOROLOGICAL SUMMARY
for

WINNIPEG, MANITOBA

MONTHLY AND ANNUAL AVERAGES AND EXTREMES OF RECORD 1872 - 1971

MONTH	TEMPERATURE											MEAN RELATIVE HUMIDITY			
	MEAN MAXIMUM	MEAN MINIMUM	MEAN MONTHLY	ABSOLUTE MAXIMUM	YEAR	ABSOLUTE MINIMUM	YEAR	HIGHEST MONTHLY MEAN	YEAR	LOWEST MONTHLY MEAN	YEAR	0000	0600	1200	1800
JAN	7.9	- 9.8	- 1.0	46	1942	-48	1877	13.0	1944	-16.5	1875	79	79	75	83
FEB	13.3	- 6.0	3.7	53	1958	-49	1966	22.9	1878	-14.9	1875	82	85	79	78
MAR	26.8	8.0	17.4	74	1946	-38	1880	34.9	1878	3.1	1899	81	86	77	76
APR	47.5	28.5	38.0	93	1952	-18	1932	49.0	1915	26.9	1893	78	82	61	57
MAY	62.7	39.4	51.1	100	1934	11	1907	60.1	1922	39.9	1907	65	75	45	42
JUN	72.8	50.6	61.7	101	1900	21	1888	68.5	1910	54.2	1969	70	77	48	48
JUL	78.6	56.3	67.5	108	1936	35	1939	75.5	1936	59.7	1884	76	83	55	50
AUG	77.0	54.0	65.5	105	1949	30	1910	70.8	1961	59.4	1890	75	85	53	49
SEPT	65.2	43.9	54.6	99	1929	17	1899	62.2	1948	46.4	1965	76	82	56	56
OCT	53.5	34.0	43.8	86	1922	- 5	1936	55.1	1963	32.6	1887	74	82	59	60
NOV	31.1	17.0	24.1	71	1903	-34	1875	34.4	1923	6.9	1896	81	85	73	77
DEC	15.4	- 0.7	7.4	53	1939	-54	1879	25.9	1877	-14.7	1879	82	80	79	79
YEAR	46.0	26.3	36.2	108	1936	-54	1879	41.6	1931	28.9	1883	77	82	63	63

Mean values based on standard period 1941 - 1970 /Extremes from complete station record 1872 - 1971

MONTH	DEGREE DAY NORMALS	PRECIPITATION								WIND		MEAN HOURS OF BRIGHT SUNSHINE
		MEAN RAINFALL	MEAN SNOWFALL	MEAN TOTAL PRECIPITATION	GREATEST MONTHLY PRECIPITATION	YEAR	LEAST MONTHLY PRECIPITATION	YEAR	GREATEST MONTHLY SNOWFALL	YEAR	MEAN WIND IN M.P.H.	PREVAILING DIRECTION	
JAN	2044	.01	9.8	.93	3.36	1916	.11	1961	33.6	1916	12.4	NW	101.0
FEB	1730	.03	7.8	.75	3.54	1881	.10	1903	35.4	1881	12.1	S	133.3
MAR	1469	.24	8.3	1.03	3.00	1904	.06	1939	30.0	1904	12.9	S,NW	166.8
APR	808	1.00	4.7	1.47	5.64	1896	.08	1949	17.5	1872	14.2	N	206.9
MAY	437	2.15	1.0	2.25	6.38	1911	.03	1917	12.8	1931	13.8	SVRL	243.9
JUN	144	3.16		3.16	10.07	1901	.13	1961	.5	1875	12.0	S	248.0
JUL	42	3.16		3.16	7.77	1953	.53	1875			10.3	S	310.1
AUG	74	2.90		2.90	7.11	1876	.13	1915			10.8	S	269.8
SEPT	328	2.07	.1	2.07	6.15	1872	.05	1948	7.2	1872	11.8	S	180.7
OCT	656	1.15	2.2	1.37	5.67	1949	.21	1920	15.2	1919	12.8	S	152.9
NOV	1224	.28	8.4	1.07	3.55	1955	.06	1939	31.6	1955	13.4	S	81.7
DEC	1784	.03	9.4	.90	3.99	1909	.10	1892	39.9	1909	12.4	S	80.6
YEAR	10740	16.18	51.7	21.06	28.48	1962	12.63	1961	104.8	1909	12.4	S	2175.7

This Summary shows new records revised by computer.

TABLE 3.4

Percent Frequency of Occurrence of Minimum Temperatures <-10°F.

Winnipeg, 1951-60.

Temperature	Nov.	Dec.	Jan.	Feb.	March	April	Winter
-10°F. or lower	4.0	25.5	47.1	35.7	14.8	0.3	25.1
-15°F. or lower	1.3	15.8	35.8	23.7	7.4	-	16.6
-20°F. or lower	0.7	8.4	24.5	13.4	3.2	-	9.9
-25°F. or lower	0.3	3.9	11.9	8.4	0.6	-	5.0
-30°F. or lower	-	0.6	3.2	2.5	-	-	1.2
-35°F. or lower	-	-	0.6	-	-	-	0.1

Source Hagglund (1964)

TABLE 3.5

Heating Degree Days Below 65°F. and Extremes

Winnipeg 1931 - 1960

Month	Degree Days 30 Year Mean	Extreme High 1874-1963	Year	Extreme Low 1874-1963	Year
Sept.	322	502	1918	128	1948
Oct.	683	1014	1919	308	1963
Nov.	1251	1758	1896	926	1923
Dec.	1757	2451	1879	1215	1877
Jan.	2008	2510	1875	1611	1944
Feb.	1719	2292	1936	1179	1878
March	1465	1950	1899	936	1878
April	813	1160	1893	509	1915
May	405	788	1907	186	1922
June	147	401	1902	36	1956
July	38	160	1884	2	1935
Aug.	71	191	1885	12	1961

Source Labelle (1966).

Table 3.6

Winnipeg Int. (A)

Mean Wind Direction and Speed 1955 - 1966

Percentage Frequency

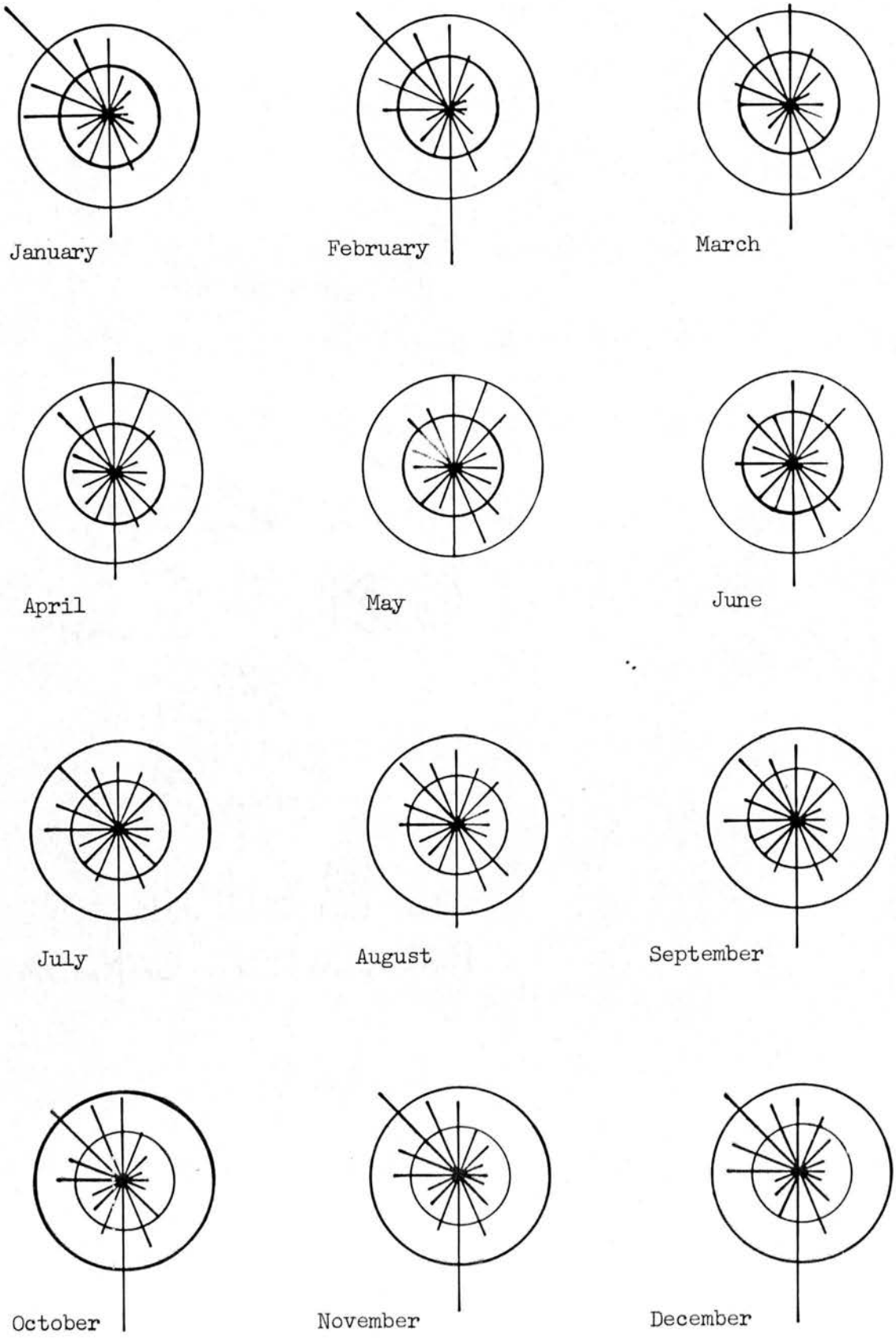
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
N	8	9	11	13	10	9	7	8	8	9	8	8	9
NNE	4	6	6	10	10	9	6	6	5	5	5	6	6
NE	3	3	4	6	8	8	5	6	5	3	4	4	5
ENE	1	1	1	2	3	2	2	3	2	1	2	2	2
E	1	1	3	3	4	3	3	3	2	2	2	2	2
ESE	2	1	3	3	4	3	3	3	3	2	2	2	3
SE	4	3	5	6	7	7	5	8	6	5	4	4	5
SSE	6	7	9	6	9	9	7	8	7	8	7	7	8
S	14	18	14	12	10	14	14	12	15	18	16	18	15
SSW	5	5	4	5	4	5	6	5	6	6	6	5	5
SW	4	4	3	4	5	5	5	4	5	4	4	3	4
WSW	3	2	2	3	3	3	4	4	5	3	3	2	3
W	9	7	5	4	4	6	8	6	8	7	7	8	7
WNW	9	8	6	4	4	4	7	6	6	6	7	8	6
NW	17	15	14	9	7	7	10	9	9	11	13	12	11
NNW	9	9	9	9	7	5	7	7	7	9	9	8	8
Calm	1	1	1	1	1	1	1	2	1	1	1	1	1

Average Wind Speed in Miles Per Hour

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
N	12.4	12.3	16.0	15.7	14.3	11.9	9.6	11.9	12.6	12.7	14.7	14.3	13.2
NNE	11.7	10.3	12.2	15.1	14.9	12.6	9.8	10.5	11.8	12.3	13.7	11.8	12.2
NE	9.5	7.6	8.6	10.3	11.3	10.0	8.1	9.1	9.2	10.0	10.5	10.2	9.5
ENE	7.6	7.3	9.5	11.0	10.8	8.4	7.7	10.0	10.1	9.1	8.5	8.8	9.1
E	8.0	8.4	11.3	12.6	11.4	9.3	8.3	9.8	9.8	8.9	9.1	9.1	9.7
ESE	10.2	10.5	11.5	13.8	12.1	11.4	8.8	10.9	10.8	10.9	11.1	11.2	11.1
SE	10.8	10.8	12.0	13.0	11.1	11.8	10.0	9.9	10.1	11.8	10.3	11.4	11.1
SSE	12.9	12.6	14.9	14.4	14.1	13.7	11.8	11.8	12.9	14.1	12.7	13.5	13.3
S	15.1	15.5	15.4	15.3	15.7	13.4	11.5	12.1	13.4	14.2	14.9	14.7	14.3
SSW	10.8	11.7	11.9	13.3	13.7	11.4	10.5	10.8	11.8	12.1	11.5	10.8	11.7
SW	9.2	7.7	8.9	12.2	11.6	10.4	9.3	8.7	9.9	10.7	10.1	8.0	9.7
WSW	10.1	8.6	9.3	12.8	13.2	11.2	10.5	9.8	11.0	11.0	10.4	8.4	10.5
W	10.9	9.6	9.4	12.7	13.3	11.4	10.3	10.4	10.7	11.4	11.4	10.4	11.0
WNW	11.2	10.8	12.4	13.6	16.4	11.6	11.0	12.2	12.6	12.6	13.9	11.3	12.5
NW	13.9	14.1	13.3	16.0	16.2	14.1	12.2	12.3	13.7	15.1	16.3	14.3	14.3
NNW	15.2	14.8	14.4	16.7	17.1	13.7	11.2	11.6	13.5	15.4	17.8	15.0	14.7
All Directions	12.4	12.1	12.9	14.2	13.8	12.0	10.3	10.8	11.8	12.8	13.4	12.4	12.4

Figure 3.13

Wind Roses Winnipeg Intl. 1955 – 66



Inner Circle Represents 5%, Outer Circle Represents 10%

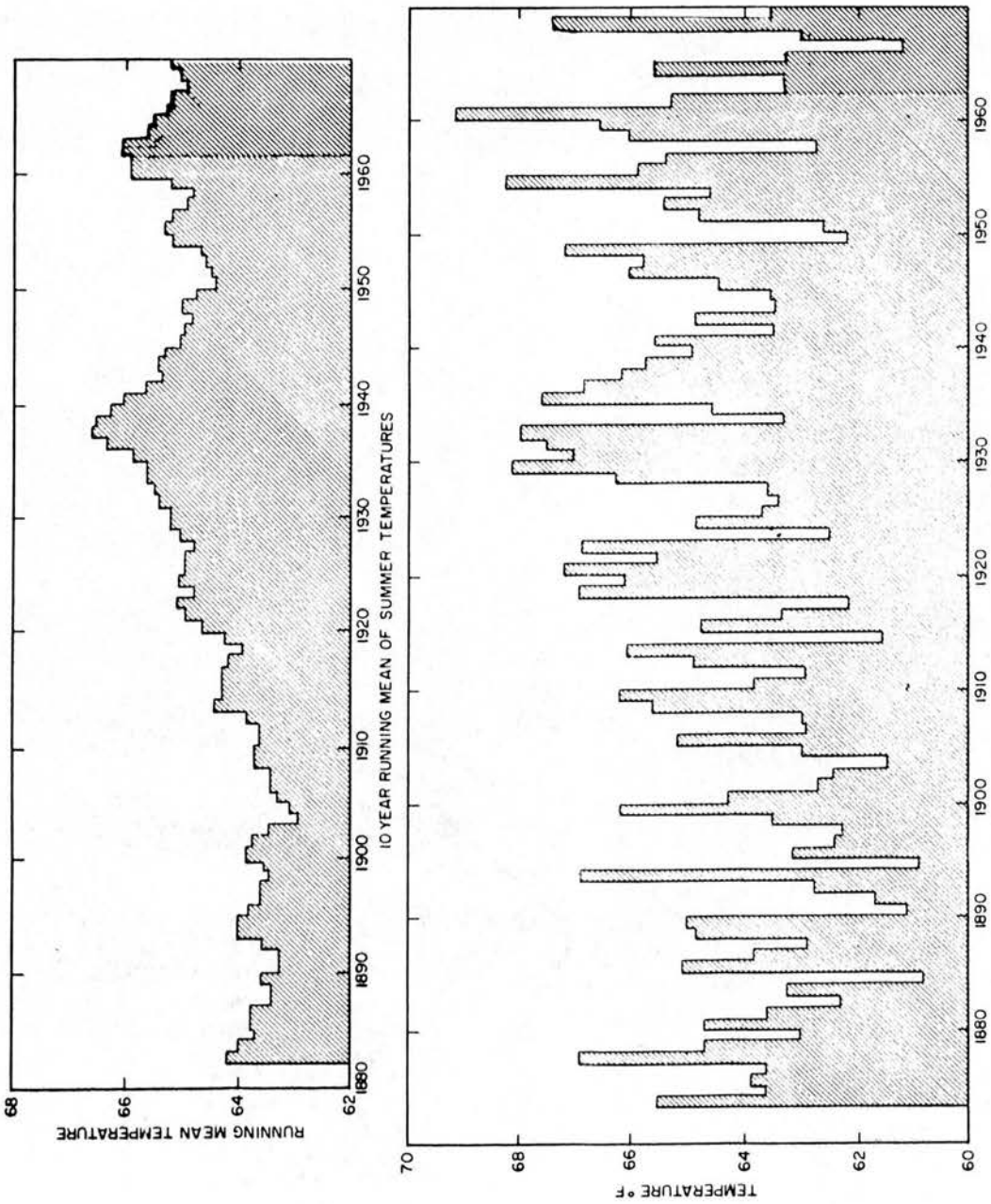


Figure 3.14 Variation of Winnipeg Summer Temperatures 1872 - 1971

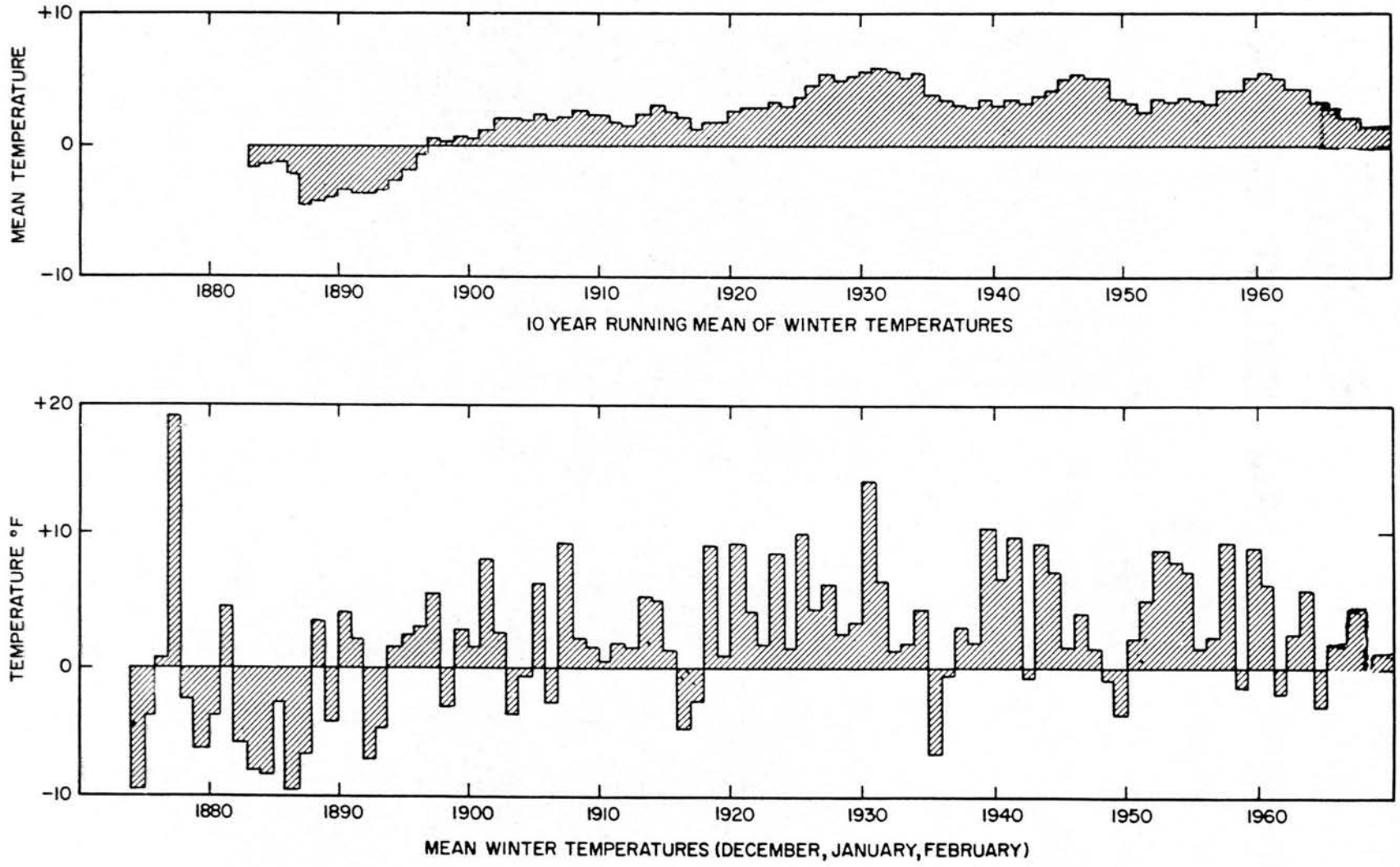


Figure 3.15 Variation of Winnipeg Winter Temperatures 1872 - 1971

TABLE 3.7

Mean Temperatures in Winnipeg for Different Averaging Periods.

Averaging Period	Annual Mean	Summer Mean	Winter Mean
1931 - 1960	36.5	65.3	4.3
1941 - 1970	36.2	64.9	3.4
1962 - 1971	35.2	64.3	1.4
1872 - 1971	35.1	-	-
Sampling Period (Oct. 69 - Dec. 71)	34.9	65.0	2.4

TABLE 3.8

Mean Daily Temperatures by Months Winnipeg International versus Mean Daily Temperature during the Sampling Period.

Month	Mean Temp. 1931-60	Mean Temp. 1941-70	Mean Temp. Oct. 69 - Dec. 71	Std. Devn. 1931-60	Std. Devn. 1881-60
Jan.	0.1	-1.0	-6.2	7.4	7.6
Feb.	4.1	3.7	5.0	7.1	6.8
March	17.7	17.4	14.2	6.1	6.5
April	38.0	38.0	36.2	4.7	4.9
May	52.4	51.1	49.5	3.5	3.9
June	61.7	61.7	64.8	2.9	3.0
July	68.3	67.5	65.2	2.4	2.6
Aug.	66.0	65.5	65.9	2.5	2.7
Sept.	55.1	54.6	55.6	3.0	3.0
Oct.	43.2	43.8	41.2	4.3	4.4
Nov.	23.3	24.1	23.8	4.8	4.6
Dec.	8.7	7.4	6.5	5.8	6.5
Annual	36.5	36.2	34.9	1.8	-

Table 3.9

ANNUAL METEOROLOGICAL SUMMARY
for
WINNIPEG, MANITOBA

DATA FOR YEAR 1969

MONTH	TEMPERATURE (°F) MEAN MAXIMUM	MEAN MINIMUM	MEAN FROM MAX/MIN	EXTREME MAXIMUM	DATE	EXTREME MINIMUM	DATE	DEGREE DAYS BELOW 65°F	MEAN RELATIVE HUMIDITY (%) 0000 CST	0600 CST	1200 CST	1800 CST
JAN	2.5	-17.4	-7.5	28.1	15	-35.8	26	2250	83	83	80	80
FEB	16.3	-2.4	7.0	33.8	25	-35.0	3	1625	85	85	82	81
MAR	23.1	2.1	12.6	36.7	22	-14.5	29	1616	82	84	78	77
APR	54.3	30.8	42.6	69.7	14	0.1	2	666	77	83	55	53
MAY	63.0	38.7	50.9	90.9	26	24.7	20	445	74	81	52	50
JUN	65.7	42.7	54.2	80.0	9	29.4	13	318	76	82	56	51
JUL	75.5	55.0	65.3	93.8	12	44.7	2	59	85	87	64	63
AUG	81.2	57.9	69.6	97.6	22	43.9	31	20	79	88	62	59
SEPT	65.7	44.0	54.9	84.8	14	26.9	30	324	85	91	66	70
OCT	43.0	29.9	36.5	56.3	3	16.6	21	877	86	87	72	77
NOV	34.1	18.0	26.1	58.0	6	-2.4	20	1159	87	87	75	81
DEC	20.9	6.5	13.7	47.3	1	-17.3	23	1584	86	87	82	84
YEAR	45.4	25.5	35.5	97.6	Aug. 22	-35.8	Jan. 26	10943	82	85	69	69

MONTH	PRECIPITATION (INS) RAIN-FALL	SNOW-FALL	TOTAL PRECIP	GREATEST RAINFALL 6 HRS	DATE	* 24 HRS	DATE	GREATEST SNOWFALL 6 HRS	DATE	* 24 HRS	DATE
JAN	TR	21.4	1.87	TR	14,15,27	TR	14,15,27	1.6	16,22	3.5	15
FEB	TR	4.3	.34	TR	23	TR	23	.4	14,18,21	.8	18
MAR	TR	4.3	.39	TR	31	TR	31	1.0	7	1.9	7
APR	1.00	TR	1.00	.32	26	.48	26	TR	1,3	TR	1,3
MAY	3.02	TR	3.02	.60	31	1.18	31	TR	16,19	TR	16,19
JUN	4.12	.1	4.13	.93	27	1.26	27	.1	12	.1	12
JUL	3.99		3.99	.70	26	1.92	26				
AUG	2.25		2.25	.52	13	.59	29				
SEPT	2.40		2.40	.66	4	1.05	4				
OCT	.84	2.7	1.07	.27	3	.41	3	1.0	21	1.0	21
NOV	.01	4.6	.37	.01	23	.01	23	1.4	23	1.4	23
DEC	Tr.	10.3	.74	Tr.	30,31	Tr.	30,31	1.2	8	2.5	8
YEAR	17.63	47.7	21.57	.93	June 27	1.92	July 26	1.6	Jan. 16,22	3.5	Jan. 15

NOTE: The following units are used throughout this summary

Temperature: Degrees Fahrenheit

Degree Day: Difference of Daily Mean Temperatures from 65°F

Relative Humidity: Percentage

Precipitation: Inches – (Snowfall is reduced to its "Water Content" by melting then added to rainfall to obtain "Total Precipitation".)

* Climatological Day - not any 24 hour period.

Wind Speed: Miles per hour

Wind Direction: Direction (true north) from which the wind is blowing

Barometric Pressure: Millibars and Tenths of Millibars

Sunshine: Hours and Tenths of Hours of Bright Sunshine

Table 3.10

ANNUAL METEOROLOGICAL SUMMARY
for
WINNIPEG, MANITOBA

DATA FOR YEAR 1969

MONTH	SUNSHINE				WIND					
							MAX FOR 1 MIN		HIGHEST GUST	
	DURATION IN HOURS	PERCENTAGE OF POSSIBLE	NO. OF DAYS WITHOUT SUNSHINE	NORMAL	AVERAGE SPEED	PREVAILING DIRECTION	DIRECTION AND SPEED	DATE	DIRECTION AND SPEED	DATE
JAN	92.5	34.6	14	101.0	12.0	NW	NW 30	24	NNW 39	24
FEB	119.6	42.5	6	133.3	9.5	S	NW 32,SE32	10,14	NW 42	10
MAR	200.6	54.5	3	166.8	11.0	N	N 30	7	N 39	7
APR	272.6	66.1	1	206.9	12.2	S	NE 29	26	S 42	19
MAY	288.4	60.4	1	243.9	11.8	N	N 28	26	NNW 66	26
JUN	263.6	53.9	1	248.0	10.7	N	NE 33	25	NNE 44	1
JUL	298.1	60.5	1	310.1	8.9	W	NE 23	4	NNW 37	23
AUG	304.4	67.9	0	269.8	11.2	W	W 37	13	WNW 55	13
SEPT	173.8	45.8	2	180.7	12.2	S, NW	S 31	19	S 44	4, 19
OCT	79.3	23.7	10	152.9	11.3	W	SE 26	3	NW 37	7
NOV	87.9	32.2	7	81.7	11.5	NW	NW 32	14	NW 42,S42	14, 21
DEC	71.2	28.1	13	80.6	10.6	S	S 27	15	NW 37	2
YEAR	2252.0	50.3	59	2175.7	11.1	S	W 37	Aug 13	NNW 66	May 26

MONTH	BAROMETRIC PRESSURE (mb)*											
	STATION LEVEL PRESSURE						SEA LEVEL PRESSURE					
	MEAN	MAX	DATE	MIN	DATE	NORMAL	MEAN	MAX	DATE	MIN	DATE	NORMAL
JAN	991.2	1004.6	10	968.1	8	989.6	1023.0	1037.3	10	998.5	8	1021
FEB	992.2	1004.0	20	966.8	10	989.7	1023.4	1035.6	20	996.8	10	1021
MAR	990.5	1005.3	29	974.5	22	987.7	1021.6	1037.4	29	1003.9	22	1018
APR	986.3	997.4	23	971.8	20	986.8	1015.8	1027.2	23	1000.4	20	1016
MAY	984.5	999.3	20	969.4	28	985.3	1013.8	1029.4	20	997.4	28	1015
JUN	981.5	996.3	8	958.9	26	983.2	1010.4	1025.8	8	987.1	26	1012
JUL	984.8	994.6	20	971.1	26	984.7	1013.6	1023.6	20	999.6	26	1013
AUG	981.4	993.9	31	963.8	13	985.2	1010.0	1023.1	31	991.4	13	1014
SEPT	986.5	999.9	8	970.6	14	987.0	1015.5	1029.5	8	998.6	14	1014
OCT	986.2	1005.6	12	965.6	10	985.9	1016.1	1036.0	12	994.5	10	1015
NOV	985.7	1007.1	26	971.8	15	986.5	1015.9	1038.6	26	1001.6	15	1016
DEC	986.7	1001.0	19	972.4	24	987.5	1017.6	1032.2	19	1002.4	24	1019
YEAR	986.5	1007.1	Nov. 26	958.9	June 26	986.6	1016.4	1038.6	Nov. 26	987.1	June 26	1016

* 1 Millibar = 0.02953 inches of mercury / 33.864 Millibars = 1 inch of mercury

Table 3.11

ANNUAL METEOROLOGICAL SUMMARY
for
WINNIPEG, MANITOBA

DATA FOR YEAR 1970

MONTH	TEMPERATURE (°F) MEAN MAXIMUM	MEAN MINIMUM	MEAN FROM MAX/MIN	EXTREME MAXIMUM	DATE	EXTREME MINIMUM	DATE	DEGREE DAYS BELOW 65°F	MEAN RELATIVE HUMIDITY (%) 0000 CST	0600 CST	1200 CST	1800 CST
JAN	5.3	-13.1	- 3.9	29.3	30	-36.5	19	2139	79	80	75	77
FEB	14.1	- 8.4	2.9	40.4	21	-26.8	3	1741	78	79	71	76
MAR	20.4	- 3.4	8.5	35.8	21	-23.7	9	1747	80	82	77	76
APR	41.8	27.3	34.6	57.9	25	- 6.7	1	906	82	84	71	73
MAY	59.4	38.1	48.8	87.8	17	22.2	5	501	79	85	59	59
JUN	78.0	53.9	66.0	96.8	8	40.1	19	56	77	82	58	55
JUL	79.8	57.9	68.9	93.1	11	46.0	4	28	78	83	58	57
AUG	79.4	52.5	66.0	96.0	13	38.8	31	76	73	84	49	46
SEPT	66.3	43.8	55.1	89.5	5	28.8	27	323	83	88	63	64
OCT	52.1	33.4	42.8	68.4	5	19.9	15	684	78	84	66	67
NOV	30.7	16.2	23.5	52.9	5	-10.0	28	1239	85	85	78	82
DEC	9.9	- 8.1	0.9	32.2	1	-29.2	20	1985	81	79	77	79
YEAR	44.8	24.2	34.5	96.8	June 8	-36.5	Jan. 19	11425	79	83	67	68

MONTH	PRECIPITATION (INS) RAIN-FALL	SNOW-FALL	TOTAL PRECIP	GREATEST RAINFALL 6 HRS	DATE	24 HRS	DATE	GREATEST SNOWFALL 6 HRS	DATE	24 HRS	DATE
JAN	Tr.	12.7	.90	Tr.	24	Tr.	24	2.8	14	4.1	14
FEB		6.5	.59					1.9	17	2.1	17
MAR	Tr.	12.0	1.08	Tr.	2, 3	Tr.	2, 3	4.9	3	6.2	3
APR	.72	13.8	2.57	.22	15	.34	15	3.0	19	4.9	20
MAY	3.39	.2	3.41	.80	24	1.27	24	.2	10	.2	10
JUN	1.99		1.99	.40	10	.40	10				
JUL	2.74		2.74	.54	14	1.28	14				
AUG	2.95		2.95	1.17	29	2.20	29				
SEPT	4.41		4.41	2.01	20	2.01	20				
OCT	.88	1.7	1.05	.32	27	.42	27	1.0	31	1.0	31
NOV	.56	6.6	1.05	.18	1	.42	1	1.5	24	2.4	17
DEC	.10	10.9	.92	.08	1	.08	1	1.9	1	2.5	1
YEAR	17.74	64.4	23.66	2.01	Sept. 20	2.20	Aug. 29	4.9	Mar. 3	6.2	Mar. 3

NOTE: The following units are used throughout this summary

Temperature: Degrees Fahrenheit

Degree Day: Difference of Daily Mean Temperatures from 65°F

Relative Humidity: Percentage

Precipitation: Inches – (Snowfall is reduced to its "Water Content" by melting then added to rainfall to obtain "Total Precipitation".)

Wind Speed: Miles per hour

Wind Direction: Direction (true north) from which the wind is blowing

Barometric Pressure: Millibars and Tenths of Millibars

Sunshine: Hours and Tenths of Hours of Bright Sunshine

Table 3.12

ANNUAL METEOROLOGICAL SUMMARY
for
WINNIPEG, MANITOBA

DATA FOR YEAR 1970

MONTH	SUNSHINE				WIND					
							MAX FOR 1 MIN		HIGHEST GUST	
	DURATION IN HOURS	PERCENTAGE OF POSSIBLE	NO. OF DAYS WITHOUT SUNSHINE	NORMAL	AVERAGE SPEED	PREVAILING DIRECTION	DIRECTION AND SPEED	DATE	DIRECTION AND SPEED	DATE
JAN	108.9	40.8	8	101.0	10.3	W	S 27	23	S 35,NNE35	23,28
FEB	131.3	46.6	1	133.3	11.9	S	N,SSE 34	1, 25	SSE 45	25
MAR	217.4	59.1	2	166.8	10.2	S	N,NNE 26	22	S,N 33	16,22
APR	140.5	34.0	7	206.9	13.2	S	WNW 35	8	WNW 62	8
MAY	205.4	43.0	4	243.9	12.6	S	NW 33	25	NNW 47	25
JUN	302.0	61.8	1	248.0	10.7	S	NW 28	3	NNW 40	23
JUL	318.7	64.7	0	310.1	10.7	S	NW 30	7	SSW 53	25
AUG	343.9	76.7	0	269.8	10.1	S	S 30	17	S 42	17
SEPT	166.9	44.0	1	180.7	10.7	S	W 26	21	N 55	20
OCT	149.3	44.7	8	152.9	12.7	S	NW 32	2	NW 45	2
NOV	70.3	25.8	15	81.7	10.9	N	S 35	24	S 54	24
DEC	106.1	41.9	7	80.6	12.1	S	WNW 35	5	NW 47	5
YEAR	2260.7	50.5	54	2175.7	11.3	S	WNW 35 S 35	Apr. 8 Dec. 5 Nov. 24	WNW 62	Apr. 8

MONTH	BAROMETRIC PRESSURE (mb)*											
	STATION LEVEL PRESSURE						SEA LEVEL PRESSURE					
	MEAN	MAX	DATE	MIN	DATE	NORMAL	MEAN	MAX	DATE	MIN	DATE	NORMAL
JAN	988.7	1005.1	20	967.9	31	989.6	1020.5	1038.4	20	998.1	31	1021
FEB	989.2	1004.8	25	963.5	1	989.7	1020.6	1036.4	25	993.7	1	1021
MAR	991.1	1000.7	19	976.5	3	987.7	1022.1	1031.5	19	1006.4	3	1018
APR	981.7	997.4	18	960.8	8	986.8	1011.2	1027.5	18	989.4	8	1016
MAY	987.1	1003.6	5	968.2	17	985.3	1016.2	1033.7	5	996.4	17	1015
JUN	982.5	994.5	3	963.5	28	983.2	1011.1	1023.5	3	991.1	28	1012
JUL	983.2	996.7	20	969.4	24	984.7	1012.0	1026.0	20	997.6	24	1013
AUG	984.0	995.8	31	970.4	17	985.2	1012.7	1025.2	31	998.4	17	1014
SEPT	982.5	998.4	14	962.9	21	987.0	1011.5	1028.3	14	991.1	21	1014
OCT	983.3	998.8	15	964.8	6	985.9	1012.8	1029.1	15	993.4	6	1015
NOV	988.3	1007.4	14	952.9	25	986.5	1018.7	1038.3	14	982.4	25	1016
DEC	986.1	1004.3	5,6	962.2	1	987.5	1018.3	1036.3	5,6	991.3	1	1019
YEAR	985.6	1007.4	Nov. 14	952.9	Nov. 25	986.6	1015.6	1038.4	Jan. 20	982.4	Nov. 25	1016

* 1 Millibar = 0.02953 inches of mercury / 33.864 Millibars = 1 inch of mercury

Table 3.13

ANNUAL METEOROLOGICAL SUMMARY
for

WINNIPEG, MANITOBA

DATA FOR YEAR 1971

MONTH	TEMPERATURE (°F) MEAN MAXIMUM	MEAN MINIMUM	MEAN FROM MAX/MIN	EXTREME MAXIMUM	DATE	MINIMUM	DATE	DEGREE DAYS BELOW 65°F	MEAN RELATIVE HUMIDITY (%) 0000 CST	0600 CST	1200 CST	1800 CST
JAN	0.0	-16.9	- 8.5	26	21	-33	15	2282	74	73	70	72
FEB	16.8	- 2.8	7.0	39	16	-27	2 & 3	1623	78	81	77	78
MAR	29.3	10.4	19.9	42	30	-10	1	1392	83	85	78	79
APR	47.6	28.0	37.8	68	15	2	3 & 4	809	76	82	65	63
MAY	64.7	35.6	50.2	81	9 & 28	26	11	450	68	74	43	41
JUN	74.5	52.6	63.6	89	3	35	1	83	79	84	60	58
JUL	72.6	50.4	61.5	87	24	40	17 & 29	119	84	87	61	57
AUG	78.1	53.4	65.8	93	15	38	2	65	75	86	55	48
SEPT	67.8	44.1	56.0	87	2	28	21	279	80	86	53	56
OCT	52.6	34.1	43.4	67	18	14	31	664	87	90	72	75
NOV	28.1	15.7	21.9	40	9	-11	29 & 30	1286	86	87	85	85
DEC	13.4	- 4.2	4.6	33	31	-22	26	1870	77	80	77	78
YEAR	45.5	25.0	35.3	93	Aug. 15	-33	Jan. 15	10922	79	83	66	66

MONTH	PRECIPITATION (INS) RAIN-FALL	SNOW-FALL	TOTAL PRECIP	GREATEST RAINFALL 6 HRS	DATE	24 HRS	DATE	GREATEST SNOWFALL 6 HRS	DATE	24 HRS	DATE
JAN	....	6.0	.42					.7	13	2.2	13
FEB	.01	2.5	.18	.01	16	.01	16	.5	10	.8	10
MAR	.29	14.5	1.72	.14	14	.14	14	2.6	14	5.0	14
APR	1.77	6.4	2.37	.85	18	1.18	18	1.8	13	1.9	1
MAY	1.85		1.85	.85	22	1.08	22	...	..	...	..
JUN	2.99		2.99	.66	5	.86	5				
JUL	4.53		4.53	.96	7	.96	7				
AUG	.67		.67	.40	16	.45	16				
SEPT	1.96		1.96	.60	12	.75	5				
OCT	1.65	12.0	2.84	.29	2	.61	2	4.4	30	9.7	30
NOV	.21	7.4	.88	.18	14	.18	14	3.3	4	3.3	4
DEC	.01	2.8	.23	.01	23	.01	23	1.0	20	1.0	20
YEAR	15.94	51.6	20.64	.96	July 7	1.18	April 18	4.4	October 30	9.7	October 30

NOTE: The following units are used throughout this summary

Temperature: Degrees Fahrenheit

Degree Day: Difference of Daily Mean Temperatures from 65°F

Relative Humidity: Percentage

Precipitation: Inches – (Snowfall is reduced to its "Water Content" by melting then added to rainfall to obtain "Total Precipitation".)

Wind Speed: Miles per hour

Wind Direction: Direction (true north) from which the wind is blowing

Barometric Pressure: Millibars and Tenths of Millibars

Sunshine: Hours and Tenths of Hours of Bright Sunshine

Table 3.14

ANNUAL METEOROLOGICAL SUMMARY
for

WINNIPEG, MANITOBA

DATA FOR YEAR 1971

MONTH	SUNSHINE				WIND					
	DURATION IN HOURS	PERCENTAGE OF POSSIBLE	NO. OF DAYS WITHOUT SUNSHINE	NORMAL	AVERAGE SPEED	PREVAILING DIRECTION	MAX FOR 1 MIN		HIGHEST GUST	
							DIRECTION AND SPEED	DATE	DIRECTION AND SPEED	DATE
JAN	149.2	55.8	2	101.0	10.9	WNW	S35,SSE35	19, 20	S 49	19
FEB	141.0	50.1	1	133.3	10.8	S	NW 35	27	S 44	13
MAR	140.5	38.2	6	166.8	10.5	NW	NW 36	31	S41, NW41	3, 31
APR	209.3	50.7	2	206.9	13.1	S	NNW 34	1	W 50	11
MAY	326.7	68.5	3	243.9	11.6	NNE	S 31	28	NW 46	15
JUN	257.3	52.6	0	248.0	8.5	NNE	SE 23	9	SSE 39	26
JUL	309.8	62.9	0	310.1	10.1	NNW	NW 34	25	SE 57	7
AUG	314.2	70.1	0	269.8	9.4	S	SW 27	15	S 45	15
SEPT	187.0	49.3	2	180.7	9.7	S	S 24	25	WNW 36	12
OCT	117.5	35.2	9	152.9	11.3	S	NNW 30	30	S 60	18
NOV	74.3	27.2	8	81.7	10.2	W	S 30	22	S 48	22
DEC	79.9	31.5	9	80.6	11.9	S	NW 26	23	S 39	9
YEAR	2306.7	51.5	42	2175.7	10.7	S	NW 36	March 31	S 60	Oct. 18

MONTH	BAROMETRIC PRESSURE (mb)*											
	STATION LEVEL PRESSURE						SEA LEVEL PRESSURE					
	MEAN	MAX	DATE	MIN	DATE	NORMAL	MEAN	MAX	DATE	MIN	DATE	NORMAL
JAN	989.0	1010.5	15	965.5	21	989.6	1020.6	1043.6	15	995.5	21	1021
FEB	985.1	1004.2	12	961.6	25	989.7	1015.9	1036.1	12	990.7	25	1021
MAR	986.0	1003.7	2	967.5	14	987.7	1016.2	1035.3	2	996.7	14	1018
APR	986.3	1004.5	4	961.6	16	986.8	1016.1	1035.3	4	989.9	16	1016
MAY	986.1	1003.7	11	969.3	17	985.3	1015.1	1033.6	11	997.8	17	1015
JUN	982.6	994.6	8	969.5	5	983.2	1011.3	1023.7	8	997.5	5	1012
JUL	982.9	994.6	10	964.9	25	984.7	1012.3	1023.6	10	992.7	25	1013
AUG	985.7	996.9	30	972.6	12	985.2	1014.5	1026.2	30	1000.8	12	1014
SEPT	983.2	1003.1	17	968.7	13	987.0	1012.2	1033.0	17	997.2	13	1014
OCT	983.0	1007.4	29	960.2	31	985.9	1012.5	1038.3	29	989.4	30	1015
NOV	985.9	1003.2	7	961.1	5	986.5	1015.9	1034.4	7	990.2	5	1016
DEC	986.6	1005.7	21	965.9	31	987.5	1017.5	1038.1	21	995.9	31	1019
YEAR	985.2	1010.5	Jan. 15	960.2	Oct. 31	986.6	1015.0	1043.6	Jan. 15	989.4	Oct. 30	1016

* 1 Millibar = 0.02953 inches of mercury / 33.864 Millibars = 1 inch of mercury

TABLE 4.1

Error Analysis of the Temperature System

	Error Type	Standard Deviation	
		Differential Mode	Absolute Mode
1.	Radiation Shield	Negligible	±0.1
2.	Calibration Error of Temperature Sensor	±0.04	±0.04
3.	Leadwire Errors	±0.02	±0.02
4.	Non-linearity of the Linear Bridge	Negligible	±0.02
5.	Errors due to line voltage variations	±0.01	±0.01
6.	Errors due to temperature variations on Linear Bridge	±0.005	±0.025
7.	Digital Voltmeter errors	±0.02	±0.02
8.	Adjustment and resolution errors at the Linear Bridge due to potentiometers	±0.02	±0.02
9.	Radiation stem conduction and time constant	Negligible	±0.1
	Total Error Std. Devn.	±0.055	±0.184

Table 4.2

Winnipeg C.B.C. Tower, Details of Sampling Periods

	Period 1, Oct.1969-Dec 1971			Period 2, Oct.1969 - June 1972		
	Operational Hours	Potential Hours	% Time in Operation	Operational Hours	Potential Hours	% Time in Operation
Jan	1392	1488	93.5	2109	2232	94.4
Feb	1239	1344	92.1	1934	2040	94.8
Mar	1350	1488	90.7	2094	2232	93.8
Apr	873	1440	60.6	1590	2160	73.6
May	1382	1488	92.8	2008	2232	89.9
Jun	1403	1440	97.4	2017	2160	93.3
Jul	1323	1488	91.3	1468	1633	98.1
Aug	1187	1488	79.8	1187	1488	79.7
Sep	1352	1440	93.8	1352	1440	93.8
Oct	1912	2232	85.6	1912	2232	85.7
Nov	2114	2160	97.8	2114	2160	97.8
Dec	1881	2232	84.2	1881	2232	84.2
Spring	3605	4416	81.6	5692	6624	85.9
Summer	3917	4416	88.7	4672	5281	88.5
Autumn	5378	5832	92.2	5378	5832	92.2
Winter	4512	5880	76.7	5924	6504	91.0
All Year	17412	19728	88.2	21666	24241	89.4

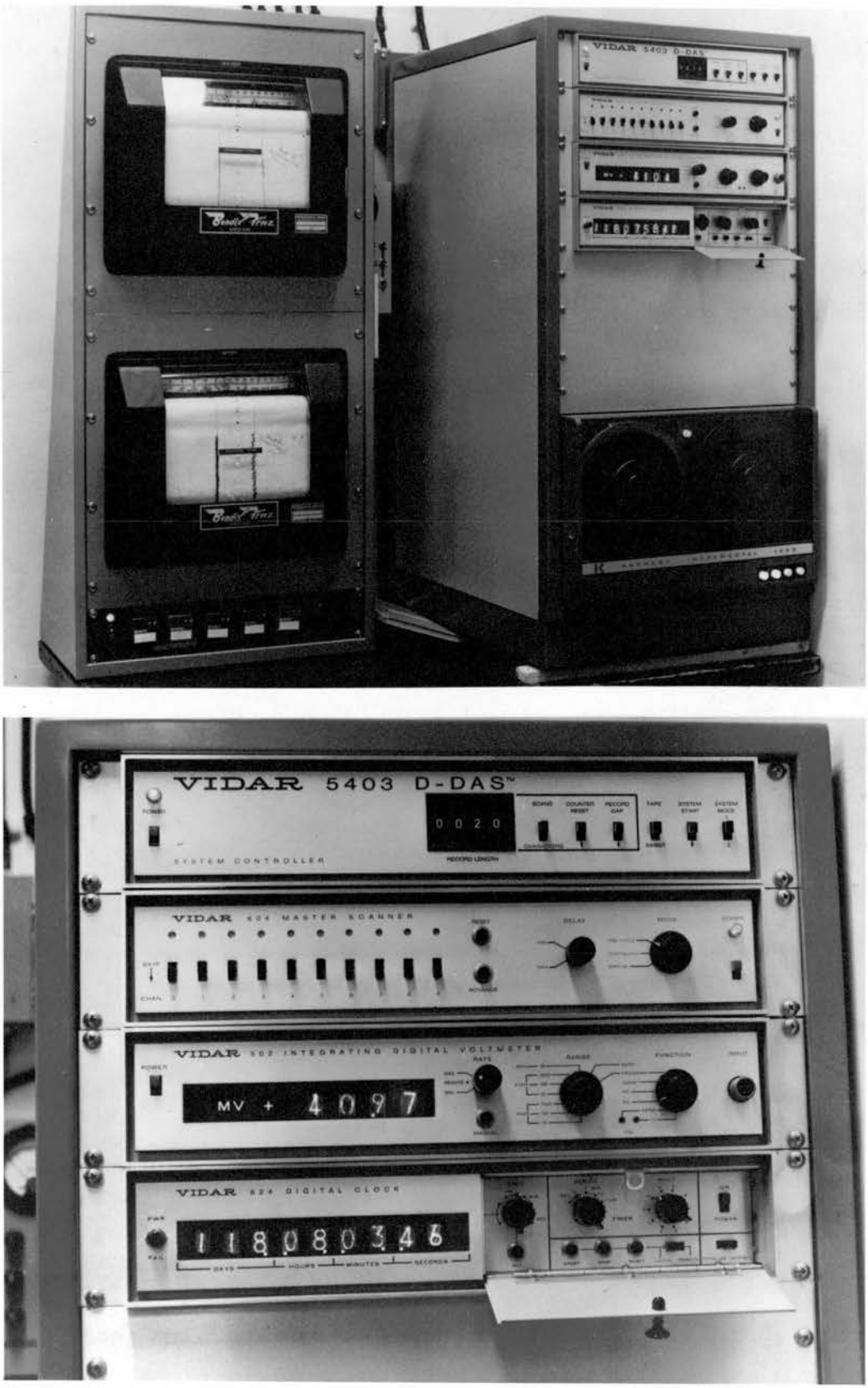


Plate 1 (top) and 2 (bottom). Tower Instrumentation, C.B.C. Tower

Plate 3 Vertical Air Photograph of the Starbuck Tower Site (circled)

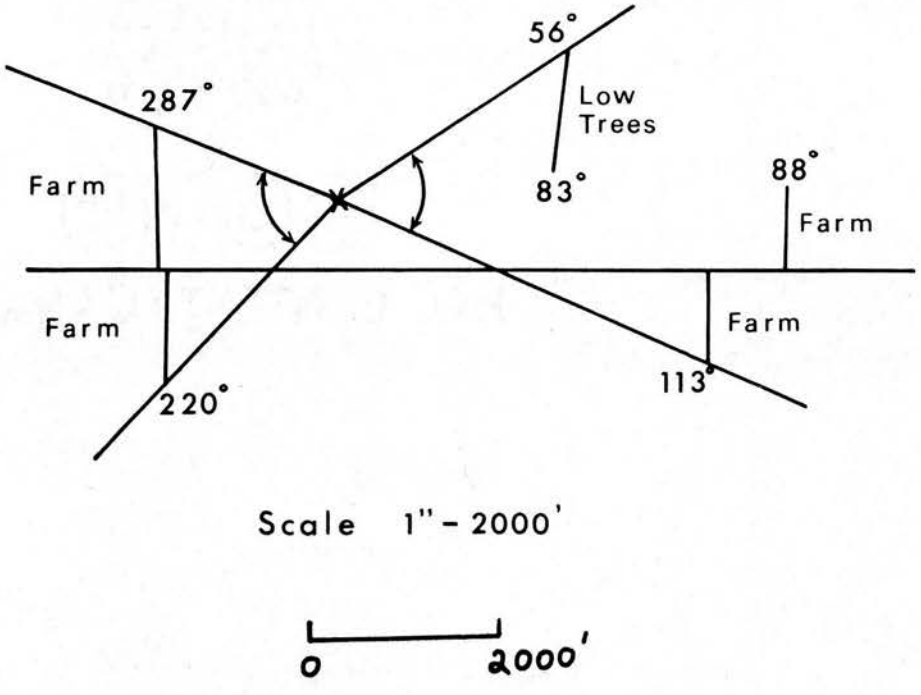
Plate 4 Vertical Air Photograph of the Starbuck Tower Site (circled)

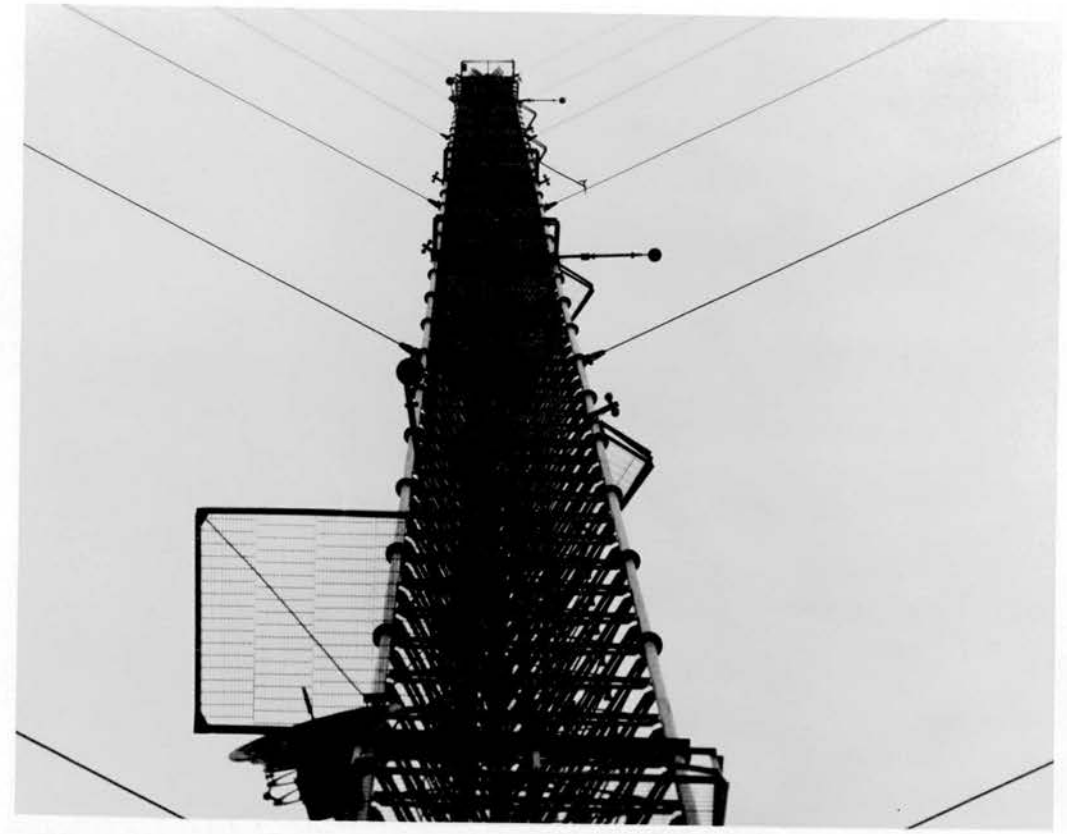
Plate 5 Vertical Air Photograph of the Starbuck Tower Site (circled)

Plate 6 Vertical Air Phograph of the Starbuck Tower Site (circled)

Figure 4.1

Bearings and Distances to Obstructions Close to the C.B.C. Tower





Plates 7 (top) and 8 (bottom)
Meteorological Instruments, C.B.C., Starbuck

Figure 4.2

Location of Wind Sensors on the C.B.C. Tower

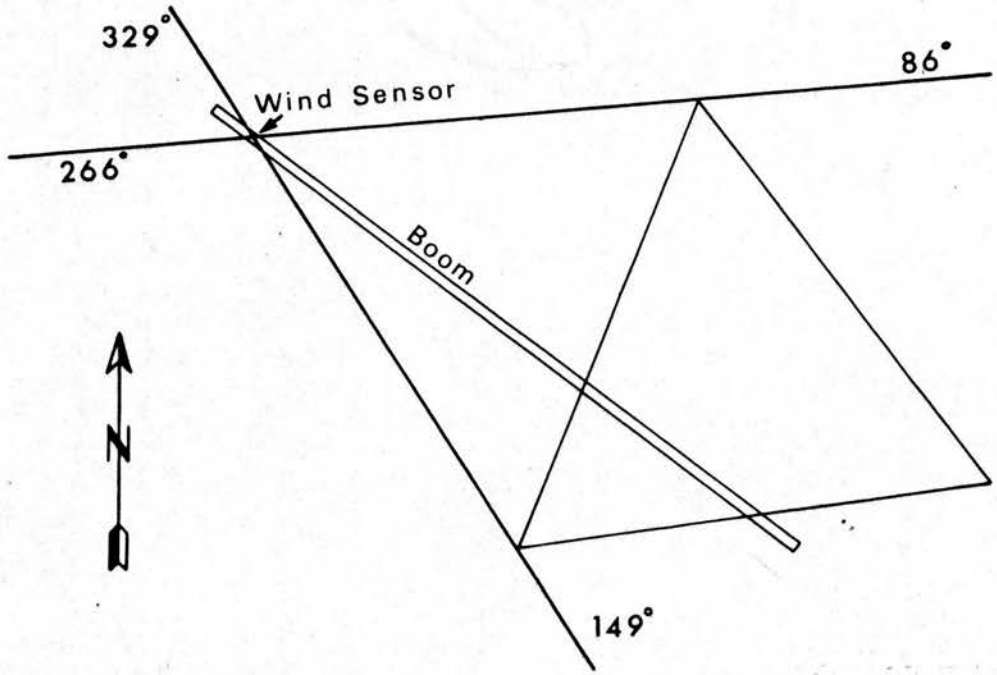


Table 5.1

PERCENT FREQUENCY OF LAPSE RATES

IN THE 35-200 FOOT LAYER FOR THE MONTH OF JAN 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10									.8				1	1		
5 - <10							2.5						3	4	.2	.2
4 - <5							2.5	2.5		.8			7	11	.5	.7
3 - <4							9.4	5.1					17	28	1.2	2.0
2.5 - <3						4.2	11.1	11.9	1.7				34	62	2.4	4.4
2 - <2.5																
1.5 - <2																
1.1 - <1.5	1.7	.8		.8	4.4	11.9	22.2	17.9	2.5	1.6	1.7	2.5	80	142	5.7	10.2
.9 - < 1.1	2.6	.8	3.5	3.4	2.6	5.1	2.5	5.9	6.8	5.0	2.5	2.5	51	193	3.6	13.8
.5 - < .9	19.1	20.0	18.5	20.8	23.0	22.2	22.2	30.7	28.2	18.6	17.9	16.9	300	493	21.5	35.4
.1 - < .5	4.3	6.9	5.3	7.8	7.0	11.9	5.1	5.1	11.1	8.4	5.9	8.4	102	595	7.3	42.7
-.1 - < .1	1.7	2.6	2.6	5.2	4.4	3.4	2.5	7.6	11.9	2.5	1.7	2.5	57	652	4.0	46.8
-.5- <-.1	6.0	3.4	9.7	4.3	4.4	6.8	5.9	4.2	5.1	11.0	7.6	6.7	88	740	6.3	53.1
-1.0 - <-.5	3.4	8.6	7.0	4.3	4.4	2.5	5.1	2.5	5.1	5.0	8.5		66	806	4.7	57.9
-1.5 - <-1.	6.9	4.3	4.4	6.0	4.4	4.2	5.9	1.7	6.8	4.2	5.9	5.9	71	877	5.1	63.0
-2.0 - <-1.5	3.4	2.6	2.6	2.6	1.7	3.4	.8	1.7	5.9	5.9	6.8	5.9	51	928	3.6	66.6
-2.5 - <-2	3.4	3.4	4.4	2.6	3.5	4.2	.8	.8	2.5	2.5	.8	3.3	38	966	2.7	69.3
-3 - <-2.5	1.7	1.7	5.3	6.9	2.6			.8	1.7	6.7	2.5	4.2	40	1006	2.8	72.2
-3.5 - <-3	5.2	3.4	4.4	3.4	4.4	1.7		.8	1.7	2.5	3.4	.8	37	1043	2.6	74.9
-4 - <-3.5	3.4	6.9	1.7	4.3	.8	5.9	.8		.8	2.5		4.2	37	1080	2.6	77.5
-4.5- <-4.	4.3	1.7	.8	2.6	3.5	2.5			2.5	2.5	4.2	5.0	35	1115	2.5	80.1
-5 - <-4.5	2.6	4.3	5.3	3.4	1.7	.8			2.5	1.6	5.1	2.5	35	1150	2.5	82.6
-5.5- <-5	3.4	1.7	2.6		2.6	.8				5.0	2.5	1.6	24	1174	1.7	84.3
-6 - <-5.5	2.6	3.4	.8	.8	1.7	.8			.8	.8	5.9	2.5	24	1198	1.7	86.0
-7 - < -6	5.2	6.0	1.7	3.4	7.0	1.7				2.5	5.9	10.1	51	1249	3.6	89.7
-8 - < -7	6.0	5.2	7.0	2.6	6.1	2.5		.0	.8	3.3	5.9	2.5	49	1298	3.5	93.2
-9 - < -8	.8	4.3	4.4	3.4	1.7	1.7				2.5	1.7	2.5	27	1325	1.9	95.1
-10 - < -9	1.7	.8	.8	3.4	1.7	.8				1.6	.8	3.3	18	1343	1.2	96.4
-20 - < -10	9.5	6.0	6.1	6.9	5.3					1.6	1.7	5.0	49	1392	3.5	100.0
-50 - < -20														1392		100.0
< -50														1392		100.0
TOT BY HRS	115	115	113	115	113	117	117	117	117	118	117	118	1392			
% TOT BY HRS	8.2	8.2	8.1	8.2	8.1	8.4	8.4	8.4	8.4	8.4	8.4	8.4				

Table 5.2

PERCENT FREQUENCY OF LAPSE RATES

IN THE 35-40C FOOT LAYER FOR THE MONTH OF JAN 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3									.8				1	1		
2 - <2.5														1		
1.5 - <2							5.1	3.4					10	11	.7	.7
1.1 - <1.5	.8				.8	7.6	13.6	19.6	5.1	1.6	2.5	1.6	63	74	4.5	5.3
.9 - < 1.1	2.6	.8		2.6	8.8	5.1	11.1	9.4	5.1	7.6	2.5	1.6	67	141	4.8	10.1
.5 - < .9	13.0	15.6	15.9	20.0	16.8	24.7	29.9	35.8	34.1	19.4	17.0	16.1	301	442	21.6	31.7
.1 - < .5	3.4	6.0	7.9	10.4	7.9	10.2	8.5	10.2	14.5	6.7	7.6	8.4	119	561	8.5	40.3
-.1 - < .1	6.0	5.2	.8	2.6	2.6	2.5	1.7	2.5	5.9	7.6	3.4	.8	49	610	3.5	43.8
-.5- <-.1	6.9	7.8	12.3	6.9	9.7	6.8	7.6	6.8	8.5	11.8	9.4	11.8	124	734	8.9	52.7
-1.0 - <-.5	7.8	8.6	8.8	5.2	3.5	3.4	7.6	2.5	10.2	8.4	9.4	5.9	95	829	6.8	59.5
-1.5 - <-1.	12.1	6.0	10.6	1.7	2.6	5.1	4.2	2.5	5.1	8.4	6.8	5.9	83	912	5.9	65.5
-2.0 - <-1.5	3.4	6.9	6.1	6.9	6.1	4.2	1.7	3.4	1.7	7.6	9.4	7.6	76	988	5.4	70.9
-2.5 - <-2	6.9	5.2	.8	8.6	6.1	5.9	2.5	2.5	3.4	7.6	6.8	7.6	75	1063	5.3	76.3
-3 - <-2.5	5.2	2.6	5.3	5.2	5.3	6.8	2.5	.8	2.5	3.3	8.5	8.4	66	1129	4.7	81.1
-3.5 - <-3	8.6	6.9	6.1	5.2	3.5	5.1	.8		1.7	1.6	5.1	4.2	57	1186	4.0	85.2
-4 - <-3.5	4.3	9.5	5.3	1.7	3.5	2.5	.8		.8		4.2	2.5	41	1227	2.9	88.1
-4.5- <-4.	3.4	5.2	4.4	3.4	3.5	2.5	1.7			2.5	2.5	5.9	41	1268	2.9	91.0
-5 - <-4.5	2.6	2.6	2.6	8.6	5.3	.8				3.3	1.7	3.3	36	1304	2.5	93.6
-5.5- <-5	4.3	1.7	3.5		2.6	3.4				.8	.8	1.6	22	1326	1.5	95.2
-6 - <-5.5	.8	.8	3.5	.8	1.7	.8							10	1336	.7	95.9
-7 - < -6	4.3	4.3	1.7	5.2	7.0	1.7				.8		5.0	35	1371	2.5	98.4
-8 - < -7	1.7	2.6	3.5	3.4	1.7						1.7	.8	18	1389	1.2	99.7
-9 - < -8	.8	.8											2	1391	.1	99.9
-10 - < -9				.8									1	1392		100.0
-20 - < -10														1392		100.0
-50 - < -20														1392		100.0
< -50														1392		100.0
TOT BY HRS	115	115	113	115	113	117	117	117	117	118	117	118	1392			
% TOT BY HRS	8.2	8.2	8.1	8.2	8.1	8.4	8.4	8.4	8.4	8.4	8.4	8.4				

Table 5.3

PERCENT FREQUENCY OF LAPSE RATES

IN THE 35-600 FOOT LAYER FOR THE MONTH OF JAN 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3																
2 - <2.5																
1.5 - <2																
1.1 - <1.5							2.5	1.7					5	5	.3	.3
.9 - < 1.1							2.5	1.7	.8				6	11	.4	.7
.5 - < .9	10.4	8.6	5.3	12.1	18.5	23.0	35.8	45.2	28.2	17.7	13.6	11.0	268	279	19.2	20.0
.1 - < .5	6.0	7.8	9.7	12.1	9.7	14.5	13.6	17.0	28.2	14.4	11.9	6.7	177	456	12.7	32.7
-.1 - < .1	3.4	5.2	6.1	5.2	2.6	5.9	.8	5.1	4.2	8.4	7.6	4.2	69	525	4.9	37.7
-.5 - <-.1	10.4	11.3	15.0	13.0	12.3	8.5	7.6	5.9	14.5	15.2	10.2	14.4	161	686	11.5	49.2
-1.0 - <-.5	13.0	12.1	10.6	4.3	7.0	6.8	11.9	8.5	8.5	14.4	10.2	13.5	141	827	10.1	59.4
-1.5 - <-1.	7.8	7.8	6.1	6.0	3.5	5.1	6.8	3.4	4.2	11.0	13.6	6.7	96	923	6.8	66.3
-2.0 - <-1.5	10.4	6.0	7.0	8.6	8.8	9.4	7.6	8.5	2.5	6.7	11.9	15.2	120	1043	8.6	74.9
-2.5 - <-2	10.4	12.1	11.5	7.8	6.1	5.9	4.2		5.1	3.3	8.5	6.7	95	1138	6.8	81.7
-3 - <-2.5	8.6	9.5	7.0	6.0	6.1	4.2	3.4	2.5	2.5	2.5	5.1	5.9	74	1212	5.3	87.0
-3.5 - <-3	5.2	6.9	8.8	8.6	7.9	3.4	.8		.8	3.3	2.5	5.0	62	1274	4.4	91.5
-4 - <-3.5	3.4	1.7	4.4	6.0	1.7	7.6	1.7			1.6	1.7	4.2	40	1314	2.8	94.3
-4.5 - <-4.	3.4	4.3	1.7	1.7	5.3	1.7				.8	.8	1.6	25	1339	1.7	96.1
-5 - <-4.5	4.3	2.6	3.5	5.2	7.0	2.5					.8	3.3	34	1373	2.4	98.6
-5.5 - <-5	.8	1.7	2.6		1.7	.8					.8		10	1383	.7	99.3
-6 - <-5.5	1.7	.8		.8	.8								5	1388	.3	99.7
-7 - < -6		.8		1.7								.8	4	1392	.2	100.0
-8 - < -7														1392		100.0
-9 - < -8														1392		100.0
-10 - < -9														1392		100.0
-20 - < -10														1392		100.0
-50 - < -20														1392		100.0
< -50														1392		100.0
TOT BY HRS	115	115	113	115	113	117	117	117	117	118	117	118	1392			
% TOT BY HRS	8.2	8.2	8.1	8.2	8.1	8.4	8.4	8.4	8.4	8.4	8.4	8.4				

All data using the 600' level should be treated with caution (see chapter five)

Table 5.4

PERCENT FREQUENCY OF LAPSE RATES

IN THE 35-810 FOOT LAYER FOR THE MONTH OF JAN 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3																
2 - <2.5																
1.5 - <2																
1.1 - <1.5							.8	2.5					4	4	.2	.2
.9 - < 1.1							5.1	5.9	.8			.8	15	19	1.0	1.3
.5 - < .9	6.9	6.0	5.3	10.4	15.0	21.3	39.3	42.7	38.4	16.9	13.6	7.6	261	280	18.7	20.1
.1 - < .5	8.6	8.6	15.0	9.5	12.3	11.9	6.8	11.9	17.0	22.8	13.6	10.1	173	453	12.4	32.5
-.1 - < .1	3.4	6.9	3.5	8.6	6.1	5.1	2.5	1.7	6.8	7.6	5.9	6.7	76	529	5.4	38.0
-.5 - <-.1	17.3	17.3	18.5	13.9	10.6	13.6	12.8	8.5	14.5	17.7	14.5	15.2	203	732	14.5	52.5
-1.0 - <-.5	10.4	11.3	8.8	11.3	10.6	10.2	9.4	11.9	6.8	15.2	19.6	18.6	168	900	12.0	64.6
-1.5 - <-1.	16.5	15.6	9.7	6.9	6.1	10.2	11.1	8.5	5.1	5.9	16.2	15.2	148	1048	10.6	75.2
-2.0 - <-1.5	10.4	7.8	11.5	9.5	8.8	7.6	5.9	4.2	5.1	7.6	6.8	6.7	107	1155	7.6	82.9
-2.5 - <-2	9.5	9.5	12.3	10.4	8.8	5.9	4.2	1.7	3.4	2.5	1.7	6.7	89	1244	6.3	89.3
-3 - <-2.5	6.0	6.0	4.4	9.5	7.9	8.5	.8		1.7	3.3	4.2	5.0	67	1311	4.8	94.1
-3.5 - <-3	3.4	2.6	6.1	6.0	9.7	1.7					1.7	4.2	41	1352	2.9	97.1
-4 - <-3.5	5.2	5.2	3.5	.8	2.6	1.7	.8				.8	1.6	26	1378	1.8	98.9
-4.5 - <-4.	.8	2.6	.8	.8		1.7					.9		9	1387	.6	99.6
-5 - <-4.5	.8			.8	.8							.8	4	1391	.2	99.9
-5.5 - <-5				.8									1	1392		100.0
-6 - <-5.5														1392		100.0
-7 - < -6														1392		100.0
-8 - < -7														1392		100.0
-9 - < -8														1392		100.0
-10 - < -9														1392		100.0
-20 - < -10														1392		100.0
-50 - < -20														1392		100.0
< -50														1392		100.0
TOT BY HRS	115	115	113	115	113	117	117	117	117	118	117	118	1392			
% TOT BY HRS	8.2	8.2	8.1	8.2	8.1	8.4	8.4	8.4	8.4	8.4	8.4	8.4				

Table 5.5

PERCENT FREQUENCY OF LAPSE RATES

IN THE 200-400 FOOT LAYER FOR THE MONTH OF JAN 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3																
2 - <2.5																
1.5 - <2							.8						1	1		
1.1 - <1.5	1.7	.8		2.6	2.6	1.7	3.4	10.2	6.8	6.7	2.5	1.6	48	49	3.4	3.5
.9 - < 1.1	.8			1.7	5.3	6.8	9.4	17.0	5.9	6.7	4.2	2.5	71	120	5.1	8.6
.5 - < .9	17.3	19.1	19.4	20.8	24.7	27.3	37.6	36.7	48.7	31.3	28.2	18.6	384	504	27.5	36.2
.1 - < .5	9.5	7.8	7.9	11.3	7.0	11.1	8.5	8.5	16.2	20.3	13.6	13.5	158	662	11.3	47.5
-.1 - < .1	3.4	5.2	4.4	4.3	4.4	5.9	5.1	3.4	5.9	8.4	8.5	6.7	77	739	5.5	53.0
-.5 - <-.1	17.3	13.0	19.4	13.0	8.8	5.1	4.2	7.6	4.2	11.8	13.6	18.4	159	898	11.4	64.5
-1.0 - <-.5	13.0	15.6	15.0	6.0	11.5	8.5	6.8	1.7	2.5	4.2	9.4	12.7	124	1022	8.9	73.4
-1.5 - <-1.	10.4	11.3	4.4	4.3	5.3	4.2	5.9	5.9	1.7	.8	7.6	5.9	79	1101	5.6	79.0
-2.0 - <-1.5	11.3	6.0	8.8	5.2	5.3	2.5	3.4	2.5	2.5	3.3	4.2	4.2	69	1170	4.9	84.0
-2.5 - <-2	4.3	2.6	1.7	7.8	5.3	5.9	2.5	1.7	2.5	2.5	3.4	6.7	55	1225	3.9	88.0
-3 - <-2.5	2.6	5.2	5.3	2.6	4.4	.8	.8	.8	.8	.8	.8	.8	30	1255	2.1	90.1
-3.5 - <-3	1.7	2.6		6.0	1.7	2.5	2.5	1.7		.8	.8	1.6	26	1281	1.8	92.0
-4 - <-3.5	3.4	2.6	4.4	.8	1.7	2.5	2.5	.8	.8	.8	1.7	.8	27	1308	1.9	93.9
-4.5 - <-4.	.8	2.6	1.7	1.7	3.5	3.4	2.5	.8				1.6	22	1330	1.5	95.5
-5 - <-4.5	.8	3.4		1.7		5.1	.8			.8		1.6	17	1347	1.2	96.7
-5.5 - <-5		.8	.8	2.6	1.7	2.5			.8			.8	12	1359	.8	97.6
-6 - <-5.5	.8		.8	2.6	1.7						.8		8	1367	.5	98.2
-7 - < -6		.8	5.3	1.7			1.7					.8	12	1379	.8	99.0
-8 - < -7				2.6		.8	.8						5	1384	.3	99.4
-9 - < -8					2.6								3	1387	.2	99.6
-10 - < -9					.8	2.5		.*					4	1391	.2	99.9
-20 - < -10					.8								1	1392		100.0
-50 - < -20														1392		100.0
< -50														1392		100.0
TOT BY HRS	115	115	113	115	113	117	117	117	117	118	117	118	1392			
% TOT BY HRS	8.2	8.2	8.1	8.2	8.1	8.4	8.4	8.4	8.4	8.4	8.4	8.4				

Table 5.6

PERCENT FREQUENCY OF LAPSE RATES

IN THE 200-600 FOOT LAYER FOR THE MONTH OF JAN 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3																
2 - <2.5																
1.5 - <2																
1.1 - <1.5																
.9 - < 1.1																
.5 - < .9	10.4	6.9	6.1	11.3	16.8	21.3	26.4	41.0	35.0	20.3	15.3	11.8	259	259	18.6	18.6
.1 - < .5	11.3	13.9	9.7	10.4	9.7	10.2	23.0	17.9	28.2	32.2	20.5	11.8	232	491	16.6	35.2
-.1 - < .1	5.2	7.8	7.0	9.5	7.0	8.5	3.4	3.4	9.4	12.7	16.2	6.7	113	604	8.1	43.3
-.5 - <-.1	18.2	18.2	23.8	15.6	12.3	11.1	5.9	9.4	7.6	14.4	17.0	26.2	209	813	15.0	58.4
-1.0 - <-.5	20.0	21.7	14.1	13.0	13.2	8.5	5.9	6.8	5.9	5.0	12.8	15.2	165	978	11.8	70.2
-1.5 - <-1.	6.0	6.9	11.5	8.6	8.8	6.8	6.8	5.1	4.2	6.7	6.8	7.6	100	1078	7.1	77.4
-2.0 - <-1.5	13.9	4.3	4.4	2.6	6.1	7.6	8.5	6.8	4.2	5.0	5.9	7.6	90	1168	6.4	83.9
-2.5 - <-2	1.7	3.4	7.9	7.8	4.4	4.2	7.6	2.5		1.6	1.7	4.2	55	1223	3.9	87.8
-3 - <-2.5	6.0	6.9	4.4	6.0	8.8	4.2	2.5	3.4	2.5	1.6	1.7	3.3	60	1283	4.3	92.1
-3.5 - <-3	2.6	5.2	6.1	7.8	4.4	6.8	3.4	1.7	.8		.8	3.3	50	1333	3.5	95.7
-4 - <-3.5	2.6	4.3	.8	4.3	1.7	3.4	2.5		.8		.8	.8	26	1359	1.8	97.6
-4.5- <-4.	.8		.8	.8	1.7	.8	.8					.8	8	1367	.5	98.2
-5 - <-4.5	.8		2.6	.8	.8	1.7	.8	1.7	.8				12	1379	.8	99.0
-5.5- <-5		.8		.8	.8	1.7							5	1384	.3	99.4
-6 - <-5.5					.8		.8						2	1386	.1	99.5
-7 - < -6					1.7	.8	.8						4	1390	.2	99.8
-8 - < -7						1.7							2	1392	.1	100.0
-9 - < -8														1392		100.0
-10 - < -9														1392		100.0
-20 - < -10														1392		100.0
-50 - < -20														1392		100.0
< -50														1392		100.0
TOT BY HRS	115	115	113	115	113	117	117	117	117	118	117	118	1392			
% TOT BY HRS	8.2	8.2	8.1	8.2	8.1	8.4	8.4	8.4	8.4	8.4	8.4	8.4				

All data using the 600' level should be treated with caution (see chapter five)

Table 5.7

PERCENT FREQUENCY OF LAPSE RATES

IN THE 200-810 FOOT LAYER FOR THE MONTH OF JAN 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3																
2 - <2.5																
1.5 - <2																
1.1 - <1.5																
.9 - < 1.1								.8					1	1		
.5 - < .9	9.5	7.8	7.0	10.4	17.6	18.8	35.0	47.0	50.4	27.9	16.2	11.0	302	303	21.6	21.7
.1 - < .5	13.9	12.1	14.1	14.7	9.7	15.3	12.8	11.1	13.6	35.5	29.9	20.3	237	540	17.0	38.7
-.1 - < .1	8.6	9.5	11.5	9.5	8.8	5.9	2.5	5.1	6.8	9.3	10.2	14.4	119	659	8.5	47.3
-.5- <-.1	22.6	25.2	20.3	16.5	17.6	14.5	11.9	5.9	10.2	9.3	18.8	18.6	222	881	15.9	63.2
-1.0 - <-.5	18.2	19.1	16.8	13.9	10.6	11.1	7.6	7.6	5.1	5.0	11.9	12.7	162	1043	11.6	74.9
-1.5 - <-1.	10.4	6.0	8.8	11.3	10.6	6.8	5.9	9.4	4.2	5.9	8.5	11.8	116	1159	8.3	83.2
-2.0 - <-1.5	6.0	12.1	9.7	6.9	7.0	10.2	8.5	6.8	5.1	2.5	.8	4.2	93	1252	6.6	89.9
-2.5 - <-2	2.6	3.4	6.1	9.5	12.3	9.4	10.2	1.7	1.7	4.2	.8	3.3	76	1328	5.4	95.4
-3 - <-2.5	1.7	.8	.8	4.3	.8	2.5	.8	2.5	1.7			1.6	21	1349	1.5	96.9
-3.5 - <-3	1.7	.8	.8	.8	.8		2.5	.8			2.5	1.6	15	1364	1.0	97.9
-4 - <-3.5	4.3		.8	1.7	.8	.8		.8	.8				12	1376	.8	98.8
-4.5- <-4.		2.6	.8		2.6	1.7	.8						10	1386	.7	99.5
-5 - <-4.5			1.7			.8							3	1389	.2	99.7
-5.5- <-5						1.7	.8						3	1392	.2	100.0
-6 - <-5.5														1392		100.0
-7 - < -6														1392		100.0
-8 - < -7														1392		100.0
-9 - < -8														1392		100.0
-10 - < -9														1392		100.0
-20 - < -10														1392		100.0
-50 - < -20														1392		100.0
< -50														1392		100.0
TOT BY HRS	115	115	113	115	113	117	117	117	117	118	117	118	1392			
% TOT BY HRS	8.2	8.2	8.1	8.2	8.1	8.4	8.4	8.4	8.4	8.4	8.4	8.4				

Table 5.8

PERCENT FREQUENCY OF LAPSE RATES

IN THE 400-600 FOOT LAYER FOR THE MONTH OF JAN 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3																
2 - <2.5																
1.5 - <2																
1.1 - <1.5																
.9 - < 1.1																
.5 - < .9	1.7	.8		1.7		3.4	2.5	5.1	5.1	3.3	.8	1.6	31	31	2.2	2.2
.1 - < .5	17.3	15.6	19.4	16.5	25.6	23.0	25.6	38.4	45.2	39.8	27.3	19.4	365	396	26.2	28.4
-.1 - < .1	9.5	10.4	11.5	3.4	5.3	7.6	14.5	10.2	12.8	16.9	15.3	12.7	152	548	10.9	39.3
-.5- <-.1	19.1	25.2	22.1	31.3	15.0	12.8	20.5	11.9	12.8	16.9	28.2	21.1	275	823	19.7	59.1
-1.0 - <-.5	16.5	13.9	7.9	11.3	11.5	20.5	4.2	5.1	7.6	7.6	11.1	16.1	155	978	11.1	70.2
-1.5 - <-1.	6.9	13.0	15.0	8.6	10.6	5.9	7.6	10.2	3.4	5.0	4.2	10.1	117	1095	8.4	78.6
-2.0 - <-1.5	10.4	6.9	5.3	10.4	8.8	2.5	4.2	3.4	2.5	3.3	1.7	4.2	74	1169	5.3	83.9
-2.5 - <-2	5.2	2.6	3.5	3.4	5.3	5.9	4.2	4.2	3.4	.8	3.4	2.5	52	1221	3.7	87.7
-3 - <-2.5		4.3	4.4	3.4	4.4	5.9	4.2	3.4	1.7	2.5	4.2	5.0	51	1272	3.6	91.3
-3.5 - <-3	3.4	.8	4.4	3.4	3.5	1.7	2.5	1.7	1.7	2.5	3.4	1.6	36	1308	2.5	93.9
-4 - <-3.5	2.6	1.7	1.7	4.3	6.1	2.5	.8	.8	.8	.8		1.6	28	1336	2.0	95.9
-4.5- <-4.	2.6			.8	.8	.8	1.7	1.7				1.6	12	1348	.8	96.8
-5 - <-4.5	.8		1.7		.8	.8	2.5	.8					9	1357	.6	97.4
-5.5- <-5	3.4	.8	.8	.8		.8		.8				.8	10	1367	.7	98.2
-6 - <-5.5						.8						.8	2	1369	.1	98.3
-7 - < -6		2.6	.8		1.7	2.5							9	1378	.6	98.9
-8 - < -7		.8					.8		2.5				5	1383	.3	99.3
-9 - < -8			.8				2.5	1.7					6	1389	.4	99.7
-10 - < -9						1.7							2	1391	.1	99.9
-20 - < -10							.8						1	1392		100.0
-50 - < -20														1392		100.0
< -50														1392		100.0
TOT BY HRS	115	115	113	115	113	117	117	117	117	118	117	118	1392			
% TOT BY HRS	8.2	8.2	8.1	8.2	8.1	8.4	8.4	8.4	8.4	8.4	8.4	8.4				

All data using the 600' level should be treated with caution (see chapter five)

Table 5.9

PERCENT FREQUENCY OF LAPSE RATES

IN THE 400-810 FOOT LAYER FOR THE MONTH OF JAN 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3																
2 - <2.5																
1.5 - <2																
1.1 - <1.5																
.9 - < 1.1																
.5 - < .9	13.0	11.3	10.6	10.4	22.1	20.5	32.4	46.1	48.7	33.8	22.2	17.7	337	337	24.2	24.2
.1 - < .5	19.1	19.1	26.5	20.0	10.6	15.3	18.8	10.2	14.5	29.6	31.6	23.7	278	615	19.9	44.1
-.1 - < .1	6.0	11.3	7.0	9.5	4.4	7.6	3.4	4.2	5.1	10.1	9.4	9.3	102	717	7.3	51.5
-.5- <-.1	21.7	21.7	15.9	19.1	16.8	17.0	13.6	11.1	12.8	8.4	12.8	22.0	224	941	16.0	67.6
-1.0 - <-.5	15.6	20.0	17.6	18.2	17.6	8.5	5.9	5.9	4.2	5.9	9.4	7.6	158	1099	11.3	78.9
-1.5 - <-1.	7.8	6.9	7.9	5.2	14.1	9.4	5.1	5.1	1.7	.8	5.1	5.0	86	1185	6.1	85.1
-2.0 - <-1.5	6.0	4.3	1.7	10.4	4.4	7.6	3.4	5.1	1.7	5.0	3.4	5.9	69	1254	4.9	90.0
-2.5 - <-2	1.7	1.7	5.3	2.6	5.3	5.9	5.9	2.5	5.1	2.5	2.5	2.5	51	1305	3.6	93.7
-3 - <-2.5	.8		.8	3.4	1.7	2.5	2.5	3.4	1.7	.8	.8	.8	23	1328	1.6	95.4
-3.5 - <-3	1.7		2.6	.8	2.6	2.5	3.4	2.5	2.5	.8	1.7	4.2	30	1358	2.1	97.5
-4 - <-3.5	1.7		.8				.8	.8		1.6	.8	.8	9	1367	.6	98.2
-4.5- <-4.	.8	.8				.8		.8	1.7				6	1373	.4	98.6
-5 - <-4.5	.8	.8	.8				3.4	1.7					9	1382	.6	99.2
-5.5- <-5	.8					.8							2	1384	.1	99.4
-6 - <-5.5	.8	1.7				.8							4	1388	.2	99.7
-7 - < -6	.8		1.7										3	1391	.2	99.9
-8 - < -7							.8						1	1392		100.0
-9 - < -8														1392		100.0
-10 - < -9														1392		100.0
-20 - < -10														1392		100.0
-50 - < -20														1392		100.0
< -50														1392		100.0
TOT BY HRS	115	115	113	115	113	117	117	117	117	118	117	118	1392			
% TOT BY HRS	8.2	8.2	8.1	8.2	8.1	8.4	8.4	8.4	8.4	8.4	8.4	8.4				

Table 5.10

PERCENT FREQUENCY OF LAPSE RATES

IN THE 600-810 FOOT LAYER FOR THE MONTH OF JAN 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3																
2 - <2.5																
1.5 - <2						1.7	2.5	3.4					9	9	.6	.6
1.1 - <1.5	6.0	6.9	1.7	3.4	8.0	8.5	17.9	24.7	22.2	13.5	10.2	13.5	160	169	11.5	12.1
.9 - < 1.1	5.2	4.3	5.3	1.7	4.4	7.6	5.9	9.4	11.1	9.3	7.6	.8	85	254	6.1	18.2
.5 - < .9	26.9	23.4	31.8	28.6	26.7	22.2	26.4	24.7	34.1	34.7	32.4	32.2	400	654	28.7	47.0
.1 - < .5	14.7	22.6	15.9	17.3	12.5	8.5	11.9	9.4	7.6	18.6	17.0	16.1	200	854	14.3	61.3
-.1 - < .1	6.0	7.8	7.9	4.3	7.1	11.9	2.5	.8	1.7	4.2	6.8	5.9	78	932	5.6	67.0
-.5- <-.1	16.5	13.9	11.5	16.5	13.3	11.1	7.6	6.8	7.6	5.9	7.6	13.5	153	1085	10.9	78.0
-1.0 - <-.5	6.9	8.6	7.9	10.4	11.6	10.2	7.6	4.2	3.4	2.5	5.9	2.5	95	1180	6.8	84.8
-1.5 - <-1.	6.0	4.3	5.3	9.5	10.7	3.4	4.2	5.9	3.4	3.3	3.4	6.7	77	1257	5.5	90.3
-2.0 - <-1.5	4.3		3.5	3.4	2.6	7.6	2.5	.8	1.7	1.6	3.4	.8	38	1295	2.7	93.0
-2.5 - <-2	1.7	4.3	.8	2.6	.8	3.4	3.4	.8	.8	1.6		2.5	27	1322	1.9	95.0
-3 - <-2.5	.8	1.7	3.5		1.7	.8		3.4		.8		1.6	17	1339	1.2	96.2
-3.5 - <-3				.8		.8	2.5		.8		1.7	.8	9	1348	.6	96.9
-4 - <-3.5	1.7					.8	1.7	.8	.8		2.5	1.6	12	1360	.8	97.7
-4.5- <-4.			2.6	.8		.8	2.5		3.4	1.6	.8		15	1375	1.0	98.8
-5 - <-4.5		.8						2.5				.8	5	1380	.3	99.2
-5.5- <-5	.8	.8	.8							1.6			5	1385	.3	99.5
-6 - <-5.5			.8					1.7					3	1388	.2	99.7
-7 - < -6									.8				1	1389		99.8
-8 - < -7														1389		99.8
-9 - < -8														1389		99.8
-10 - < -9														1389		99.8
-20 - < -10	1.7												2	1391	.1	100.0
-50 - < -20														1391		100.0
< -50														1391		100.0
TOT BY HRS	115	115	113	115	112	117	117	117	117	118	117	118	1391			
% TOT BY HRS	8.2	8.2	8.1	8.2	8.0	8.4	8.4	8.4	8.4	8.4	8.4	8.4				

All data for the 600' level should be treated with caution (see chapter five)

Table 5.11

PERCENT FREQUENCY OF LAPSE RATES

IN THE 35-200 FOOT LAYER FOR THE MONTH OF JULY 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10					.8								1	1		
4 - <5							.8						1	2		.1
3 - <4					1.7				2.0				4	6	.3	.4
2.5 - <3					1.7	3.5	2.6		1.0				10	16	.7	1.2
2 - <2.5		1.7			2.6	2.6	7.8	9.0	1.0	1.0			29	45	2.1	3.3
1.5 - <2	.8			1.7	23.8	35.9	39.4	32.4	18.1	4.1			174	219	13.1	16.5
1.1 - <1.5				16.6	42.4	35.0	28.9	27.9	29.2	7.2		.8	208	427	15.7	32.2
.9 - < 1.1			.8	4.3	7.9	7.8	3.5	9.0	8.0	3.1			49	476	3.7	35.9
.5 - < .9	3.5	2.6	7.0	23.6	13.2	12.2	12.2	10.8	30.3	35.4	2.8	2.6	167	643	12.6	48.5
.1 - < .5	6.1	2.6	2.6	13.1	2.6	1.7	2.6	3.6	4.0	14.5	6.5	7.8	74	717	5.5	54.1
-.1 - < .1	.8	4.3	4.3	2.6	.8		1.7	4.5		6.2	5.6	2.6	37	754	2.7	56.9
-.5 - <-.1	10.5	8.7	10.5	8.7					1.0	8.3	10.2	6.1	71	825	5.3	62.3
-1.0 - <-.5	3.5	7.0	9.6	6.1	.8			.9	2.0	7.2	12.1	4.3	59	884	4.4	66.7
-1.5 - <-1.	5.2	1.7	4.3	2.6					1.0	4.1	13.0	4.3	40	924	3.0	69.7
-2.0 - <-1.5	4.3	5.2	5.2	3.5	.8					4.1	5.6	7.0	40	964	3.0	72.8
-2.5 - <-2	5.2	4.3	5.2							3.1	6.5	6.1	34	998	2.5	75.3
-3 - <-2.5	2.6	3.5	5.2	.8							6.5	5.2	27	1025	2.0	77.4
-3.5 - <-3	6.1	6.1	3.5	2.6		.8		.9	1.0		5.6	4.3	35	1060	2.6	80.0
-4 - <-3.5	3.5	5.2	1.7								3.7	4.3	21	1081	1.5	81.6
-4.5 - <-4.	3.5	3.5	3.5	.8						1.0	5.6	2.6	23	1104	1.7	83.3
-5 - <-4.5	1.7	4.3	3.5	2.6							1.8	1.7	18	1122	1.3	84.7
-5.5 - <-5	1.7	1.7		2.6							4.6	2.6	15	1137	1.1	85.8
-6 - <-5.5	6.1	3.5	3.5								2.8	4.3	23	1160	1.7	87.6
-7 - < -6	7.8	3.5	5.2	1.7							2.8	11.4	37	1197	2.7	90.4
-8 - < -7	7.8	5.2	3.5	1.7							1.8	7.8	32	1229	2.4	92.8
-9 - < -8	3.5	8.7	7.8								1.8	9.6	36	1265	2.7	95.5
-10 - < -9	3.5	4.3	6.1	1.7								.8	19	1284	1.4	96.9
-20 - < -10	11.4	11.4	6.1	1.7				.9	1.0			2.6	40	1324	3.0	100.0
-50 - < -20														1324		100.0
< -50														1324		100.0
TOT BY HRS	114	114	114	114	113	114	114	111	99	96	107	114	1324			
% TOT BY HRS	8.6	8.6	8.6	8.6	8.5	8.6	8.6	8.3	7.4	7.2	8.0	8.6				

Table 5.12

PERCENT FREQUENCY OF LAPSE RATES

IN THE 35-400 FOOT LAYER FOR THE MONTH OF JULY 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3						.8	.8						2	2	.1	.1
2 - <2.5				1.7			4.3						7	9	.5	.6
1.5 - <2					6.1	17.5	23.6	15.3	7.0	1.0			79	88	5.9	6.6
1.1 - <1.5		1.7		14.0	58.4	69.2	57.8	59.4	48.4	11.4	.9		355	443	26.8	33.4
.9 - < 1.1	.8	.8		5.2	7.9	3.5	4.3	6.3	14.1	4.1			51	494	3.8	37.3
.5 - < .9	6.1	1.7	6.1	14.9	16.8	7.8	8.7	13.5	22.2	45.8	4.6	6.1	164	658	12.3	49.6
.1 - < .5	10.5	7.0	6.1	10.5	5.3			3.6	4.0	14.5	13.0	7.8	90	748	6.7	56.4
-.1 - < .1	1.7	7.8	2.6	5.2	.8				1.0	4.1	5.6	2.6	35	783	2.6	59.1
-.5 - <-.1	5.2	7.8	14.9	8.7	1.7				1.0	12.5	25.2	7.8	93	876	7.0	66.1
-1.0 - <-.5	6.1	2.6	5.2	7.0	1.7	.8		.9		3.1	12.1	9.6	55	931	4.1	70.3
-1.5 - <-1.	4.3	4.3	1.7	5.2						1.0	13.0	8.7	43	974	3.2	73.5
-2.0 - <-1.5	6.1	5.2	7.8	7.0	.8				1.0	1.0	10.2	7.8	53	1027	4.0	77.5
-2.5 - <-2	7.0	7.0	7.8	3.5						1.0	4.6	8.7	45	1072	3.3	80.9
-3 - <-2.5	8.7	2.6	7.8	1.7							2.8	11.4	40	1112	3.0	83.9
-3.5 - <-3	7.0	7.0	3.5	1.7							2.8	7.0	33	1145	2.4	86.4
-4 - <-3.5	8.7	7.0	5.2	2.6							1.8	5.2	35	1180	2.6	89.1
-4.5 - <-4.	4.3	7.0	7.8	2.6					1.0		.9	6.1	34	1214	2.5	91.6
-5 - <-4.5	12.2	7.8	7.0	.8				.9			1.8	4.3	40	1254	3.0	94.7
-5.5 - <-5	5.2	8.7	4.3	1.7								.8	24	1278	1.8	96.5
-6 - <-5.5	2.6	4.3	4.3	3.5								5.2	23	1301	1.7	98.2
-7 - < -6	2.6	7.0	2.6	.8									15	1316	1.1	99.3
-8 - < -7		1.7	4.3	.8									8	1324	.6	100.0
-9 - < -8														1324		100.0
-10 - < -9														1324		100.0
-20 - < -10														1324		100.0
-50 - < -20														1324		100.0
< -50														1324		100.0
TOT BY HRS	114	114	114	114	113	114	114	111	99	96	107	114	1324			
% TOT BY HRS	8.6	8.6	8.6	8.6	8.5	8.6	8.6	8.3	7.4	7.2	8.0	8.6				

Table 5.13

PERCENT FREQUENCY OF LAPSE RATES

IN THE 35-600 FOOT LAYER FOR THE MONTH OF JULY 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3																
2 - <2.5																
1.5 - <2						.8	2.6						4	4	.3	.3
1.1 - <1.5				1.7	11.5	28.0	32.4	19.8	13.1	2.0			121	125	9.1	9.4
.9 - < 1.1					12.3	26.3	24.5	22.5	12.1	1.0	.9		111	236	8.3	17.8
.5 - < .9	2.6	3.5	3.5	22.8	47.7	42.9	39.4	49.5	64.6	51.0	1.8	4.3	360	596	27.1	45.0
.1 - < .5	10.5	5.2	7.0	12.2	13.2	.8	.8	6.3	5.0	20.8	13.0	7.0	111	707	8.3	53.3
-.1 - < .1	3.5	7.0	2.6	4.3	3.5				1.0	7.2	7.4	2.6	43	750	3.2	56.6
-.5- <-.1	6.1	10.5	14.0	10.5	6.1	.8		.9	2.0	13.5	28.9	12.2	116	866	8.7	65.4
-1.0 - <-.5	10.5	5.2	7.0	10.5	2.6					1.0	22.4	12.2	80	946	6.0	71.4
-1.5 - <-1.	10.5	6.1	5.2	14.0					1.0	2.0	13.0	13.1	73	1019	5.5	76.9
-2.0 - <-1.5	10.5	11.4	14.0	3.5	2.6					1.0	5.6	15.7	73	1092	5.5	82.4
-2.5 - <-2	9.6	7.0	5.2	5.2					1.0		3.7	13.1	51	1143	3.8	86.3
-3 - <-2.5	10.5	6.1	9.6	3.5				.9			1.8	7.8	46	1189	3.4	89.8
-3.5 - <-3	13.1	16.6	8.7	4.3							.9	5.2	56	1245	4.2	94.0
-4 - <-3.5	7.8	11.4	11.4	3.5								3.5	43	1288	3.2	97.2
-4.5- <-4.	3.5	5.2	7.0	1.7								.8	21	1309	1.5	98.8
-5 - <-4.5	.8	2.6	3.5	.8								1.7	11	1320	.8	99.6
-5.5- <-5		.8	.8	.8									3	1323	.2	99.9
-6 - <-5.5														1323		99.9
-7 - < -6		.8											1	1324		100.0
-8 - < -7														1324		100.0
-9 - < -8														1324		100.0
-10 - < -9														1324		100.0
-20 - < -10														1324		100.0
-50 - < -20														1324		100.0
< -50														1324		100.0
TOT BY HRS	114	114	114	114	113	114	114	111	99	96	107	114	1324			
% TOT BY HRS	8.6	8.6	8.6	8.6	8.5	8.6	8.6	8.3	7.4	7.2	8.0	8.6				

All data for the 600' level should be treated with caution (see chapter five)

Table 5.14

PERCENT FREQUENCY OF LAPSE RATES

IN THE 35-810 FOOT LAYER FOR THE MONTH OF JULY 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3																
2 - <2.5																
1.5 - <2						.8	2.6			1.0			5	5	.3	.3
1.1 - <1.5				1.7	24.7	57.0	63.1	47.7	34.3	5.2			259	264	19.5	19.9
.9 - < 1.1				5.2	24.7	22.8	19.2	24.3	22.2	5.2			136	400	10.2	30.2
.5 - < .9	8.7	5.2	5.2	17.5	23.8	17.5	14.9	25.2	35.3	59.3	9.3	8.7	246	646	18.5	48.7
.1 - < .5	8.7	7.8	7.8	13.1	10.6	1.7		.9	5.0	16.6	23.3	7.0	112	758	8.4	57.2
-.1 - < .1	2.6	6.1	4.3	3.5	3.5			.9	1.0	6.2	14.9	5.2	53	811	4.0	61.2
-.5 - <-.1	12.2	9.6	11.4	16.6	7.0				1.0	4.1	29.9	16.6	121	932	9.1	70.3
-1.0 - <-.5	16.6	12.2	12.2	15.7	3.5					2.0	14.0	23.6	113	1045	8.5	78.9
-1.5 - <-1.	12.2	11.4	14.0	6.1	1.7				1.0		6.5	19.2	82	1127	6.1	85.1
-2.0 - <-1.5	17.5	9.6	7.8	8.7				.9			1.8	8.7	63	1190	4.7	89.8
-2.5 - <-2	14.0	15.7	12.2	6.1								7.0	63	1253	4.7	94.6
-3 - <-2.5	3.5	17.5	15.7	2.6								1.7	47	1300	3.5	98.1
-3.5 - <-3	1.7	1.7	7.8	2.6								1.7	18	1318	1.3	99.5
-4 - <-3.5	.8	1.7	.8										4	1322	.3	99.8
-4.5 - <-4.	.8												1	1323		99.9
-5 - <-4.5														1323		99.9
-5.5 - <-5		.8											1	1324		100.0
-6 - <-5.5														1324		100.0
-7 - < -6														1324		100.0
-8 - < -7														1324		100.0
-9 - < -8														1324		100.0
-10 - < -9														1324		100.0
-20 - < -10														1324		100.0
-50 - < -20														1324		100.0
< -50														1324		100.0
TOT BY HRS	114	114	114	114	113	114	114	111	99	96	107	114	1324			
% TOT BY HRS	8.6	8.6	8.6	8.6	8.5	8.6	8.6	8.3	7.4	7.2	8.0	8.6				

Table 5.15

PERCENT FREQUENCY OF LAPSE RATES

IN THE 200-400 FOOT LAYER FOR THE MONTH OF JULY 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4				1.7	.8	.8	.8						5	5	.3	.3
2.5 - <3							1.7						2	7	.1	.5
2 - <2.5					.8	.8				1.0			3	10	.2	.7
1.5 - <2	.8				3.5	8.7	7.0	1.8	2.0		.9		28	38	2.1	2.8
1.1 - <1.5	1.7	1.7		8.7	44.2	74.5	77.1	71.1	63.6	13.5	.9	1.7	395	433	29.8	32.7
.9 - < 1.1	1.7	.8		7.0	9.7	7.0	7.0	9.0	15.1	17.7	.9		81	514	6.1	38.8
.5 - < .9	17.5	8.7	11.4	20.1	23.8	6.1	3.5	15.3	13.1	51.0	33.6	18.4	240	754	18.1	56.9
.1 - < .5	12.2	15.7	14.0	12.2	5.3		1.7	1.8	3.0	7.2	25.2	18.4	130	884	9.8	66.7
-.1 - < .1	7.0	9.6	5.2	2.6	1.7			.9		2.0	11.2	9.6	56	940	4.2	70.9
-.5- <-.1	14.0	13.1	9.6	11.4	3.5	1.7	.8		2.0	3.1	14.9	16.6	102	1042	7.7	78.7
-1.0 - <-.5	11.4	6.1	7.0	7.0	2.6					3.1	5.6	11.4	61	1103	4.6	83.3
-1.5 - <-1.	7.0	5.2	6.1	1.7	1.7						2.8	7.8	37	1140	2.7	86.1
-2.0 - <-1.5	3.5	7.0	8.7	3.5						1.0	1.8	1.7	31	1171	2.3	88.4
-2.5 - <-2	3.5	3.5	7.8	3.5					1.0			5.2	28	1199	2.1	90.5
-3 - <-2.5	3.5	5.2	8.7	.8	.8							2.6	25	1224	1.8	92.4
-3.5 - <-3	3.5	2.6	7.8	4.3								1.7	23	1247	1.7	94.1
-4 - <-3.5	5.2	2.6			.8						1.8	.8	13	1260	.9	95.1
-4.5- <-4.	.8	6.1	3.5	8.7									22	1282	1.6	96.8
-5 - <-4.5		.8	4.3										6	1288	.4	97.2
-5.5- <-5	5.2	2.6	2.6	1.7								.8	15	1303	1.1	98.4
-6 - <-5.5	.8	3.5	.8	.8								.8	8	1311	.6	99.0
-7 - < -6		2.6	.8	2.6								.8	8	1319	.6	99.6
-8 - < -7		1.7	.8	.8									4	1323	.3	99.9
-9 - < -8												.8	1	1324		100.0
-10 - < -9														1324		100.0
-20 - < -10														1324		100.0
-50 - < -20														1324		100.0
< -50														1324		100.0
TOT BY HRS	114	114	114	114	113	114	114	111	99	96	107	114	1324			
% TOT BY HRS	8.6	8.6	8.6	8.6	8.5	8.6	8.6	8.3	7.4	7.2	8.0	8.6				

Table 5.16

PERCENT FREQUENCY OF LAPSE RATES

IN THE 200-600 FOOT LAYER FOR THE MONTH OF JULY 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3																
2 - <2.5																
1.5 - <2				.8	.8	.8	.8						4	4	.3	.3
1.1 - <1.5				1.7	.8	1.7	1.7	.9		1.0	.9		10	14	.7	1.0
.9 - < 1.1					.8	2.6	4.3	1.8	2.0				13	27	.9	2.0
.5 - < .9	4.3	2.6	3.5	16.6	59.2	91.2	92.9	90.9	87.8	65.6	12.1	6.1	579	606	43.7	45.7
.1 - < .5	22.8	12.2	10.5	16.6	15.9	3.5		5.4	4.0	19.7	37.3	20.1	185	791	13.9	59.7
-.1 - < .1	5.2	11.4	7.8	6.1	2.6				3.0	4.1	18.6	8.7	75	866	5.6	65.4
-.5- <-.1	23.6	20.1	16.6	11.4	7.9			.9	1.0	5.2	16.8	27.1	147	1013	11.1	76.5
-1.0 - <-.5	13.1	13.1	8.7	9.6	6.1				1.0	3.1	8.4	19.2	93	1106	7.0	83.5
-1.5 - <-1.	9.6	8.7	10.5	9.6	1.7					1.0	3.7	6.1	58	1164	4.3	87.9
-2.0 - <-1.5	7.8	7.0	16.6	7.0	.8				1.0		.9	6.1	54	1218	4.0	91.9
-2.5 - <-2	3.5	7.8	7.0	7.0							.9	2.6	33	1251	2.4	94.4
-3 - <-2.5	4.3	4.3	5.2	2.6									19	1270	1.4	95.9
-3.5 - <-3	.8	7.0	7.0	2.6	2.6							.8	24	1294	1.8	97.7
-4 - <-3.5	1.7	1.7	3.5	3.5								.8	13	1307	.9	98.7
-4.5- <-4.	.8	1.7	2.6	3.5								.8	11	1318	.8	99.5
-5 - <-4.5	.8	.8		.8									3	1321	.2	99.7
-5.5- <-5	.8											.8	2	1323	.1	99.9
-6 - <-5.5														1323		99.9
-7 - < -6														1323		99.9
-8 - < -7		.8											1	1324		100.0
-9 - < -8														1324		100.0
-10 - < -9														1324		100.0
-20 - < -10														1324		100.0
-50 - < -20														1324		100.0
< -50														1324		100.0
TOT BY HRS	114	114	114	114	113	114	114	111	99	96	107	114	1324			
% TOT BY HRS	8.6	8.6	8.6	8.6	8.5	8.6	8.6	8.3	7.4	7.2	8.0	8.6				

All data for the 600' level should be treated with caution (see chapter five)

Table 5.17

PERCENT FREQUENCY OF LAPSE RATES

IN THE 200-810 FOOT LAYER FOR THE MONTH OF JULY 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3																
2 - <2.5										1.0			1	1		
1.5 - <2					.8	.8	.8						3	4	.2	.3
1.1 - <1.5				2.6	6.1	20.1	25.4	17.1	9.0	1.0			91	95	6.8	7.1
.9 - < 1.1				2.6	17.6	47.3	49.1	45.9	44.4	8.3			236	331	17.8	25.0
.5 - < .9	20.1	8.7	7.0	16.6	43.3	28.9	24.5	35.1	40.4	73.9	41.1	21.9	389	720	29.3	54.3
.1 - < .5	25.4	19.2	14.0	16.6	10.6	1.7		1.8	5.0	7.2	36.4	28.0	185	905	13.9	68.3
-.1 - < .1	7.0	12.2	7.8	5.2	3.5	.8				3.1	6.5	13.1	67	972	5.0	73.4
-.5- <-.1	21.9	19.2	17.5	15.7	9.7					5.2	12.1	21.9	139	1111	10.4	83.9
-1.0 - <-.5	12.2	12.2	22.8	14.0	2.6				1.0		2.8	9.6	88	1199	6.6	90.5
-1.5 - <-1.	5.2	13.1	9.6	10.5	2.6						.9	1.7	50	1249	3.7	94.3
-2.0 - <-1.5	3.5	3.5	7.8	7.0	2.6							.8	29	1278	2.1	96.5
-2.5 - <-2	.8	5.2	8.7	7.0								.8	26	1304	1.9	98.4
-3 - <-2.5	.8	3.5	2.6	1.7								.8	11	1315	.8	99.3
-3.5 - <-3	.8	.8										.8	3	1318	.2	99.5
-4 - <-3.5	.8		.8										2	1320	.1	99.6
-4.5- <-4.		.8											1	1321		99.7
-5 - <-4.5	.8		.8										2	1323	.1	99.9
-5.5- <-5														1323		99.9
-6 - <-5.5		.8											1	1324		100.0
-7 - < -6														1324		100.0
-8 - < -7														1324		100.0
-9 - < -8														1324		100.0
-10 - < -9														1324		100.0
-20 - < -10														1324		100.0
-50 - < -20														1324		100.0
< -50														1324		100.0
TOT BY HRS	114	114	114	114	113	114	114	111	99	96	107	114	1324			
% TOT BY HRS	8.6	8.6	8.6	8.6	8.5	8.6	8.6	8.3	7.4	7.2	8.0	8.6				

Table 5.18

PERCENT FREQUENCY OF LAPSE RATES

IN THE 400-600 FOOT LAYER FOR THE MONTH OF JULY 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3				.8			.8						2	2	.1	.1
2 - <2.5														2		.1
1.5 - <2								.9					1	3		.2
1.1 - <1.5					.8	2.6	1.7		1.0				7	10	.5	.7
.9 - < 1.1					.8	.8	.8						3	13	.2	.9
.5 - < .9		.8	.8	2.6	12.3	25.4	27.1	18.9	17.1	4.1		.8	122	135	9.2	10.1
.1 - < .5	22.8	12.2	4.3	17.5	46.0	60.5	63.1	75.6	71.7	76.0	28.0	21.0	540	675	40.7	50.9
-.1 - < .1	11.4	14.0	7.8	11.4	10.6	6.1	3.5	2.7	5.0	5.2	32.7	21.0	146	821	11.0	62.0
-.5 - <-.1	28.0	27.1	29.8	14.9	9.7	4.3		1.8	2.0	9.3	23.3	27.1	199	1020	15.0	77.0
-1.0 - <-.5	16.6	21.0	19.2	17.5	6.1		.8		3.0	2.0	13.0	8.7	122	1142	9.2	86.2
-1.5 - <-1.	8.7	7.8	18.4	9.6	2.6		1.7			3.1	.9	9.6	71	1213	5.3	91.6
-2.0 - <-1.5	7.0	6.1	7.0	10.5	3.5							7.0	47	1260	3.5	95.1
-2.5 - <-2	1.7	7.0	.8	7.0	4.4						.9	2.6	28	1288	2.1	97.2
-3 - <-2.5			3.5	2.6							.9	1.7	10	1298	.7	98.0
-3.5 - <-3	.8	1.7		1.7									5	1303	.3	98.4
-4 - <-3.5			.8		1.7								3	1306	.2	98.6
-4.5 - <-4.		.8	4.3	1.7									8	1314	.6	99.2
-5 - <-4.5	.8		1.7										3	1317	.2	99.4
-5.5 - <-5	.8			.8	.8								3	1320	.2	99.6
-6 - <-5.5	.8												1	1321		99.7
-7 - < -6			.8	.8									2	1323	.1	99.9
-8 - < -7														1323		99.9
-9 - < -8		.8											1	1324		100.0
-10 - < -9														1324		100.0
-20 - < -10														1324		100.0
-50 - < -20														1324		100.0
< -50														1324		100.0
TOT BY HRS	114	114	114	114	113	114	114	111	99	96	107	114	1324			
% TOT BY HRS	8.6	8.6	8.6	8.6	8.5	8.6	8.6	8.3	7.4	7.2	8.0	8.6				

All data for the 600' level should be treated with caution (see chapter five)

Table 5.19

PERCENT FREQUENCY OF LAPSE RATES

IN THE 400-810 FOOT LAYER FOR THE MONTH OF JULY 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5																
3 - <4																
2.5 - <3										1.0			1	1		
2 - <2.5														1		
1.5 - <2				.8			.8						2	3	.1	.2
1.1 - <1.5							4.3	1.8	2.0	1.0			10	13	.7	.9
.9 - < 1.1					4.4	12.2	15.7	11.7	16.1	2.0	.9		69	82	5.2	6.1
.5 - < .9	27.1	18.4	9.6	21.0	55.7	85.0	77.1	84.6	76.7	82.2	52.3	40.3	686	768	51.8	58.0
.1 - < .5	36.8	27.1	21.9	20.1	16.8	1.7	.8	1.8	2.0	5.2	31.7	28.9	219	987	16.5	74.5
-.1 - < .1	9.6	15.7	12.2	12.2	1.7		.8		3.0	3.1	3.7	7.0	78	1065	5.8	80.4
-.5- <-.1	16.6	17.5	27.1	17.5	5.3					4.1	9.3.	14.9	127	1192	9.5	90.0
-1.0 - <-.5	4.3	10.5	14.9	10.2	7.0	.8				1.0	1.8	7.8	67	1259	5.0	95.0
-1.5 - <-1.	1.7	4.3	2.6	5.2	5.3							.8	23	1282	1.7	96.8
-2.0 - <-1.5	.8	2.6	4.3	5.2									15	1297	1.1	97.9
-2.5 - <-2	.8	1.7	3.5	6.1	3.5								18	1315	1.3	99.3
-3 - <-2.5			1.7	.8									3	1318	.2	99.5
-3.5 - <-3	.8	.8											2	1320	.1	99.6
-4 - <-3.5														1320		99.6
-4.5- <-4.			.8										1	1321		99.7
-5 - <-4.5			.8										1	1322		99.8
-5.5- <-5		.8											1	1323		99.9
-6 - <-5.5	.8												1	1324		100.0
-7 - < -6														1324		100.0
-8 - < -7														1324		100.0
-9 - < -8														1324		100.0
-10 - < -9														1324		100.0
-20 - < -10														1324		100.0
-50 - < -20														1324		100.0
< -50														1324		100.0
TOT BY HRS	114	114	114	114	113	114	114	111	99	96	107	114	1324			
% TOT BY HRS	8.6	8.6	8.6	8.6	8.5	8.6	8.6	8.3	7.4	7.2	8.0	8.6				

Table 5.20

PERCENT FREQUENCY OF LAPSE RATES

IN THE 600-810 FOOT LAYER FOR THE MONTH OF JULY 1970 - 1971

ACCORDING TO LAPSE RATE INTERVAL AND TIME OF DAY INTERVAL

L.R. INTERVAL	TIME OF DAY IN HOURS 00-01	02-03	04-05	06-07	08-09	10-11	12-13	14-15	16-17	18-19	20-21	22-23	TOT BY INTVL	CUM FREQ	% FREQ	% CUM FREQ
>10																
5 - <10																
4 - <5							.8			1.0			2	2	.1	.1
3 - <4												.8	1	3		.2
2.5 - <3									1.0		.9		2	5	.1	.3
2 - <2.5										2.0			2	7	.1	.5
1.5 - <2				.8	9.7	29.8	41.2	29.7	36.3	8.3			170	177	12.8	13.3
1.1 - <1.5	26.3	14.9	9.6	15.7	45.1	57.8	54.3	63.0	52.5	72.9	52.3	40.3	549	726	41.4	54.8
.9 - < 1.1	18.4	7.0	4.3	9.6	7.9	2.6		.9	4.0	1.0	9.3	8.7	83	809	6.2	61.1
.5 - < .9	33.3	37.7	38.5	35.0	17.6	5.2	.8	5.4	5.0	11.4	27.1	37.7	286	1095	21.6	82.7
.1 - < .5	11.4	17.5	16.6	13.1	2.6	3.5	2.6		1.0	1.0	6.5	4.3	91	1186	6.8	89.5
-.1 - < .1	4.3	5.2	5.2	2.6	2.6						.9	3.5	28	1214	2.1	91.6
-.5 - <-.1	2.6	7.0	14.0	11.4	8.8					1.0	1.8	2.6	56	1270	4.2	95.9
-1.0 - <-.5	.8	5.2	3.5	3.5	1.7			.9		1.0	.9	1.7	22	1292	1.6	97.5
-1.5 - <-1.		1.7	2.6	2.6	.8	.8							10	1302	.7	98.3
-2.0 - <-1.5	1.7	1.7	1.7	.8									7	1309	.5	98.8
-2.5 - <-2		.8	.8	1.7	.8								5	1314	.3	99.2
-3 - <-2.5			.8		.8								2	1316	.1	99.3
-3.5 - <-3				.8									1	1317		99.4
-4 - <-3.5				1.7	.8								3	1320	.2	99.6
-4.5 - <-4.														1320		99.6
-5 - <-4.5			.8										1	1321		99.7
-5.5 - <-5	.8	.8											2	1323	.1	99.9
-6 - <-5.5			.8										1	1324		100.0
-7 - < -6														1324		100.0
-8 - < -7														1324		100.0
-9 - < -8														1324		100.0
-10 - < -9														1324		100.0
-20 - < -10														1324		100.0
-50 - < -20														1324		100.0
< -50														1324		100.0
TOT BY HRS	114	114	114	114	113	114	114	111	99	96	107	114	1324			
% TOT BY HRS	8.6	8.6	8.6	8.6	8.5	8.6	8.6	8.3	7.4	7.2	8.0	8.6				

All data for the 600' level should be treated with caution (see chapter five)

Table 5.21

Cumulative % Frequency of Lapse Rates in the 35'-200' Layer,

by Months and Lapse Rate Intervals,

Winnipeg C.B.C. Tower, Oct. 1969 - Dec. 1971

Lapse Rate Interval in D.A.L.R. units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
10								0.2				
5 - 10			0.1		0.2			0.2	0.1			
4 - 5			0.2	0.2	0.4	0.2	0.1	0.3	0.4			
3 - 4	0.2		0.3	0.6	0.8	0.5	0.4	1.0	0.7	0.3	0.2	0.3
2.5 - 3	0.7		0.5	1.5	2.8	1.5	1.2	4.9	2.4	1.3	0.4	0.5
2 - 2.5	2.0		1.2	3.3	8.9	6.2	3.3	15.8	10.4	4.8	0.9	1.2
1.5 - 2	4.4	2.1	7.5	13.1	19.8	21.4	16.5	31.1	23.3	12.4	4.1	4.1
1 - 1.5	13.8	13.1	17.6	31.6	33.9	41.5	35.9	40.7	36.0	29.3	19.4	20.4
0 - 1	46.8	41.4	46.0	63.9	66.7	63.0	56.9	51.9	55.3	61.5	61.7	60.8
+0.5 - 0	53.1	48.4	51.1	71.2	72.3	68.0	62.3	56.9	61.3	66.5	67.8	67.6
-1 - -0.5	57.9	53.5	55.4	75.6	75.9	72.1	66.7	60.3	66.4	69.6	72.5	72.0
-1.5 - -1	63.0	58.1	58.8	78.8	79.3	74.7	69.7	63.5	71.0	73.2	75.3	76.1
-2 - -1.5	66.6	61.5	61.5	81.1	81.4	77.6	72.8	66.1	74.3	76.1	77.6	78.6
-2.5 - -2	69.3	65.1	64.2	83.4	84.0	80.6	75.3	69.1	77.1	78.0	80.3	81.9
-3 - -2.5	72.2	67.9	67.1	85.2	85.7	83.2	77.4	71.9	79.4	80.7	81.8	84.3
-4 - -3	77.5	74.8	71.2	87.4	89.2	87.0	81.6	78.0	84.0	85.7	85.7	88.0
-5 - -4	82.6	79.0	75.4	89.5	91.8	89.3	84.7	80.9	86.9	88.8	88.5	90.8
-7 - -5	89.7	86.7	81.7	93.7	95.1	93.3	90.4	87.7	91.6	92.7	93.4	95.4
-10 - -7	96.4	94.2	90.0	97.5	98.3	97.2	96.9	95.5	97.0	96.4	96.9	99.1
-20 - -10	100.0	100.0	99.1	99.8	100.0	99.8	100.0	100.0	100.0	100.0	99.9	100.0
-20			100.0	100.0		100.0					100.0	

Table 5.22

Cumulative % Frequency of Lapse Rates in the 200'-400' Layer,
by Months and Lapse Rate Intervals,
Winnipeg C.B.C. Tower, Oct. 1969 - Dec. 1971

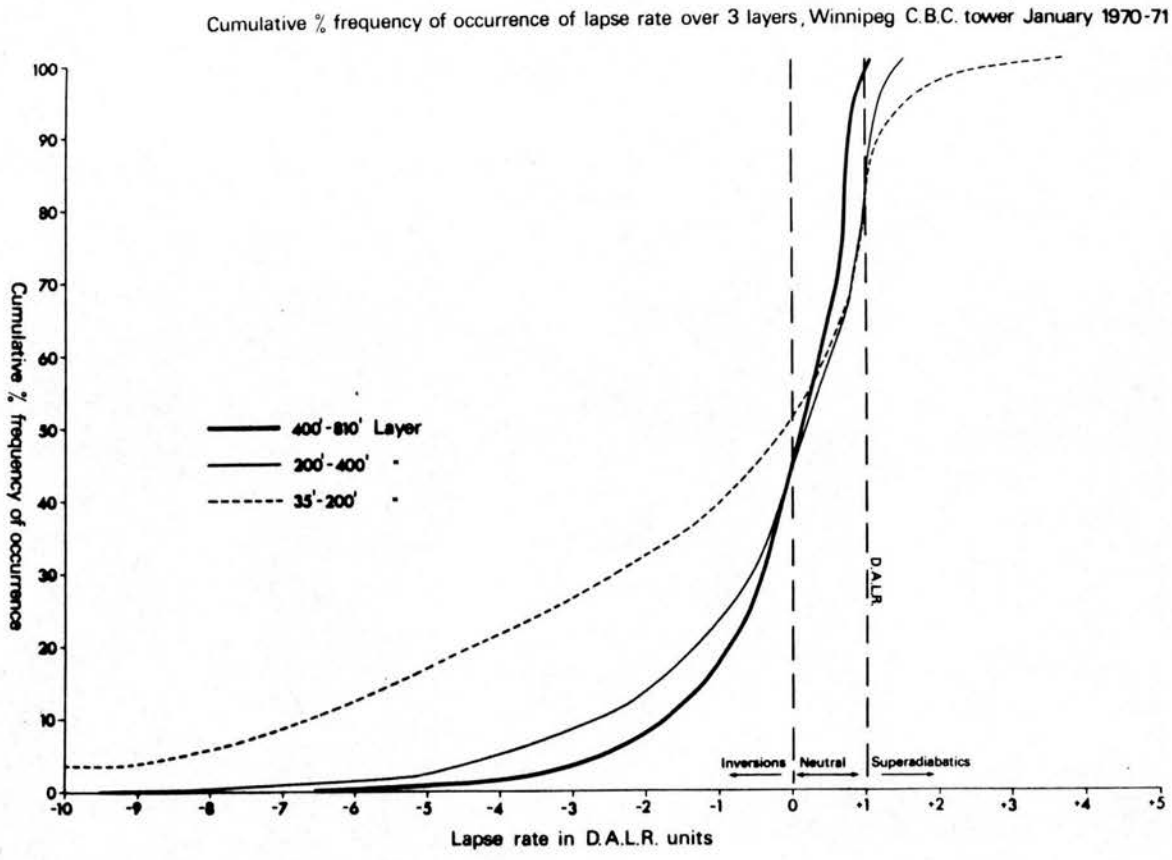
Lapse Rate Intervals in D.A.L.R. units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
10												
5 - 10												
4 - 5						0.2	0.3		0.1			
3 - 4					0.1	0.3	0.5	0.1	0.1	0.1		
2.5 - 3					0.1	0.6	0.7	0.1	0.5	0.4		
2 - 2.5			0.2	0.2	1.3	1.9	2.8	1.1	2.2	1.6	0.1	
1.5 - 2			12.7	23.7	31.9	43.9	38.8	35.9	36.9	33.5	20.6	14.0
1 - 1.5	8.6	11.3										
0 - 1	53.0	55.6	54.6	69.5	79.5	72.3	70.9	62.4	69.2	71.2	72.9	67.3
-0.5 - 0	64.5	64.7	63.0	76.8	85.8	79.5	78.7	68.9	76.3	77.1	79.0	73.9
-1 - -0.5	73.4	71.9	69.9	81.3	90.4	84.1	83.3	73.6	82.1	81.9	83.5	79.0
-1.5 - -1	79.0	78.7	74.7	85.4	93.4	88.0	86.1	77.9	85.5	85.2	86.8	82.9
-2 - -1.5	84.0	83.5	79.7	87.4	94.9	90.5	88.4	81.5	88.6	87.7	89.1	85.3
-2.5 - -2	88.0	86.3	83.6	89.8	96.5	93.2	90.5	85.0	90.6	89.7	90.8	87.8
-3 - -2.5	90.1	88.7	86.3	92.4	97.3	95.3	92.4	87.7	92.2	92.0	91.7	89.4
-4 - -3	93.9	92.5	91.3	95.5	98.0	97.6	95.1	92.5	94.8	94.8	93.8	93.0
-5 - -4	96.7	95.4	95.0	97.9	98.8	98.5	97.2	94.7	97.0	96.4	95.9	95.3
-7 - -5	99.0	98.7	98.9	99.6	99.5	99.7	99.6	98.3	98.6	98.7	98.1	97.8
-10 - -7	99.9	99.8	99.8	100.0	99.9	100.0	100.0	99.7	99.9	99.8	99.6	99.7
-20 - -10	100.0	100.0	100.0		100.0			100.0	100.0	100.0	100.0	100.0
-20												

Table 5.23

Cumulative % Frequency of Lapse Rate in the 400'-810' Layer,
by Months and Lapse Rate Intervals,
Winnipeg C.B.C. Tower, Oct. 1969 - Dec. 1971

Lapse Rate Intervals in D.A.L.R. units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
10												
5 - 10								0.2	0.1			
4 - 5								0.7	0.3			
3 - 4				0.1			0.2	0.8	0.5			
2.5 - 3				1.9			6.1	8.8	5.9	3.2	0.7	0.1
2 - 2.5		0.2	1.1	5.2	5.4							
1.5 - 2												
1 - 1.5												
0 - 1	51.5	55.3	61.4	77.0	84.5	79.4	80.4	74.3	72.9	78.6	72.5	54.7
-0.5 - 0	67.6	71.0	76.0	86.9	91.0	89.0	90.0	83.0	83.5	86.1	82.4	64.8
-1 - -0.5	78.9	79.9	83.3	91.1	94.4	94.0	95.0	88.9	89.4	90.1	87.9	74.1
-1.5 - -1	85.1	86.6	88.1	93.8	96.7	96.3	96.8	93.3	92.7	93.4	90.7	81.1
-2 - -1.5	90.0	90.6	91.7	96.1	97.9	97.5	97.9	96.1	95.4	95.4	93.7	86.7
-2.5 - -2	93.7	93.7	94.7	97.4	98.9	98.4	99.3	97.8	96.8	96.7	95.6	91.2
-3 - -2.5	95.4	95.9	97.1	98.3	99.3	99.0	99.5	98.5	98.5	97.6	97.3	94.2
-4 - -3	98.2	98.6	99.1	99.2	99.6	99.8	99.6	99.4	99.4	98.9	98.9	97.3
-5 - -4	99.2	99.4	99.7	99.5	99.9	100.0	99.8	99.8	99.7	99.5	99.5	98.8
-7 - -5	99.9	100.0	100.0	99.7	100.0		100.0	100.0	100.0	100.0	100.0	99.7
-10 - -7	100.0			100.0								100.0
-20 - -10												
-20												

Figure 5.1


Cumulative % frequency of occurrence of lapse rate over 3 layers, Winnipeg C.B.C. tower January 1970-71
Cumulative % frequency of occurrence
400'-810' Layer
200'-400'
35'-200'
D.A.L.R.
Inversions
Neutral
Superadiabatics
Lapse rate in D.A.L.R. units

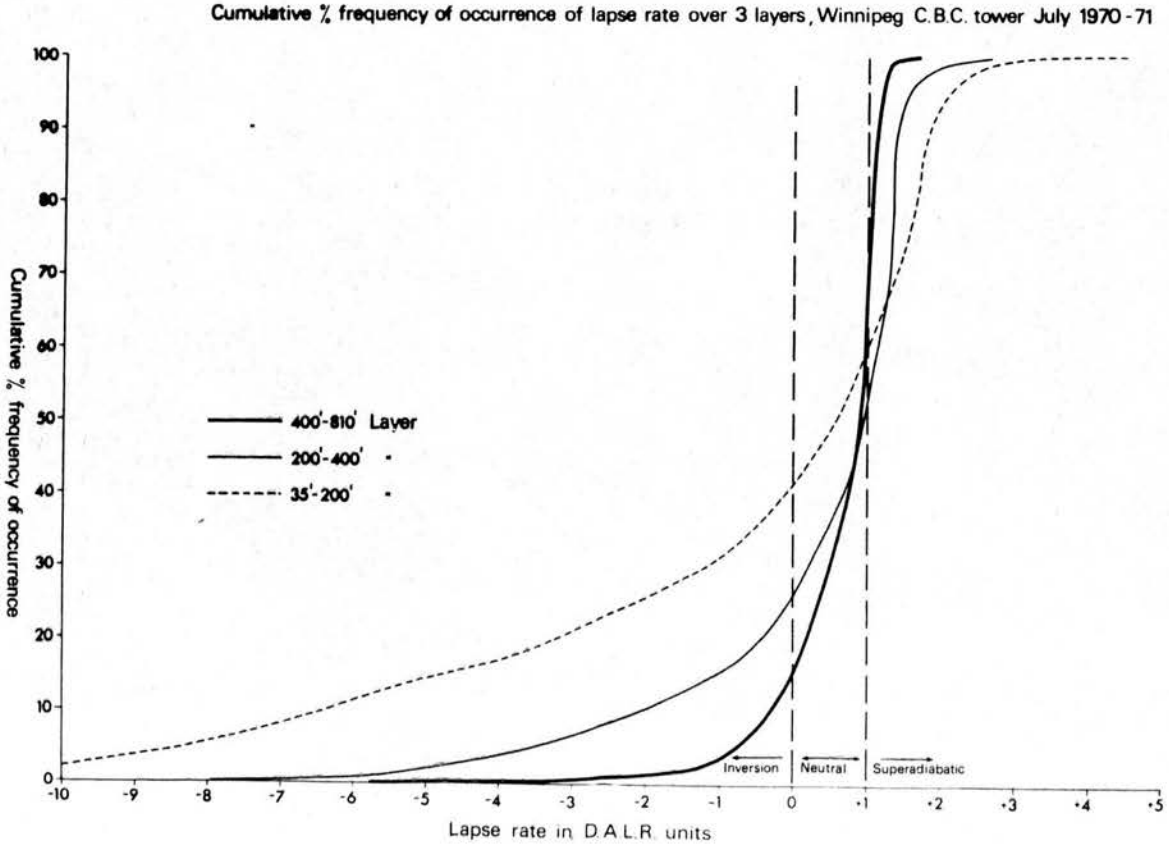
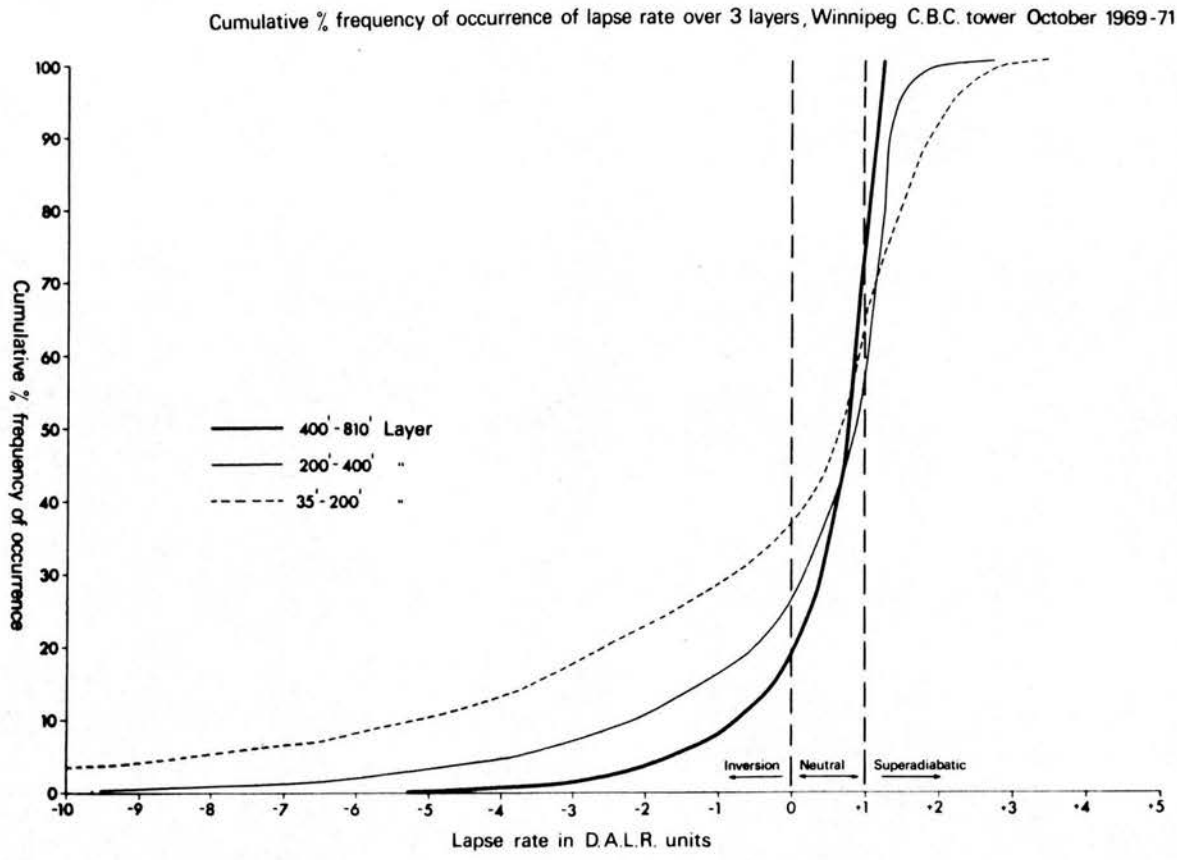

Cumulative % frequency of occurrence of lapse rate over 3 layers, Winnipeg C.B.C. tower July 1970-71
Cumulative % frequency of occurrence
400'-810' Layer
200'-400'
35'-200'
Inversion
Neutral
Superadiabatic
Lapse rate in D.A.L.R. units

Figure 5.2


Cumulative % frequency of occurrence of lapse rate over 3 layers, Winnipeg C.B.C. tower October 1969-71
Cumulative % frequency of occurrence
400'-810' Layer
200'-400' "
35'-200' "
Inversion
Neutral
Superadiabatic
Lapse rate in D.A.L.R. units

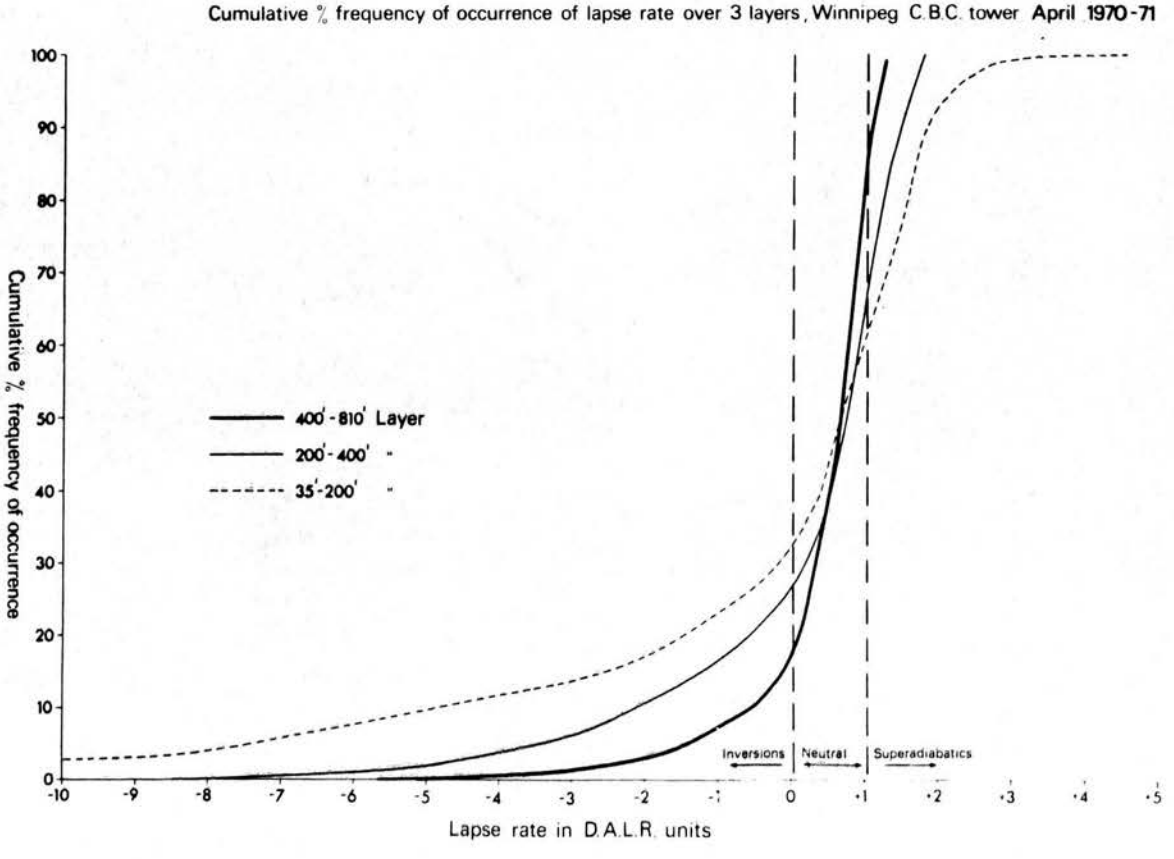

Cumulative % frequency of occurrence of lapse rate over 3 layers, Winnipeg C.B.C. tower April 1970-71
Cumulative % frequency of occurrence
400'-810' Layer
200'-400' "
35'-200' "
Inversions
Neutral
Superadiabatics
Lapse rate in D.A.L.R. units

Table 5.24

% frequency of Hours/month with Lapse rates ≥ D.A.L.R. by 10 Height Intervals

Winnipeg C.B.C. Tower, Oct. 1969 - Dec. 1971

	35'-200'	200'-400'	400'-600'	600'-810'	35'-400'	35'-600'	35'-810'	200'-600'	200'-810'	400'-810'
Jan	13.9	8.6	0.0(3.8)	18.2(0.5)	10.1	0.7(5.6)	1.3	0(3.0)	0	0
Feb	13.1	11.3	0 (6.6)	27.6(1.4)	11.1	0.1(7.1)	2.9	0(5.1)	0.4	0.2
Mar	17.6	12.7	0.4(8.5)	27.3(2.0)	14.5	2.2(11.1)	6.0	0(8.3)	1.7	1.1
Apr	31.6	23.7	1.1(9.3)	39.9(4.5)	26.7	8.0(22.5)	16.2	0.3(15.8)	6.8	1.9
May	33.9	31.9	0.3(13.6)	47.8(5.9)	31.1	18.6(29.5)	26.5	0.5(26.1)	18.3	5.2
Jun	41.5	43.9	0.4(16.9)	61.0(7.2)	42.4	21.4(38.6)	33.8	0.5(36.5)	24.4	5.4
Jul	35.9	38.8	0.9(14.3)	61.1(8.3)	37.3	17.8(33.9)	30.2	2.0(33.3)	25.0	6.1
Aug	40.7	35.9	1.0(18.9)	59.0(6.7)	38.3	28.1(37.0)	32.7	1.2(31.3)	21.5	8.8
Sep	36.0	36.9	0.7(13.8)	54.6(7.5)	34.2	21.1(30.5)	26.9	0.7(28.9)	20.3	5.9
Oct	29.3	33.5	0.6(20.1)	54.3(4.6)	29.5	12.6(27.9)	21.5	0.8(27.8)	15.2	3.2
Nov	19.4	20.6	0.6(15.3)	39.4(0.5)	16.8	2.6(14.5)	7.1	0.3(15.6)	3.1	0.7
Dec	20.4	14,0	0.2(4.4)	23.4(0.1)	14.7	0.7(8.5)	2.3	0.2(6.2)	0.5	0.1

( ) denotes figure obtained by subtracting 0.6°F from 600' temperature

Table 5.25

% Frequency of hours/Month with Lapse Rates ≥ 0 by 10 Height Intervals,

Winnipeg C.B.C. Tower, Oct. 1969- Dec. 1971

	35'-200'	200'-400'	400'-600'	600'-810'	35'-400'	35'-600'	35'-810'	200'-600'	200'-810'	400'-810'
Jan	46.8	53.0	39.3(60.1)	67.0(48.9)	43.8	37.7(42.0)	38.0	43.3(52.6)	47.3	51.5
Feb	41.1	55.6	42.5(59.4)	73.6(56.4)	42.6	38.4(41.6)	41.1	46.7(53.1)	50.6	55.3
Mar	46.0	54.6	43.7(64.8)	77.9(60.7)	46.5	41.9(46.0)	43.3	46.8(56.0)	53.3	61.4
Apr	63.9	69.5	60.9(77.8)	88.4(73.8)	66.5	62.7(66.7)	65.3	65.6(71.5)	70.6	77.0
May	66.7	79.5	73.2(86.6)	91.1(80.1)	69.5	67.7(71.2)	70.7	76.1(81.5)	81.1	84.5
Jun	63.0	72.3	62.3(77.9)	91.0(82.6)	64.6	61.7(64.1)	65.3	67.3(73.0)	73.7	79.4
Jul	56.9	70.9	62.0(77.7)	91.6(83.9)	59.1	56.6(60.0)	61.2	65.4(72.5)	73.4	80.4
Aug	51.9	62.4	58.4(73.3)	87.4(78.7)	53.6	51.2(54.0)	53.6	59.0(64.0)	65.3	74.3
Sep	55.3	69.2	55.0(71.3)	86.3(77.5)	58.9	54.6(58.2)	59.1	62.0(68.2)	68.7	72.9
Oct	61.5	71.2	63.8(77.9)	88.5(79.9)	63.6	61.5(64.6)	65.3	67.1(73.0)	74.1	78.6
Nov	61.7	72.9	60.3(74.9)	84.0(72.5)	64.2	60.4(64.8)	64.8	66.5(71.9)	70.8	72.5
Dec	60.8	67.3	46.3(62.5)	64.3(50.2)	58.3	50.0(53.7)	48.0	53.4(59.8)	54.1	54.7

( ) denotes figure obtained by subracting $0.6^{\circ}F$ from 600' temperature

Table 5.26

Maximum % Occurence of Superadiabatic Lapse Rates by 2 Hour Periods and Months for 3 Height Intervals

Winnipeg C.B.C. Tower, Oct.1969- Dec.1971

Height Interval	35'-200'		200'-400'		400'-810'	
Months	Max.% DALR	2 Hour Period Commencing	Max.% DALR	2 Hour Period Commencing	Max.% DALR	2 Hour Period Commencing
Jan.	50.2	1200	27.3	1400	0	-
Feb.	54.6	1200	42.3	1400	1.9	1600
Mar.	54.9	1400	41.4	1400	6.3	1200
Apr.	76.0	1200	49.9	1200	6.2	1200
May	72.0	1000	67.4	1000	22.4	1200
Jun.	92.3	1200	90.3	1200	18.1	1200
Jul.	84.9	1000	93.7	1200	20.9	1200
Aug.	96.0	1000	89.4	1000	28.6	1200
Sep.	93.4	1000	89.4	1200	22.3	1200
Oct.	93.6	1200	83.4	1200	14.6	1200
Nov.	68.3	1200	57.3	1400	2.7	1400
Dec.	61.7	1200	25.0	1400	0.6	2000

Table 5.27

Maximum % Occurence of Inversions by 2 Hour Periods and Months for 3 Height Intervals

Winnipeg C.B.C. Tower, Oct.1969- Dec.1971

Height Interval	35 - 200'		200 - 400'		400 - 810'	
Months	Max.% Inv.	2 Hour Period Commencing	Max.% Inv.	2 Hour Period Commencing	Max.% Inv.	2 Hour Period Commencing
Jan.	70.5	0	68.2	0400	61.8	0
Feb.	84.4	2000	61.7	0600	59.7	0600
Mar.	77.7	0	68.8	0400	66.7	0800
Apr.	66.7	2000	52.7	0600	46.2	0600
May	74.7	2200	56.4	0200	43.0	0600
Jun.	85.7	0200	71.9	0400	51.3	0400
Jul.	88.7	0	69.3	0400	56.2	0400
Aug.	93.6	2200	79.9	0200	63.7	0600
Sep.	79.1	2000	63.9	0400	59.3	0400
Oct.	65.3	0	55.0	0	40.2	0600
Nov,	59.1	2000	41.0	0	41.4	0400
Dec.	44.6	1800	43.4	0600	58.0	0600

Figure 5.3 (over)

Figure 5.4

AVERAGE MONTHLY LAPSE RATES in °F/1000' at WINNIPEG C.B.C. TOWER

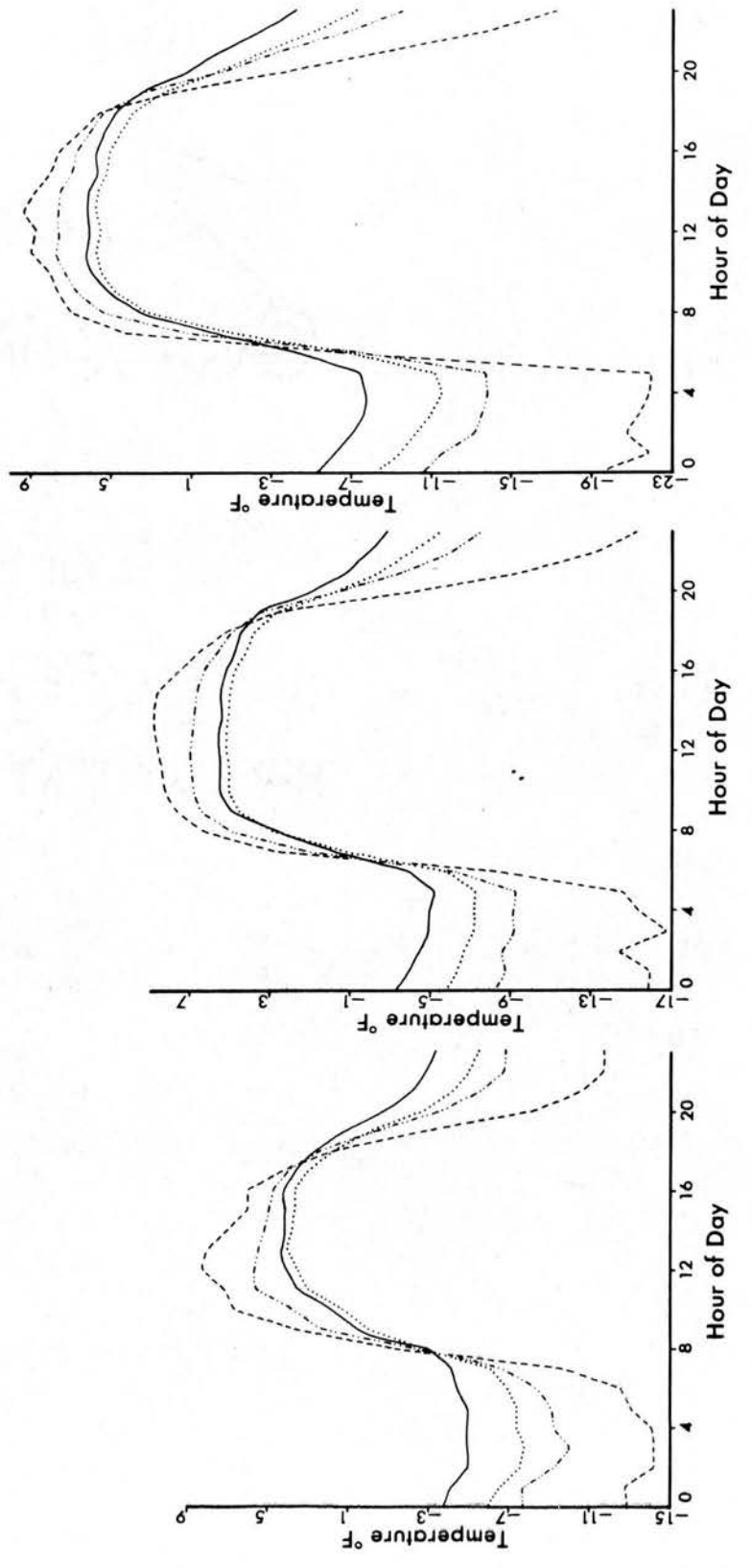


Figure 5.5 (over)

Figure 5.6

AVERAGE MONTHLY LAPSE RATES in °F/1000' at WINNIPEG C.B.C. TOWER

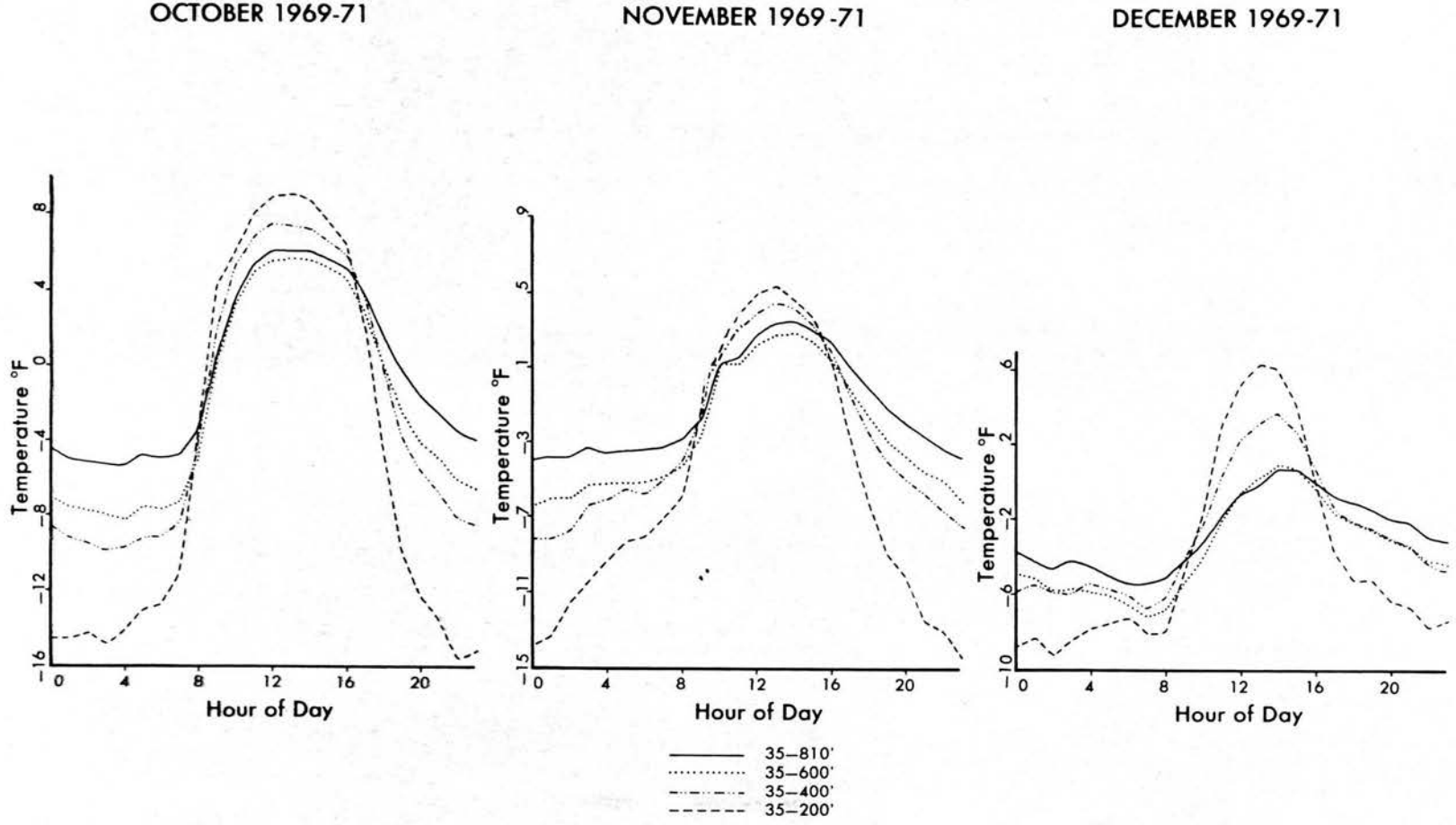


Figure 5.7 (over)

Figure 5.8

AVERAGE MONTHLY VERTICAL TEMPERATURE PROFILES in °F at WINNIPEG C.B.C. TOWER

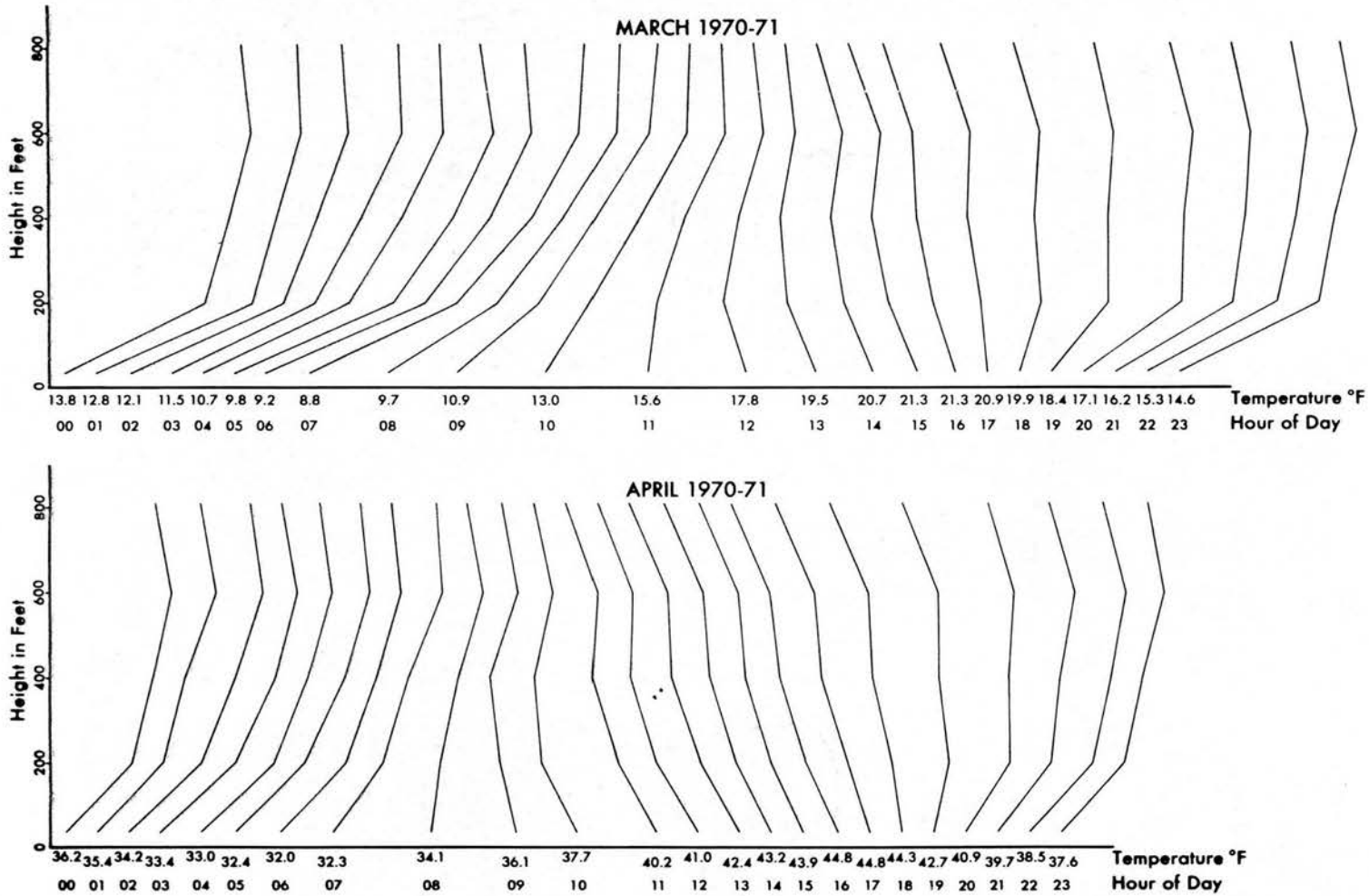


Figure 5.9 (over)

Figure 5.10

AVERAGE MONTHLY VERTICAL TEMPERATURE PROFILES in °F at WINNIPEG C.B.C. TOWER

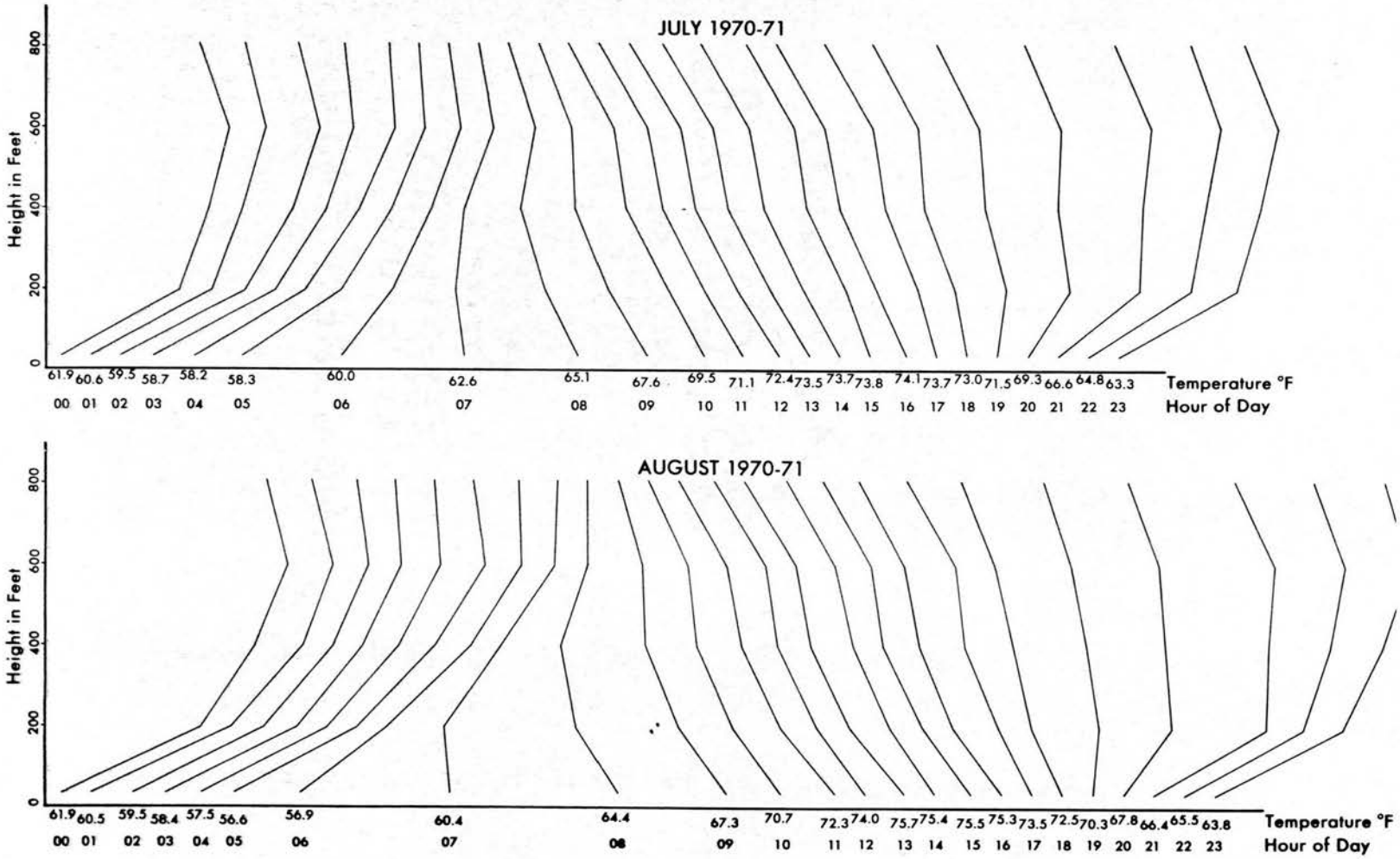


Figure 5.11 (over)

Figure 5.12

AVERAGE MONTHLY VERTICAL TEMPERATURE PROFILES in °F at WINNIPEG C.B.C. TOWER

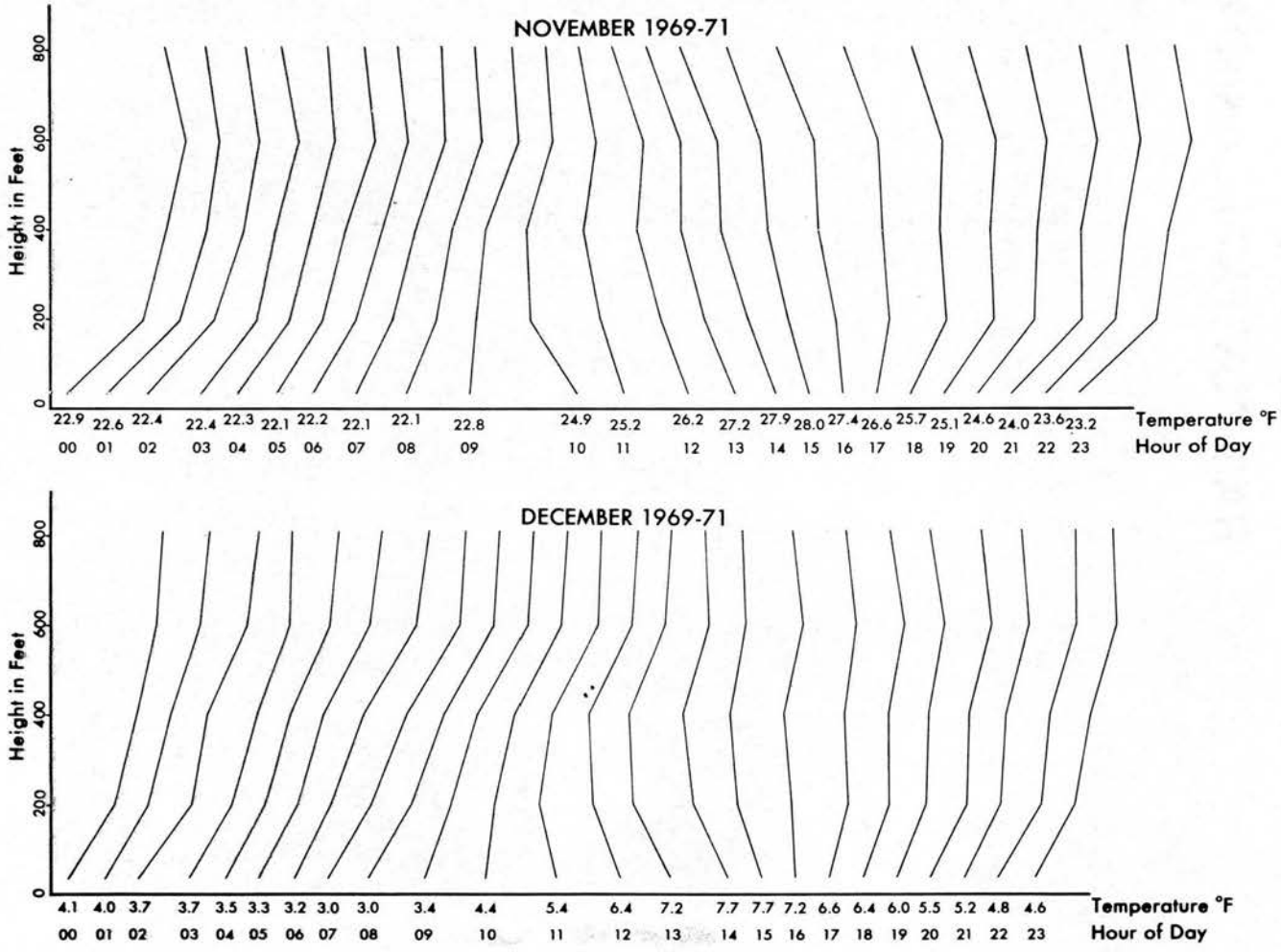


Figure 5.13

Theoretical Distribution of the Variation of Temperature With Height in the Lower 1000'

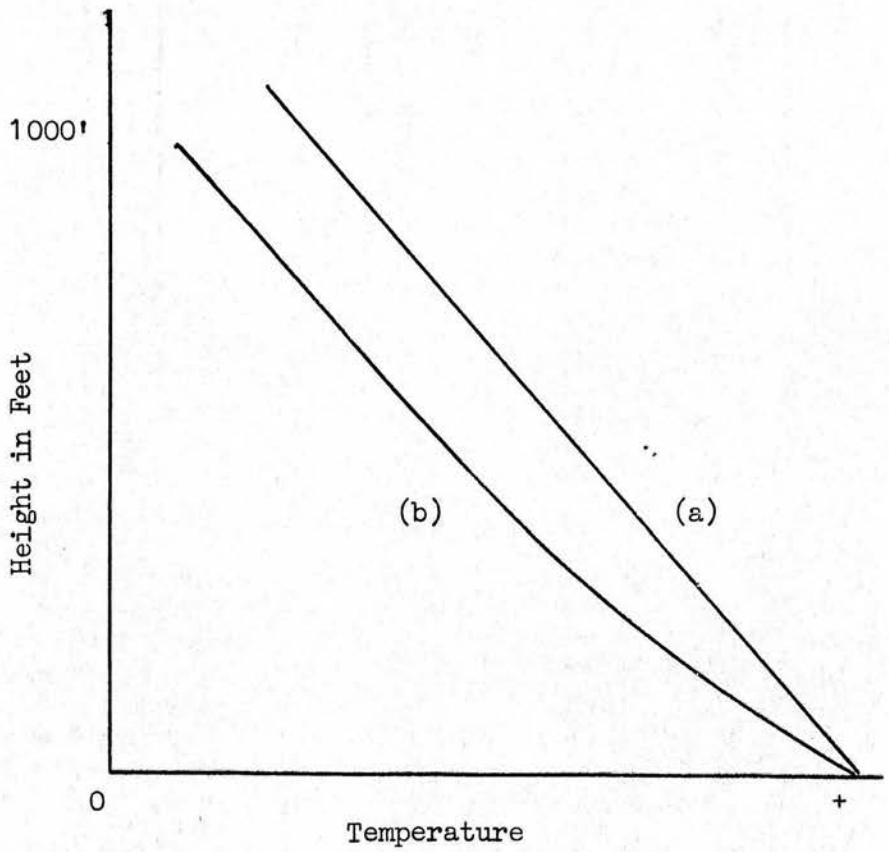


Figure 5.14 (a)

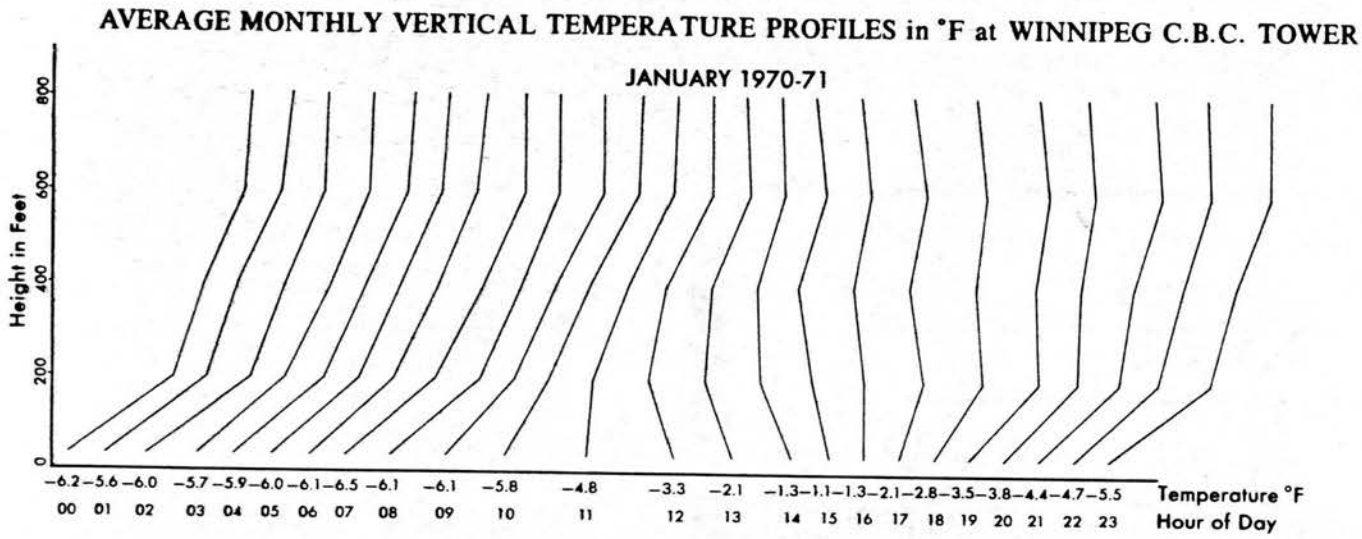
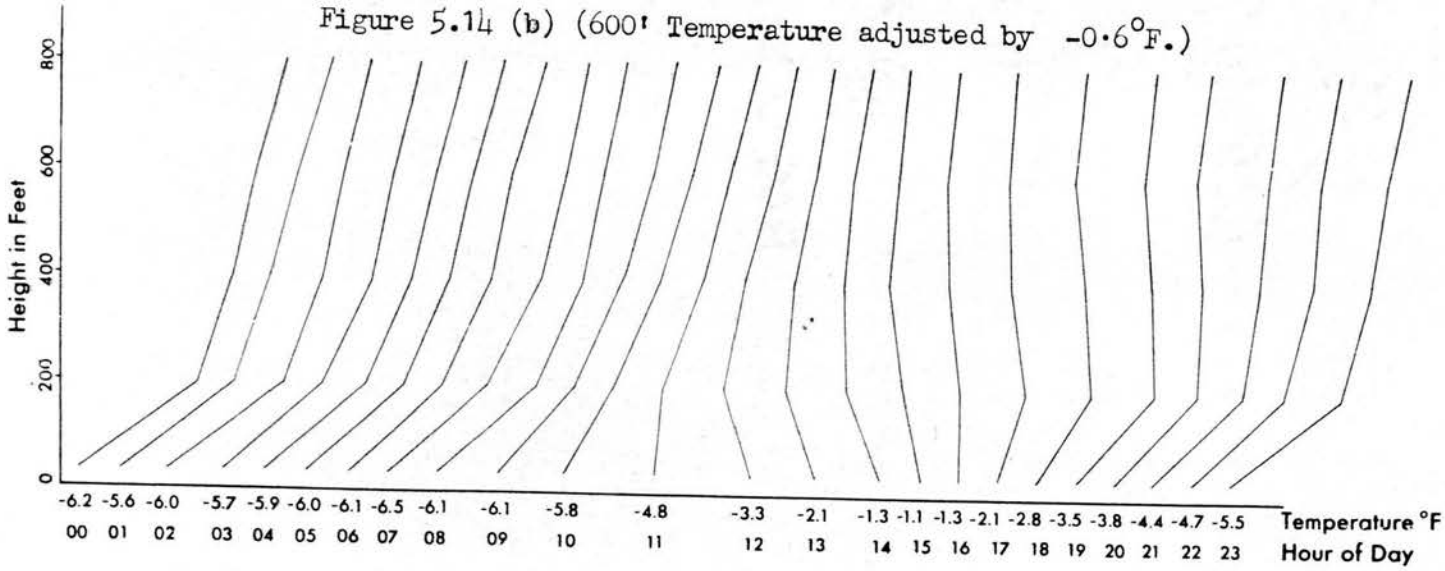


Figure 5.14 (b) (600' Temperature adjusted by $-0{\cdot}6^{\circ}F.$)



AVERAGE MONTHLY VERTICAL TEMPERATURE PROFILES in °F at WINNIPEG C.B.C. TOWER

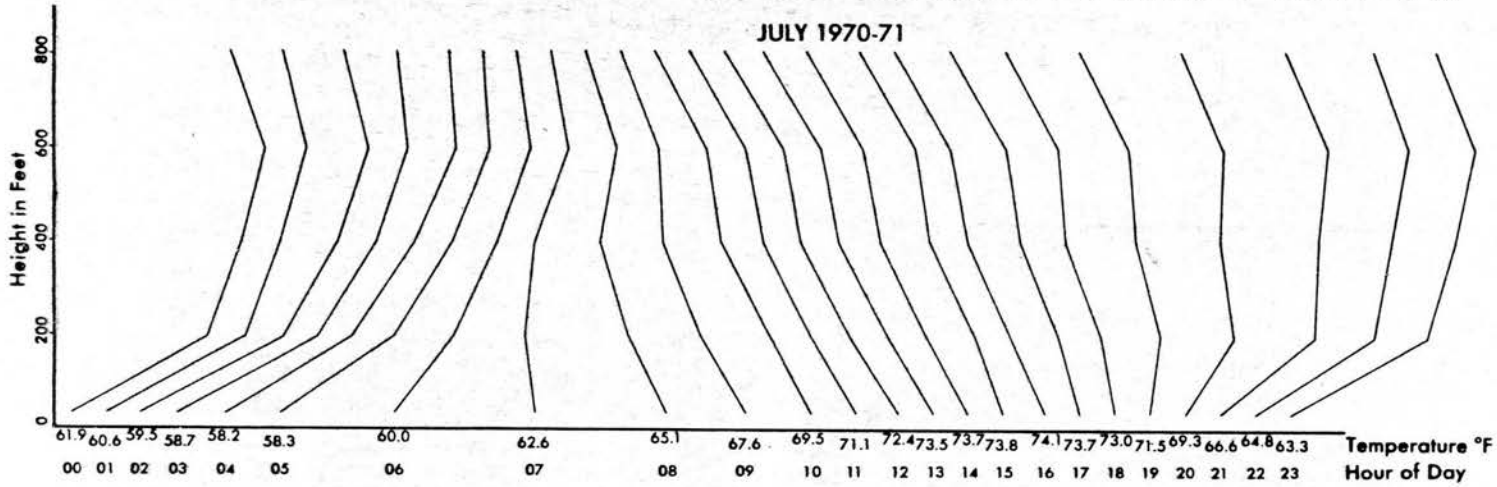


Figure 5.15 (b) (600' Temperature adjusted by -0·6°F.)

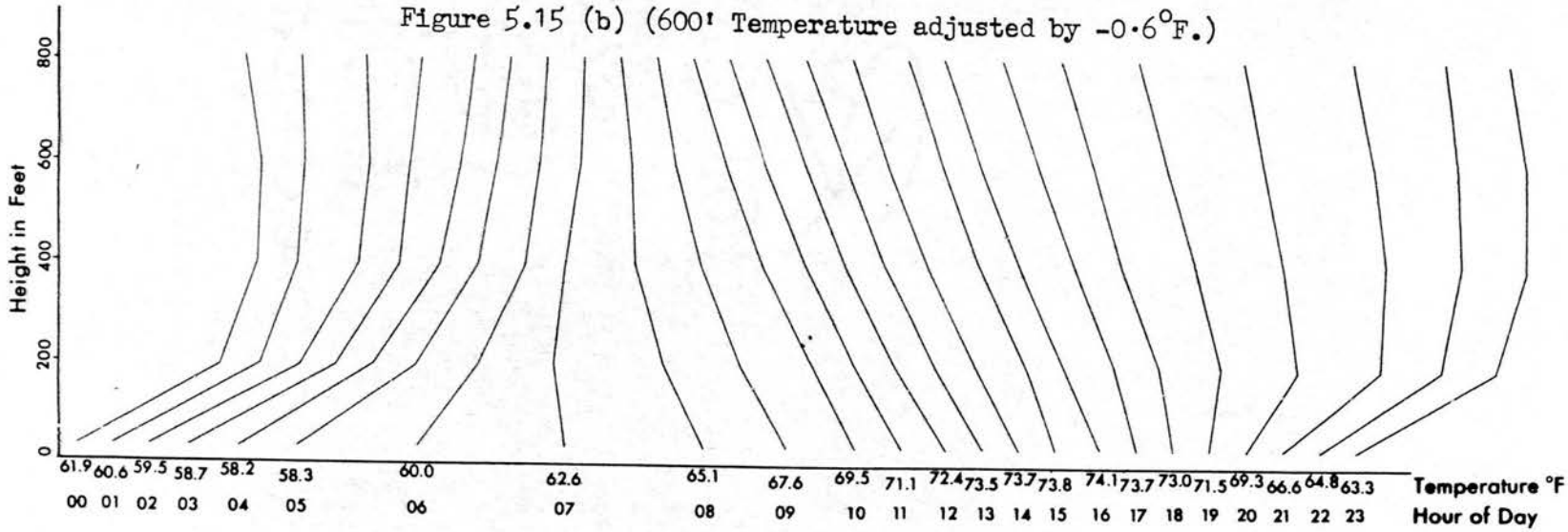


TABLE 5.28

WINNIPEG CBC TOWER, STARBUCK

AVERAGE TEMPERATURE DIFFERENCES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH JANUARY, 1970 - 1971

UNSIGNED VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	3.1	4.0	5.2	5.4	.8	1.9	2.2	1.1	1.4	.2
01	3.0	4.0	5.2	5.6	.9	2.1	2.5	1.2	1.6	.3
02	3.0	4.1	5.2	5.2	1.0	2.1	2.1	1.0	1.1	.0
03	2.6	3.9	5.0	5.1	1.2	2.4	2.4	1.1	1.1	.0
04	2.6	3.9	5.0	5.1	1.2	2.5	2.6	1.1	1.4	.1
05	2.5	3.7	4.9	5.2	1.2	2.4	2.7	1.2	1.5	.2
06	2.4	3.7	4.7	5.0	1.2	2.3	2.6	1.0	1.2	.2
07	2.4	3.8	5.0	5.0	1.3	2.5	2.6	1.1	1.2	.0
08	2.6	3.9	5.0	4.9	1.2	2.3	2.3	1.1	1.0	.0-
09	1.9	3.1	4.6	4.6	1.2	2.6	2.6	1.4	1.4	.0-
10	1.3	2.5	3.9	4.1	1.2	2.6	2.7	1.4	1.5	.0
11	.1	1.3	2.5	2.6	1.0	2.3	2.4	1.2	1.3	.1
12	.7-	.1-	1.1	1.2	.5	1.8	1.9	1.3	1.4	.0
13	.8-	.5-	.5	.3	.2	1.4	1.2	1.1	.9	.1-
14	.8-	1.0-	.1-	.3-	.2-	.6	.5	.8	.7	.1-
15	.5-	.9-	.2-	.4-	.4-	.3	.0	.7	.4	.3-
16	.0-	.3-	.1	.0-	.3-	.2	.0-	.5	.2	.2-
17	.7	.3	.8	.3	.4-	.0	.3-	.4	.0	.3-
18	1.4	1.2	1.6	1.2	.2-	.1	.2-	.3	.0	.3-
19	2.0	2.0	2.4	2.1	.0	.2	.0	.3	.1	.2-
20	2.1	2.3	2.6	2.4	.1	.4	.3	.3	.1	.1-
21	2.4	2.7	3.5	3.3	.3	1.0	.9	.7	.6	.1-
22	2.5	3.1	4.0	3.9	.6	1.4	1.4	.8	.7	.0-
23	2.9	3.6	4.5	4.6	.7	1.7	1.6	1.0	.9	.0-
MONTHLY AVERAGE	1.6	2.2	3.2	3.1	.6	1.5	1.5	.9	.9	.0-

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.29

WINNIPEG CBC TOWER STARBUCK

AVERAGE TEMPERATURE DIFFERENCES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH FEBRUARY, 1970 - 1971

UNSIGNED VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	3.9	5.0	5.9	5.7	1.0	1.9	1.7	.9	.6	.2-
01	4.1	5.1	6.3	6.0	1.0	2.2	1.9	1.1	.9	.2-
02	4.3	5.4	6.5	6.2	1.1	2.1	1.8	1.1	.7	.3-
03	4.0	5.2	6.4	6.2	1.3	2.5	2.3	1.1	.9	.2-
04	3.4	5.0	6.1	6.3	1.6	2.8	3.0	1.2	1.3	.2
05	3.3	4.9	6.1	6.2	1.5	2.8	2.9	1.2	1.2	.0
06	3.4	5.0	6.2	6.4	1.6	2.7	2.9	1.1	1.3	.1
07	2.8	4.1	5.5	5.6	1.2	2.7	2.7	1.4	1.5	.0-
08	2.9	3.9	5.5	5.4	1.0	2.6	2.6	1.6	1.5	.0-
09	2.4	3.5	4.7	5.1	1.1	2.3	2.7	1.2	1.6	.4
10	1.5	2.4	3.6	3.9	1.0	2.2	2.5	1.2	1.5	.3
11	.0	.4	1.7	1.4	.4	1.6	1.4	1.2	.9	.2-
12	.6-	.3-	.4	.0	.2	.9	.6	.7	.4	.3-
13	.7-	1.1-	.5-	1.0-	.4-	.1	.4-	.6	.0	.5-
14	.7-	1.3-	1.0-	1.4-	.5-	.3-	.6-	.2	.1-	.4-
15	.6-	1.2-	.9-	1.4-	.6-	.3-	.7-	.2	.1-	.4-
16	.4-	.9-	.5-	1.1-	.5-	.0-	.6-	.3	.1-	.5-
17	.2	.0	.4	.1-	.1-	.2	.3-	.4	.1-	.5-
18	1.4	1.4	2.0	1.5	.0-	.5	.0	.5	.1	.5-
19	2.3	2.7	3.5	2.9	.4	1.1	.6	.7	.2	.5-
20	2.7	3.4	4.0	3.4	.6	1.3	.6	.6	.0	.6-
21	3.0	3.9	4.7	4.0	.8	1.6	.9	.7	.1	.6-
22	3.5	4.3	5.1	4.7	.7	1.5	1.1	.7	.4	.3-
23	4.0	4.9	5.7	5.5	.8	1.6	1.4	.8	.6	.2-
MONTHLY AVERAGE	2.0	2.7	3.6	3.4	.6	1.5	1.3	.9	.6	.2-

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.30

WINNIPEG CBC TOWER, STARBUCK

AVERAGE TEMPERATURE DIFFERENCES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH MARCH, 1970 - 1971

UNSIGNED VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	4.5	5.3	6.0	5.7	.8	1.5	1.2	.7	.4	.3-
01	5.0	5.8	6.6	6.4	.8	1.6	1.5	.8	.6	.1-
02	5.0	6.0	7.0	6.8	1.0	2.0	1.9	1.0	.8	.1-
03	4.6	6.0	7.4	7.2	1.4	2.7	2.6	1.3	1.2	.1-
04	4.6	6.4	7.7	7.6	1.8	3.0	3.0	1.2	1.1	.1-
05	5.1	6.9	8.2	7.8	1.9	3.1	2.8	1.2	.8	.3-
06	5.1	7.0	8.3	8.2	1.9	3.2	3.1	1.2	1.1	.0-
07	4.7	7.1	8.5	8.7	2.3	3.8	4.0	1.4	1.6	.1
08	3.5	5.6	7.3	7.4	2.0	3.7	3.8	1.6	1.8	.0
09	2.6	4.3	6.0	6.3	1.7	3.4	3.7	1.7	2.0	.2
10	1.3	2.9	4.4	4.5	1.5	3.1	3.1	1.5	1.5	.0
11	.2	1.2	2.4	2.3	.9	2.2	2.1	1.2	1.1	.0-
12	.6-	.1-	.6	.3	.5	1.3	1.0	.8	.4	.4-
13	.8-	1.0-	.5-	.9-	.2-	.2	.1-	.4	.1	.4-
14	.9-	1.3-	.9-	1.5-	.4-	.0-	.7-	.3	.3-	.6-
15	.8-	1.3-	1.1-	2.0-	.5-	.3-	1.2-	.2	.7-	.9-
16	.7-	1.2-	1.2-	2.2-	.5-	.5-	1.5-	.0-	.9-	.9-
17	.1-	.6-	.5-	1.4-	.4-	.3-	1.2-	.1	.8-	.8-
18	.7	.4	.6	.1-	.2-	.0-	.8-	.2	.6-	.8-
19	1.7	1.7	2.0	1.3	.0	.2	.4-	.2	.4-	.6-
20	3.0	3.1	3.4	2.7	.1	.4	.3-	.3	.4-	.7-
21	3.7	4.1	4.4	3.7	.4	.7	.0-	.2	.4-	.6-
22	4.0	4.6	5.0	4.5	.6	1.0	.4	.4	.1-	.5-
23	4.3	4.9	5.5	5.0	.5	1.1	.6	.6	.1	.4-
MONTHLY AVERAGE	2.5	3.2	4.1	3.7	.7	1.5	1.1	.7	.3	.3-

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.31

WINNIPEG CBC TOWER, STARBUCK

AVERAGE TEMPERATURE DIFFERENCES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH APRIL, 1970 - 1971

UNSIGNED VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	2.1	2.7	3.4	2.9	.7	1.2	.7	.5	.0	.5-
01	2.1	2.8	3.7	3.2	.7	1.6	1.1	.9	.4	.5-
02	2.3	3.4	4.3	3.9	1.0	1.9	1.5	.9	.4	.4-
03	2.3	3.7	4.4	3.9	1.3	2.0	1.6	.7	.2	.4-
04	2.3	3.4	4.1	3.8	1.1	1.8	1.5	.7	.4	.3-
05	2.1	3.3	4.1	3.9	1.2	2.0	1.7	.8	.5	.3-
06	2.1	3.1	3.9	3.5	1.0	1.8	1.4	.7	.4	.3-
07	1.6	2.4	3.5	3.2	.8	1.9	1.6	1.0	.8	.2-
08	.2	.8	1.6	1.1	.5	1.3	.9	.7	.2	.5-
09	.6-	.8-	.0	.4-	.3-	.6	.1	.9	.4	.4-
10	1.1-	1.3-	.7-	1.4-	.2-	.4	.3-	.6	.0-	.7-
11	1.2-	2.0-	1.7-	2.7-	.8-	.5-	1.5-	.2	.6-	.9-
12	1.3-	2.0-	2.1-	3.1-	.7-	.7-	1.8-	.0	1.0-	1.0-
13	1.2-	2.0-	2.3-	3.4-	.6-	1.0-	2.1-	.3-	1.3-	1.1-
14	1.1-	1.9-	2.1-	3.2-	.7-	1.0-	2.1-	.2-	1.3-	1.1-
15	1.0-	1.8-	2.1-	3.2-	.8-	1.1-	2.2-	.2-	1.4-	1.1-
16	1.0-	1.7-	2.1-	3.3-	.7-	1.1-	2.3-	.3-	1.5-	1.2-
17	.7-	1.4-	1.7-	2.9-	.7-	1.0-	2.2-	.2-	1.4-	1.2-
18	.2-	.8-	1.0-	2.1-	.6-	.7-	1.8-	.1-	1.2-	1.1-
19	.5	.2	.1	.8-	.3-	.3-	1.3-	.0-	1.0-	.9-
20	1.3	1.3	1.6	.7	.0-	.2	.6-	.2	.6-	.8-
21	1.7	2.0	2.6	1.7	.2	.8	.0	.4	.2-	.7-
22	1.9	2.5	3.0	2.3	.6	1.0	.3	.5	.2-	.6-
23	1.9	2.5	3.2	2.7	.6	1.3	.7	.7	.1	.5-
MONTHLY AVERAGE	.6	.7	1.1	.4	.1	.5	.2-	.4	.3-	.7-

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.32

WINNIPEG CBC TOWER, STARBUCK

AVERAGE TEMPERATURE DIFFERENCES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH MAY, 1970 - 1971

UNSIGNED VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	2.6	2.9	3.3	2.5	.3	.6	.0-	.3	.4-	.8-
01	2.6	3.2	3.6	3.0	.6	1.0	.4	.4	.1-	.6-
02	2.3	3.1	3.8	3.4	.7	1.4	1.0	.6	.3	.3-
03	2.7	3.3	4.0	3.8	.6	1.3	1.0	.7	.4	.2-
04	2.5	3.3	4.0	3.7	.7	1.5	1.2	.7	.4	.3-
05	2.4	3.4	4.1	4.0	1.0	1.7	1.6	.7	.6	.0-
06	1.4	2.2	3.3	3.1	.8	1.9	1.7	1.0	.8	.1-
07	.4-	.4-	.4	.1	.0	.8	.6	.8	.5	.2-
08	1.0-	1.8-	1.6-	2.0-	.7-	.6-	1.0-	.2	.2-	.5-
09	1.2-	2.3-	2.6-	3.7-	1.0-	1.3-	2.4-	.2-	1.4-	1.1-
10	1.3-	2.5-	2.8-	4.2-	1.1-	1.5-	2.8-	.3-	1.7-	1.3-
11	1.4-	2.5-	2.9-	4.2-	1.1-	1.5-	2.8-	.3-	1.7-	1.3-
12	1.4-	2.5-	2.9-	4.3-	1.1-	1.5-	2.9-	.3-	1.8-	1.4-
13	1.4-	2.5-	2.9-	4.3-	1.1-	1.4-	2.9-	.4-	1.8-	1.4-
14	1.4-	2.5-	2.9-	4.2-	1.0-	1.4-	2.8-	.4-	1.8-	1.3-
15	1.4-	2.4-	2.8-	4.2-	1.0-	1.4-	2.8-	.4-	1.8-	1.4-
16	1.2-	2.3-	2.7-	4.1-	1.1-	1.4-	2.8-	.3-	1.7-	1.3-
17	1.1-	2.1-	2.4-	3.7-	1.0-	1.3-	2.7-	.4-	1.7-	1.3-
18	.8-	1.8-	2.1-	3.4-	.9-	1.3-	2.6-	.3-	1.6-	1.3-
19	.4-	1.2-	1.5-	2.8-	.8-	1.1-	2.3-	.3-	1.5-	1.3-
20	.7	.1	.1	.9-	.5-	.5-	1.6-	.0	1.0-	1.1-
21	1.5	1.3	1.4	.6	.2-	.1-	.9-	.1	.7-	.8-
22	2.1	2.1	2.2	1.3	.0	.0	.8-	.0	.8-	.9-
23	2.5	2.7	3.1	2.2	.2	.6	.3-	.4	.5-	.9-
MONTHLY AVERAGE	.3	.0	.1	.7-	.3-	.2-	1.1-	.1	.8-	.9-

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.33

WINNIPEG CBC TOWER, STARBUCK

AVERAGE TEMPERATURE DIFFERENCES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH JUNE, 1970 - 1971

UNSIGNED VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	3.1	3.8	4.6	4.0	.6	1.4	.9	.7	.2	.5-
01	3.6	4.2	5.2	4.7	.6	1.6	1.1	1.1	.5	.5-
02	3.4	4.7	5.8	5.4	1.3	2.4	2.0	1.0	.6	.3-
03	3.5	4.9	6.2	5.9	1.4	2.7	2.4	1.2	.9	.3-
04	3.6	5.0	6.5	6.0	1.4	2.9	2.3	1.4	.9	.4-
05	3.6	5.0	6.2	5.8	1.4	2.6	2.2	1.2	.8	.3-
06	1.1	2.8	3.9	3.3	1.6	2.8	2.2	1.1	.5	.6-
07	.6-	.4-	.6	.1	.2	1.3	.8	1.1	.6	.4-
08	1.1-	2.0-	1.8-	2.7-	.8-	.6-	1.5-	.2	.7-	.8-
09	1.2-	2.4-	2.7-	4.0-	1.2-	1.4-	2.7-	.2-	1.5-	1.2-
10	1.3-	2.6-	3.1-	4.6-	1.3-	1.8-	3.3-	.4-	2.0-	1.5-
11	1.4-	2.8-	3.2-	4.9-	1.3-	1.8-	3.4-	.4-	2.1-	1.6-
12	1.4-	2.7-	3.1-	4.7-	1.3-	1.6-	3.3-	.3-	1.9-	1.6-
13	1.6-	2.8-	3.3-	4.8-	1.2-	1.7-	3.2-	.4-	2.0-	1.5-
14	1.4-	2.8-	3.2-	4.8-	1.3-	1.7-	3.3-	.4-	2.0-	1.6-
15	1.2-	2.5-	2.9-	4.4-	1.2-	1.7-	3.1-	.4-	1.9-	1.5-
16	1.2-	2.4-	2.9-	4.4-	1.2-	1.6-	3.2-	.4-	1.9-	1.6-
17	1.0-	2.2-	2.5-	4.2-	1.1-	1.5-	3.1-	.3-	1.9-	1.5-
18	.9-	1.9-	2.2-	3.7-	1.0-	1.3-	2.8-	.2-	1.8-	1.5-
19	.3-	1.2-	1.3-	2.7-	.9-	1.0-	2.4-	.1-	1.5-	1.3-
20	.5	.1	.2	1.0-	.3-	.3-	1.5-	.0	1.2-	1.2-
21	1.4	1.1	1.5	.3	.2-	.0	1.1-	.3	.8-	1.2-
22	2.3	2.5	2.9	1.9	.2	.7	.3-	.4	.5-	1.0-
23	2.9	3.4	4.1	3.3	.6	1.1	.3	.6	.2-	.8-
MONTHLY AVERAGE	.6	.4	.6	.3-	.2-	.0	1.0-	.3	.8-	1.1-

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.34

WINNIPEG CBC TOWER, STARBUCK

AVERAGE TEMPERATURE DIFFERENCES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH JULY, 1970 - 1971

UNSIGNED VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	3.9	5.1	5.6	4.6	1.0	1.7	.6	.5	.3-	1.0-
01	4.0	5.0	5.8	5.1	1.0	1.7	1.0	.8	.1	.7-
02	4.1	5.7	6.5	5.9	1.6	2.5	1.8	.8	.2	.5-
03	4.0	5.8	6.6	6.3	1.7	2.6	2.2	.8	.5	.3-
04	3.7	5.5	6.7	6.5	1.7	3.0	2.7	1.2	.9	.2-
05	3.1	4.8	6.0	5.8	1.6	2.9	2.6	1.2	.9	.2-
06	1.7	2.9	4.0	3.5	1.2	2.3	1.9	1.0	.5	.4-
07	.3-	.0	.9	.5	.3	1.3	.9	.9	.5	.3-
08	1.0-	1.9-	1.4-	2.2-	.8-	.3-	1.1-	.4	.3-	.7-
09	1.2-	2.4-	2.5-	3.6-	1.1-	1.2-	2.3-	.1-	1.3-	1.1-
10	1.2-	2.5-	2.9-	4.5-	1.3-	1.7-	3.3-	.4-	1.9-	1.5-
11	1.3-	2.7-	3.2-	4.8-	1.3-	1.8-	3.4-	.4-	2.0-	1.6-
12	1.4-	2.8-	3.3-	4.9-	1.4-	1.9-	3.6-	.5-	2.1-	1.7-
13	1.3-	2.7-	3.1-	4.8-	1.4-	1.8-	3.5-	.4-	2.1-	1.7-
14	1.2-	2.5-	2.9-	4.6-	1.2-	1.7-	3.3-	.5-	2.0-	1.5-
15	.8-	2.1-	2.5-	4.1-	1.2-	1.6-	3.2-	.4-	2.0-	1.6-
16	1.1-	2.3-	2.7-	4.3-	1.2-	1.6-	3.2-	.4-	2.0-	1.6-
17	.6-	1.6-	2.0-	3.7-	1.1-	1.4-	3.0-	.3-	2.0-	1.6-
18	.4-	1.4-	1.6-	3.1-	.8-	1.1-	2.7-	.2-	1.7-	1.5-
19	.3	.4-	.6-	2.0-	.7-	.9-	2.3-	.1-	1.6-	1.4-
20	1.3	1.0	1.0	.0-	.3-	.2-	1.4-	.1	1.0-	1.1-
21	2.7	2.8	3.0	1.9	.0	.3	.8-	.2	.8-	1.1-
22	3.4	3.9	4.4	3.4	.5	1.0	.0	.5	.5-	1.0-
23	3.8	4.6	5.2	4.2	.8	1.3	.2	.5	.5-	1.1-
MONTHLY AVERAGE	1.0	1.0	1.2	.1	.0-	.1	.9-	.2	.8-	1.0-

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.35

WINNIPEG CBC TOWER, STARBUCK

AVERAGE TEMPERATURE DIFFERENCES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH AUGUST, 1970 - 1971

UNSIGNED VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	4.7	6.4	7.5	6.9	1.7	2.8	2.1	1.0	.4	.6-
01	4.7	7.0	8.1	7.4	2.3	3.3	2.6	1.0	.3	.6-
02	4.5	6.6	7.9	7.5	2.2	3.4	2.9	1.2	.7	.4-
03	4.4	6.6	7.9	7.6	2.1	3.4	3.1	1.3	1.0	.2-
04	4.3	6.6	8.1	7.8	2.3	3.7	3.5	1.4	1.2	.2-
05	4.2	6.8	8.4	8.1	2.6	4.2	3.9	1.6	1.3	.3-
06	3.1	5.9	7.5	7.5	2.8	4.4	4.3	1.6	1.5	.0-
07	.1-	1.9	3.7	3.7	2.0	3.8	3.8	1.8	1.7	.0
08	1.4-	1.7-	.7-	.8-	.3-	.6	.6	1.0	.9	.0
09	1.5-	2.6-	2.7-	3.6-	1.1-	1.1-	2.0-	.0-	.9-	.8-
10	1.6-	2.8-	3.2-	4.5-	1.2-	1.5-	2.8-	.3-	1.6-	1.3-
11	1.8-	3.1-	3.6-	5.2-	1.3-	1.8-	3.4-	.4-	2.1-	1.6-
12	1.6-	2.8-	3.4-	5.0-	1.2-	1.7-	3.4-	.5-	2.1-	1.6-
13	1.7-	3.0-	3.5-	5.2-	1.2-	1.8-	3.4-	.5-	2.2-	1.7-
14	1.4-	2.6-	3.2-	4.8-	1.2-	1.8-	3.3-	.6-	2.2-	1.6-
15	1.6-	2.7-	3.2-	4.8-	1.2-	1.6-	3.2-	.4-	2.0-	1.6-
16	1.6-	2.7-	3.1-	4.6-	1.1-	1.5-	3.0-	.4-	1.9-	1.4-
17	1.0-	2.1-	2.3-	4.0-	1.1-	1.4-	3.0-	.2-	1.8-	1.6-
18	.9-	1.5-	2.2-	3.2-	.5-	1.2-	2.2-	.6-	1.6-	1.0-
19	.1	.1-	.6-	1.5-	.3-	.8-	1.7-	.4-	1.4-	.9-
20	1.6	1.4	1.1	.2	.1-	.4-	1.4-	.2-	1.2-	.9-
21	3.6	3.8	4.0	2.7	.2	.3	.9-	.1	1.1-	1.2-
22	3.9	4.8	5.3	4.4	.9	1.4	.5	.5	.3-	.9-
23	4.2	5.5	6.4	5.5	1.4	2.3	1.4	.9	.0	.8-
MONTHLY AVERAGE	1.2	1.6	2.1	1.2	.4	.8	.0-	.4	.4-	.9-

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.36

WINNIPEG CBC TOWER, STARBUCK

AVERAGE TEMPERATURE DIFFERENCES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH SEPTEMBER, 1970 - 1971

UNSIGNED VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	2.9	3.9	4.7	4.1	.9	1.7	1.2	.8	.2	.6-
01	2.8	3.9	5.0	4.5	1.0	2.1	1.5	1.1	.5	.6-
02	2.8	3.9	5.0	4.6	1.1	2.2	1.9	1.1	.7	.3-
03	2.9	4.2	5.4	5.3	1.2	2.5	2.4	1.2	1.1	.1-
04	2.7	4.0	5.5	5.3	1.4	2.8	2.7	1.3	1.2	.1-
05	3.2	4.8	6.0	5.6	1.5	2.7	2.3	1.2	.8	.3-
06	2.9	4.4	5.7	5.4	1.5	2.8	2.5	1.3	.9	.3-
07	1.7	2.9	4.5	4.3	1.1	2.8	2.5	1.6	1.3	.2-
08	.3-	.0	1.2	.9	.4	1.6	1.3	1.1	.8	.2-
09	1.3-	2.1-	1.7-	2.3-	.7-	.4-	.9-	.4	.1-	.6-
10	1.5-	2.7-	2.9-	4.1-	1.2-	1.4-	2.6-	.2-	1.4-	1.1-
11	1.7-	3.1-	3.3-	4.9-	1.3-	1.5-	3.1-	.2-	1.8-	1.6-
12	1.5-	2.9-	3.2-	4.9-	1.4-	1.7-	3.4-	.4-	2.0-	1.6-
13	1.5-	2.8-	3.3-	5.0-	1.3-	1.8-	3.4-	.4-	2.1-	1.6-
14	1.6-	2.8-	3.3-	4.9-	1.2-	1.7-	3.4-	.4-	2.1-	1.6-
15	1.4-	2.7-	3.1-	4.7-	1.2-	1.7-	3.2-	.4-	2.0-	1.5-
16	1.1-	2.2-	2.6-	4.1-	1.1-	1.5-	3.0-	.3-	1.8-	1.5-
17	.6-	1.7-	1.9-	3.4-	1.0-	1.3-	2.7-	.3-	1.7-	1.4-
18	.4	.4-	.6-	1.9-	.7-	1.0-	2.3-	.2-	1.5-	1.3-
19	1.3	1.0	1.1	.1	.2-	.0-	1.1-	.1	.8-	1.0-
20	1.9	2.1	2.7	1.8	.1	.7	.1-	.6	.2-	.8-
21	2.3	2.6	3.4	2.7	.3	1.0	.4	.7	.1	.6-
22	2.7	3.4	4.2	3.5	.6	1.4	.7	.7	.1	.7-
23	2.8	3.8	4.6	3.9	.9	1.8	1.1	.8	.2	.6-
MONTHLY AVERAGE	.9	.9	1.4	.5	.0	.5	.3-	.5	.3-	.8-

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.37

WINNIPEG CBC TOWER, STARBUCK

AVERAGE TEMPERATURE DIFFERENCES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH OCTOBER , 1969 - 1971

UNSIGNED VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	2.4	3.1	4.0	3.4	.7	1.6	1.0	.8	.3	.5-
01	2.4	3.3	4.3	3.8	1.0	1.9	1.5	.9	.4	.5-
02	2.3	3.5	4.4	3.9	1.1	2.0	1.6	.9	.5	.4-
03	2.4	3.6	4.5	4.1	1.1	2.0	1.6	.8	.5	.3-
04	2.3	3.5	4.7	4.1	1.2	2.3	1.8	1.1	.5	.5-
05	2.1	3.4	4.3	3.7	1.3	2.1	1.6	.9	.3	.5-
06	2.1	3.3	4.3	3.9	1.2	2.2	1.7	1.0	.5	.4-
07	1.8	3.1	4.1	3.7	1.2	2.3	1.9	1.0	.6	.3-
08	.6	1.5	2.8	2.7	1.0	2.2	2.1	1.2	1.1	.0-
09	.6-	.6-	.1-	.3-	.0	.5	.3	.5	.3	.1-
10	1.0-	1.9-	1.8-	2.6-	.9-	.8-	1.6-	.1	.7-	.8-
11	1.3-	2.4-	2.8-	4.2-	1.1-	1.4-	2.8-	.3-	1.7-	1.3-
12	1.5-	2.7-	3.2-	4.7-	1.2-	1.7-	3.2-	.4-	1.9-	1.5-
13	1.5-	2.7-	3.2-	4.8-	1.2-	1.7-	3.2-	.4-	2.0-	1.5-
14	1.4-	2.6-	3.2-	4.7-	1.2-	1.7-	3.2-	.5-	2.0-	1.5-
15	1.2-	2.4-	2.9-	4.4-	1.1-	1.6-	3.2-	.5-	2.0-	1.5-
16	1.0-	2.1-	2.6-	4.0-	1.0-	1.5-	2.9-	.4-	1.9-	1.4-
17	.3-	1.3-	1.6-	2.9-	.9-	1.3-	2.6-	.3-	1.7-	1.3-
18	.7	.1	.0-	1.2-	.6-	.6-	1.9-	.1-	1.3-	1.2-
19	1.6	1.3	1.4	.2	.2-	.1-	1.3-	.0	1.1-	1.1-
20	2.0	2.1	2.3	1.2	.0	.3	.7-	.2	.8-	1.0-
21	2.2	2.4	2.8	2.0	.2	.5	.2-	.3	.4-	.7-
22	2.6	2.9	3.5	2.8	.3	.8	.2	.4	.1-	.6-
23	2.5	3.1	3.7	3.1	.6	1.2	.5	.5	.0-	.6-
MONTHLY AVERAGE	.8	.8	1.2	.3	.0	.4	.4-	.3	.5-	.8-

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.38

WINNIPEG CBC TOWER, STARBUCK

AVERAGE TEMPERATURE DIFFERENCES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH NOVEMBER , 1969 - 1971

UNSIGNED VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	2.2	3.0	3.6	3.0	.7	1.3	.8	.6	.1	.4-
01	2.2	2.9	3.4	3.0	.8	1.2	.8	.4	.0	.4-
02	1.9	2.8	3.4	2.9	.9	1.5	1.0	.5	.0	.4-
03	1.7	2.3	3.0	2.5	.6	1.3	.8	.6	.2	.4-
04	1.5	2.2	3.0	2.7	.6	1.4	1.2	.8	.6	.2-
05	1.3	2.0	2.9	2.6	.6	1.5	1.2	.9	.5	.3-
06	1.3	2.1	2.9	2.6	.7	1.5	1.3	.8	.5	.2-
07	1.1	1.8	2.7	2.5	.6	1.5	1.4	.9	.7	.1-
08	.9	1.5	2.4	2.2	.5	1.4	1.2	.9	.7	.1-
09	.1	.5	1.5	1.3	.3	1.3	1.1	.9	.7	.1-
10	1.5-	1.4-	.7-	.9-	.0	.7	.5	.7	.5	.1-
11	.6-	1.1-	.6-	1.2-	.4-	.0-	.5-	.4	.0-	.4-
12	.8-	1.4-	1.3-	2.1-	.5-	.4-	1.3-	.1	.7-	.8-
13	.8-	1.6-	1.6-	2.6-	.7-	.6-	1.6-	.0	.9-	.9-
14	.7-	1.5-	1.6-	2.7-	.7-	.8-	1.9-	.1-	1.1-	1.0-
15	.6-	1.2-	1.3-	2.4-	.5-	.7-	1.8-	.1-	1.2-	1.0-
16	.2-	.7-	.7-	1.8-	.5-	.5-	1.6-	.0-	1.1-	1.0-
17	.4	.2	.1	.8-	.2-	.3-	1.3-	.0-	1.0-	1.0-
18	1.0	.9	.9	.0	.0-	.0-	.9-	.0	.8-	.9-
19	1.5	1.4	1.6	.8	.0-	.1	.6-	.2	.6-	.8-
20	1.7	1.8	2.1	1.5	.1	.4	.1-	.3	.2-	.5-
21	2.0	2.1	2.6	2.0	.0	.5	.0	.5	.0	.5-
22	2.1	2.4	2.8	2.5	.2	.7	.4	.4	.1	.3-
23	2.3	2.7	3.4	2.9	.3	1.0	.5	.7	.2	.5-
MONTHLY AVERAGE	.8	1.0	1.4	.8	.1	.6	.0	.4	.1-	.5-

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.39

WINNIPEG CBC TOWER, STARBUCK

AVERAGE TEMPERATURE DIFFERENCES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH DECEMBER , 1969 - 1971

UNSIGNED VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	1.4	2.1	2.7	2.8	.6	1.3	1.4	.6	.7	.0
01	1.3	2.0	3.0	3.2	.6	1.6	1.8	.9	1.2	.2
02	1.5	2.1	3.3	3.7	.5	1.7	2.1	1.1	1.5	.3
03	1.4	2.1	3.2	3.3	.7	1.8	1.9	1.0	1.1	.0
04	1.3	1.9	3.3	3.5	.7	2.0	2.2	1.3	1.5	.2
05	1.2	2.0	3.5	3.9	.8	2.2	2.6	1.4	1.8	.4
06	1.2	2.1	3.8	4.2	1.0	2.6	3.0	1.5	2.0	.4
07	1.3	2.5	4.1	4.3	1.1	2.7	2.9	1.5	1.7	.2
08	1.3	2.3	3.8	4.0	.9	2.5	2.6	1.5	1.7	.1
09	.7	1.5	3.1	3.3	.7	2.3	2.5	1.5	1.7	.1
10	.3	.9	2.3	2.6	.5	2.0	2.3	1.4	1.7	.2
11	.5-	.1-	1.2	1.5	.3	1.7	1.9	1.3	1.5	.2
12	.8-	.8-	.3	.5	.0	1.2	1.4	1.2	1.4	.2
13	1.0-	1.1-	.1-	.1	.0-	.9	1.2	1.0	1.2	.3
14	1.0-	1.3-	.5-	.5-	.3-	.4	.4	.8	.7	.0-
15	.6-	.9-	.4-	.5-	.2-	.3	.1	.5	.4	.1-
16	.0-	.2-	.2	.0-	.2-	.2	.0	.5	.2	.2-
17	.6	.5	.9	.6	.0-	.3	.0	.4	.0	.3-
18	.8	.8	1.2	.9	.0-	.4	.0	.4	.0	.3-
19	.8	.9	1.4	1.1	.0	.6	.2	.4	.1	.3-
20	1.0	1.1	1.8	1.5	.0	.7	.5	.6	.4	.2-
21	1.1	1.2	2.0	1.7	.1	.9	.6	.7	.4	.2-
22	1.3	1.6	2.4	2.3	.3	1.1	1.0	.7	.7	.1-
23	1.2	1.7	2.5	2.5	.5	1.2	1.3	.7	.7	.0-
MONTHLY AVERAGE	.6	1.0	2.0	2.1	.3	1.3	1.4	1.0	1.0	.0

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.40

WINNIPEG CBC TOWER, STARBUCK

LAPSE RATES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH JANUARY, 1970 - 1971

NEGATIVE VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	19.1-	11.0-	9.2-	7.0-	4.3-	5.0-	3.7-	5.8-	3.5-	1.2-
01	18.5-	10.9-	9.2-	7.2-	4.6-	5.4-	4.1-	6.1-	3.9-	1.7-
02	18.7-	11.3-	9.3-	6.8-	5.2-	5.3-	3.5-	5.5-	2.8-	.2-
03	16.2-	10.8-	8.9-	6.6-	6.2-	5.9-	4.0-	5.6-	2.9-	.3-
04	15.9-	10.6-	8.9-	6.8-	6.2-	6.1-	4.3-	6.0-	3.3-	.9-
05	15.2-	10.2-	8.7-	6.7-	6.1-	6.0-	4.4-	6.0-	3.6-	1.2-
06	14.6-	10.2-	8.4-	6.4-	6.6-	5.8-	4.2-	5.1-	3.1-	1.2-
07	15.4-	10.9-	9.1-	6.7-	7.2-	6.5-	4.3-	5.8-	2.9-	.0-
08	16.0-	10.6-	8.9-	6.4-	6.2-	5.9-	3.8-	5.7-	2.7-	.1
09	11.9-	8.8-	8.1-	5.9-	6.1-	6.5-	4.3-	7.0-	3.5-	.1-
10	8.0-	6.9-	7.0-	5.3-	6.1-	6.6-	4.5-	7.1-	3.7-	.6-
11	1.4-	3.5-	4.5-	3.5-	5.3-	5.7-	4.0-	6.2-	3.4-	.7-
12	4.2	.5	2.0-	1.5-	2.5-	4.5-	3.1-	6.6-	3.4-	.3-
13	5.1	1.6	.9-	.4-	1.1-	3.4-	1.9-	5.7-	2.3-	.8
14	5.2	2.8	.2	.3	.8	1.6-	.9-	4.2-	1.7-	.6
15	3.3	2.5	.3	.6	1.9	.8-	.1-	3.7-	1.1-	1.3
16	.1-	.8	.3-	.1	1.6	.4-	.1	2.5-	.5-	1.2
17	4.2-	.9-	1.3-	.4-	1.8	.2-	.4	2.2-	.1-	1.8
18	8.8-	3.4-	2.8-	1.6-	.9	.3-	.2	1.7-	.0-	1.5
19	12.3-	5.4-	4.1-	2.7-	.1	.8-	.1-	1.8-	.2-	1.2
20	13.0-	6.2-	4.6-	3.1-	.7-	1.2-	.5-	1.8-	.4-	.8
21	14.6-	7.5-	6.2-	4.3-	1.6-	2.7-	1.5-	3.7-	1.4-	.6
22	15.3-	8.6-	7.1-	5.0-	3.2-	3.7-	2.3-	4.1-	1.8-	.3
23	17.5-	9.9-	8.1-	5.9-	3.5-	4.2-	2.7-	5.0-	2.3-	.1
MONTHLY AVERAGE	9.9-	6.1-	5.7-	4.1-	3.1-	3.9-	2.5-	4.8-	2.3-	.1

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.41

WINNIPEG CBC TOWER, STARBUCK

LAPSE RATES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH FEBRUARY, 1970 - 1971

NEGATIVE VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	23.8-	13.7-	10.4-	7.3-	5.3-	4.9-	2.8-	4.5-	1.7-	.9
01	24.9-	14.1-	11.2-	7.8-	5.1-	5.5-	3.2-	5.9-	2.2-	1.1
02	26.5-	15.0-	11.8-	8.1-	5.6-	5.7-	3.2-	6.0-	2.0-	1.7
03	24.0-	14.4-	11.4-	8.0-	6.5-	6.1-	3.7-	5.8-	2.3-	.8
04	20.6-	13.6-	10.9-	8.2-	7.9-	7.0-	4.9-	6.0-	3.4-	1.1-
05	20.3-	13.6-	10.9-	8.0-	8.0-	7.0-	4.7-	6.0-	3.1-	.3-
06	20.9-	13.9-	11.0-	8.3-	8.2-	6.8-	4.8-	5.4-	3.2-	1.0-
07	17.5-	11.3-	9.9-	7.2-	6.2-	6.8-	4.5-	7.3-	3.6-	.0-
08	17.6-	10.8-	9.8-	7.1-	5.2-	6.6-	4.2-	8.0-	3.8-	.1
09	14.7-	9.7-	8.4-	6.6-	5.6-	5.8-	4.4-	6.0-	3.9-	1.9-
10	8.8-	6.6-	6.4-	5.1-	4.8-	5.4-	4.1-	6.0-	3.7-	1.6-
11	.5-	1.3-	3.1-	1.9-	2.0-	4.2-	2.3-	6.3-	2.4-	1.3
12	3.6	1.0	.6-	.0	1.1-	2.4-	1.0-	3.8-	.9-	1.8
13	4.1	3.1	1.0	1.3	2.3	.3-	.6	2.9-	.1-	2.4
14	4.6	3.6	1.8	1.9	2.9	.6	1.1	1.4-	.3	2.0
15	4.0	3.4	1.7	1.8	2.9	.8	1.2	1.4-	.4	2.2
16	2.6	2.5	.9	1.3	2.4	.1	1.1	2.0-	.3	2.6
17	1.4-	.1-	.8-	.1	.9	.5-	.5	2.0-	.3	2.5
18	8.7-	3.9-	3.6-	2.0-	.0	1.5-	.1-	2.9-	.2-	2.3
19	14.0-	7.5-	6.2-	3.8-	2.1-	2.9-	1.0-	3.8-	.5-	2.6
20	16.7-	9.4-	7.1-	4.4-	3.3-	3.2-	1.1-	3.0-	.0-	2.9
21	18.7-	10.8-	8.3-	5.2-	4.3-	4.0-	1.6-	3.8-	.2-	3.0
22	21.5-	11.7-	9.0-	6.0-	3.6-	3.7-	1.9-	4.0-	1.1-	1.6
23	24.8-	13.4-	10.1-	7.1-	4.0-	4.1-	2.4-	4.2-	1.6-	.9
MONTHLY AVERAGE	12.7-	7.5-	6.4-	4.4-	3.2-	3.9-	2.1-	4.5-	1.6-	1.1

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.42

WINNIPEG CBC TOWER, STARBUCK

LAPSE RATES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH MARCH, 1970 - 1971

NEGATIVE VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	27.4-	14.5-	10.7-	7.3-	3.9-	3.8-	1.9-	3.8-	1.0-	1.7
01	30.1-	15.8-	11.7-	8.3-	4.1-	4.0-	2.4-	4.0-	1.6-	.6
02	30.2-	16.5-	12.5-	8.8-	5.1-	5.1-	3.1-	5.1-	2.1-	.7
03	28.0-	16.7-	13.0-	9.3-	7.3-	6.8-	4.3-	6.4-	2.8-	.5
04	28.1-	17.7-	13.6-	9.8-	9.1-	7.7-	4.9-	6.1-	2.8-	.3
05	30.6-	19.1-	14.5-	10.2-	9.6-	7.9-	4.6-	6.1-	2.1-	1.6
06	30.9-	19.5-	14.7-	10.7-	10.0-	8.1-	5.2-	6.1-	2.8-	.3
07	28.8-	19.5-	15.1-	11.3-	11.8-	9.5-	6.6-	7.2-	4.0-	.9-
08	21.5-	15.3-	12.9-	9.6-	10.2-	9.4-	6.3-	8.5-	4.4-	.5-
09	15.8-	11.8-	10.7-	8.2-	8.5-	8.6-	6.1-	8.7-	4.9-	1.3-
10	8.2-	8.0-	7.8-	5.8-	7.9-	7.6-	5.1-	7.5-	3.8-	.3-
11	1.4-	3.2-	4.3-	3.1-	4.8-	5.5-	3.5-	6.3-	2.9-	.3
12	4.1	.3	1.2-	.3-	2.6-	3.4-	1.5-	4.1-	1.1-	1.8
13	5.1	2.9	1.0	1.2	1.1	.6-	.1	2.4-	.3-	1.8
14	5.4	3.5	1.6	2.0	2.0	.0	1.1	1.8-	.7	3.2
15	5.0	3.7	2.0	2.6	2.7	.7	2.0	1.2-	1.7	4.4
16	4.4	3.3	2.2	2.8	2.5	1.3	2.4	.1	2.4	4.5
17	1.1	1.7	.9	1.8	2.1	.9	2.0	.3-	1.9	4.1
18	4.3-	1.3-	1.2-	.1	1.1	.0	1.4	.9-	1.5	3.8
19	10.9-	4.9-	3.6-	1.7-	.0	.6-	.6	1.2-	1.0	3.1
20	18.6-	8.6-	6.1-	3.5-	.4-	.9-	.4	1.5-	.9	3.2
21	22.6-	11.3-	7.7-	4.7-	2.0-	1.6-	.0	1.2-	1.0	3.2
22	24.5-	12.7-	8.9-	5.8-	3.0-	2.4-	.7-	1.8-	.3	2.4
23	26.5-	13.5-	9.7-	6.5-	2.7-	2.9-	1.0-	3.0-	.2-	2.3
MONTHLY AVERAGE	15.3-	9.0-	7.2-	4.7-	3.8-	3.9-	1.9-	3.9-	1.0-	1.7

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5. 43

WINNIPEG CBC TOWER, STARBUCK

LAPSE RATES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH APRIL, 1970 - 1971

NEGATIVE VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	12.9-	7.7-	6.0-	3.7-	3.4-	3.2-	1.2-	2.9-	.1-	2.5
01	12.7-	7.7-	6.6-	4.1-	3.6-	4.2-	1.9-	4.7-	1.0-	2.4
02	14.2-	9.2-	7.6-	5.0-	5.2-	4.9-	2.5-	4.6-	1.1-	2.1
03	14.2-	10.1-	7.8-	5.0-	6.8-	5.0-	2.6-	3.3-	.5-	2.1
04	14.1-	9.3-	7.4-	4.9-	5.5-	4.7-	2.5-	3.9-	1.0-	1.6
05	13.0-	9.2-	7.4-	5.0-	6.0-	5.2-	2.9-	4.2-	1.3-	1.5
06	12.5-	8.5-	6.9-	4.5-	5.2-	4.5-	2.4-	3.9-	1.0-	1.6
07	9.7-	6.7-	6.1-	4.2-	4.1-	4.7-	2.7-	5.3-	2.0-	1.1
08	1.4-	2.3-	2.8-	1.5-	3.0-	3.5-	1.5-	3.8-	.7-	2.2
09	3.7	2.4	.0-	.5	1.5	1.5-	.2-	4.5-	1.1-	2.2
10	6.7	3.8	1.3	1.8	1.2	.9-	.5	3.2-	.1	3.3
11	7.2	5.6	3.1	3.5	4.2	1.3	2.5	1.3-	1.6	4.5
12	8.3	5.7	3.6	4.1	3.6	1.7	2.9	.0-	2.6	5.1
13	8.0	5.5	4.1	4.4	3.5	2.4	3.4	1.4	3.4	5.2
14	7.0	5.2	3.8	4.2	3.7	2.5	3.5	1.4	3.3	5.2
15	6.0	5.0	3.7	4.2	4.2	2.8	3.7	1.5	3.5	5.4
16	6.0	4.8	3.7	4.3	3.9	2.8	3.7	1.7	3.7	5.6
17	4.2	4.0	3.0	3.7	3.9	2.4	3.6	1.2	3.5	5.7
18	1.7	2.4	1.7	2.7	2.9	1.7	3.0	.6	3.1	5.5
19	3.0-	.3-	.1-	1.2	1.9	1.1	2.4	.3	2.6	4.8
20	8.2-	3.6-	2.7-	.7-	.1	.4-	1.3	.9-	1.8	4.5
21	10.6-	5.5-	4.2-	2.1-	1.2-	1.5-	.2	1.9-	.9	3.7
22	11.7-	6.7-	5.0-	2.8-	2.5-	2.3-	.3-	2.1-	.6	3.2
23	11.7-	6.8-	5.5-	3.3-	2.9-	2.9-	1.1-	3.1-	.2-	2.4
MONTHLY AVERAGE	3.6-	1.9-	1.9-	.4-	.5-	1.2-	.4	1.8-	.8	3.5

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.44

WINNIPEG CBC TOWER, STARBUCK

LAPSE RATES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH MAY, 1970 - 1971

NEGATIVE VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	15.9-	8.2-	5.8-	3.2-	1.8-	1.7-	.1	1.6-	1.1	3.7
01	16.0-	8.8-	6.4-	3.9-	2.9-	2.5-	.6-	2.1-	.4	2.8
02	14.4-	8.6-	6.7-	4.4-	3.8-	3.6-	1.8-	3.4-	.8-	1.7
03	16.8-	9.2-	7.2-	4.9-	2.9-	3.2-	1.7-	3.6-	1.0-	1.3
04	15.4-	9.1-	7.2-	4.9-	3.8-	3.8-	2.0-	3.7-	1.1-	1.2
05	14.5-	9.3-	7.3-	5.2-	5.1-	4.4-	2.7-	3.6-	1.6-	.2
06	8.3-	6.2-	5.8-	4.0-	4.5-	4.8-	2.8-	5.1-	2.0-	.8
07	2.7	1.1	.7-	.2-	.2-	2.2-	.9-	4.2-	1.4-	1.2
08	6.3	4.9	2.8	2.6	3.8	1.4	1.7	.9-	.6	2.1
09	7.7	6.4	4.6	4.9	5.4	3.3	4.1	1.3	3.5	5.5
10	8.3	6.8	5.1	5.5	5.5	3.7	4.7	1.9	4.3	6.5
11	8.4	6.9	5.1	5.5	5.6	3.7	4.7	1.8	4.2	6.4
12	8.6	7.0	5.2	5.5	5.7	3.8	4.8	1.8	4.3	6.7
13	8.8	6.9	5.2	5.6	5.4	3.6	4.7	2.0	4.4	6.8
14	8.8	6.8	5.1	5.4	5.2	3.6	4.5	2.0	4.3	6.4
15	8.6	6.7	5.0	5.5	5.2	3.6	4.6	2.0	4.4	6.7
16	7.6	6.4	4.8	5.3	5.4	3.6	4.7	1.9	4.3	6.6
17	6.5	5.7	4.2	4.8	5.0	3.4	4.4	1.8	4.1	6.4
18	5.2	5.0	3.8	4.5	4.8	3.3	4.3	1.7	4.0	6.3
19	2.7	3.5	2.7	3.6	4.2	2.7	3.9	1.3	3.8	6.0
20	4.0-	.2-	.2-	1.1	2.8	1.2	2.5	.3-	2.4	5.1
21	9.6-	3.6-	2.5-	.8-	1.1	.3	1.5	.5-	1.7	4.0
22	13.3-	6.0-	4.0-	1.7-	.0-	.2-	1.3	.4-	2.0	4.3
23	15.3-	7.5-	5.5-	2.8-	1.1-	1.5-	.5	2.0-	1.3	4.5
MONTHLY AVERAGE	2.1-	.0-	.2-	1.0	1.6	.5	1.8	.4-	2.0	4.3

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.45

WINNIPEG CBC TOWER, STARBUCK

LAPSE RATES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH JUNE, 1970 - 1971

NEGATIVE VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	19.2-	10.5-	8.2-	5.2-	3.3-	3.6-	1.5-	3.9-	.5-	2.6
01	21.9-	11.5-	9.4-	6.1-	2.9-	4.3-	1.8-	5.6-	1.2-	2.7
02	20.7-	13.1-	10.2-	7.0-	6.8-	5.9-	3.3-	5.1-	1.6-	1.6
03	21.4-	13.5-	11.0-	7.6-	6.9-	6.7-	3.9-	6.3-	2.3-	1.4
04	21.9-	13.8-	11.5-	7.7-	7.1-	7.1-	3.9-	7.2-	2.3-	2.3
05	22.0-	13.7-	11.1-	7.5-	6.9-	6.6-	3.6-	6.2-	2.0-	1.9
06	6.9-	7.7-	6.9-	4.3-	8.3-	6.9-	3.6-	5.6-	1.3-	2.7
07	4.3	1.3	1.0-	.1-	1.1-	3.2-	1.3-	5.4-	1.5-	2.2
08	7.0	5.4	3.2	3.5	4.1	1.6	2.5	.8-	1.7	4.2
09	7.7	6.7	4.8	5.1	6.0	3.6	4.4	1.3	3.7	6.0
10	8.1	7.3	5.5	6.0	6.7	4.5	5.5	2.2	4.8	7.4
11	9.0	7.8	5.8	6.3	6.8	4.5	5.6	2.3	5.0	7.7
12	8.7	7.6	5.5	6.1	6.7	4.2	5.4	1.8	4.7	7.5
13	9.4	7.7	5.8	6.2	6.2	4.2	5.3	2.2	4.9	7.4
14	8.8	7.6	5.7	6.2	6.7	4.4	5.5	2.1	4.9	7.6
15	8.0	7.0	5.2	5.7	6.1	4.1	5.2	2.1	4.7	7.1
16	7.6	6.8	5.1	5.8	6.1	4.1	5.3	2.1	4.9	7.5
17	6.5	6.1	4.5	5.4	5.8	3.7	5.0	1.6	4.7	7.5
18	5.5	5.4	3.9	4.8	5.3	3.3	4.7	1.4	4.3	7.2
19	1.8	3.3	2.3	3.5	4.5	2.6	3.9	.6	3.6	6.5
20	3.7-	.6-	.4-	1.2	1.8	.7	2.6	.2-	2.9	5.9
21	8.7-	3.3-	2.7-	.4-	1.2	.2-	1.8	1.7-	2.1	5.7
22	13.7-	6.8-	5.2-	2.5-	1.2-	1.7-	.5	2.2-	1.4	4.8
23	17.3-	9.5-	7.2-	4.2-	3.0-	3.0-	.6-	2.9-	.5	3.7
MONTHLY AVERAGE	3.6-	1.0-	1.2-	.5	1.1	.1-	1.6	1.4-	1.9	5.1

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.46

WINNIPEG CBC TOWER, STARBUCK

LAPSE RATES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH JULY, 1970 - 1971

NEGATIVE VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	24.3-	13.9-	10.1-	6.0-	5.4-	4.2-	1.1-	3.0-	.9	4.7
01	24.5-	13.8-	10.2-	6.6-	5.0-	4.4-	1.8-	3.8-	.2-	3.2
02	24.8-	15.7-	11.6-	7.7-	8.2-	6.2-	3.0-	4.2-	.5-	2.8
03	24.9-	16.0-	11.8-	8.1-	8.6-	6.4-	3.6-	4.3-	1.2-	1.6
04	22.8-	15.3-	11.9-	8.4-	9.1-	7.4-	4.5-	5.9-	2.3-	1.2
05	19.4-	13.3-	10.7-	7.5-	8.2-	7.2-	4.2-	6.1-	2.3-	1.2
06	10.3-	8.2-	7.1-	4.6-	6.5-	5.8-	3.1-	5.2-	1.4-	2.2
07	2.3	.0	1.6-	.6-	1.7-	3.3-	1.5-	4.8-	1.3-	1.9
08	6.8	5.2	2.6	2.9	3.9	.8	1.8	2.3-	.9	3.8
09	7.8	6.5	4.4	4.7	5.5	3.0	3.9	.5	3.1	5.5
10	7.2	7.0	5.3	5.8	6.8	4.4	5.4	2.0	4.7	7.2
11	8.0	7.4	5.6	6.2	6.9	4.6	5.6	2.3	5.0	7.6
12	8.6	7.7	5.9	6.4	7.0	4.7	5.8	2.5	5.3	7.9
13	7.8	7.4	5.5	6.2	7.1	4.5	5.8	1.9	5.1	8.1
14	7.4	6.9	5.3	5.9	6.4	4.4	5.5	2.3	5.0	7.5
15	5.3	5.9	4.5	5.3	6.3	4.1	5.3	2.0	4.9	7.6
16	6.7	6.4	4.8	5.6	6.2	4.0	5.3	2.0	4.9	7.7
17	3.9	4.7	3.7	4.8	5.4	3.6	5.0	1.7	4.8	7.8
18	3.0	3.9	2.9	4.1	4.6	2.8	4.4	1.1	4.2	7.2
19	1.3-	1.4	1.2	2.7	3.7	2.3	3.9	.9	4.0	6.9
20	8.4-	2.8-	1.9-	.1	1.7	.6	2.4	.3-	2.7	5.8
21	16.2-	7.4-	5.2-	2.4-	.2-	.8-	1.2	1.3-	2.0	5.2
22	20.3-	10.5-	7.6-	4.2-	2.5-	2.4-	.0	2.4-	1.3	4.8
23	23.3-	12.7-	9.2-	5.2-	4.0-	3.3-	.4-	2.8-	1.3	5.2
MONTHLY AVERAGE	6.3-	2.6-	2.1-	.1-	.3	.4-	1.5	1.1-	2.0	5.1

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.47

LAPSE RATES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH AUGUST, 1970 - 1971

NEGATIVE VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	28.8-	17.8-	13.3-	8.9-	8.8-	7.0-	3.4-	5.2-	.9-	3.2
01	29.7-	19.6-	14.5-	9.6-	11.3-	8.2-	4.2-	5.1-	.8-	3.4
02	27.8-	18.5-	14.1-	9.7-	10.7-	8.5-	4.8-	6.2-	1.8-	2.3
03	27.5-	18.4-	14.2-	10.0-	10.9-	8.7-	5.2-	6.4-	2.5-	1.3
04	26.0-	18.1-	14.2-	10.1-	11.7-	9.4-	5.8-	7.1-	2.9-	1.0
05	25.8-	18.7-	15.0-	10.5-	12.8-	10.5-	6.3-	8.2-	3.2-	1.5
06	19.1-	16.2-	13.3-	9.6-	13.9-	10.9-	7.1-	8.1-	3.7-	.4
07	.4	5.3-	6.6-	4.8-	10.1-	9.5-	6.1-	8.8-	4.2-	.1
08	8.4	4.8	1.4	.9	1.8	1.5-	1.0-	4.8-	2.4-	.1-
09	9.4	7.3	4.8	4.6	5.5	3.0	3.3	.3	2.2	4.0
10	9.9	7.8	5.6	5.8	6.1	3.8	4.7	1.6	3.9	6.2
11	10.9	8.5	6.3	6.7	6.6	4.4	5.6	2.3	5.1	7.8
12	10.0	7.9	6.0	6.4	6.3	4.3	5.5	2.4	5.1	7.8
13	10.9	8.3	6.3	6.7	6.1	4.4	5.6	2.6	5.4	8.0
14	8.9	7.3	5.8	6.3	5.9	4.4	5.6	3.0	5.4	7.7
15	9.6	7.7	5.7	6.2	6.1	4.1	5.3	2.2	5.0	7.6
16	9.6	7.4	5.6	6.0	5.6	3.9	5.0	2.2	4.8	7.1
17	6.4	5.9	4.3	5.2	5.5	3.4	4.9	1.2	4.6	7.8
18	5.8	4.2	3.9	4.1	2.9	3.0	3.7	3.2	4.1	5.0
19	1.1-	.4	1.1	2.1	1.8	2.0	2.9	2.3	3.5	4.7
20	9.9-	3.9-	2.1-	.3-	.9	1.1	2.2	1.2	2.9	4.5
21	22.1-	10.4-	7.0-	3.4-	.9-	.8-	1.5	.6-	2.7	6.0
22	23.8-	13.1-	9.4-	5.7-	4.4-	3.5-	.8-	2.7-	1.0	4.6
23	25.6-	15.2-	11.4-	7.2-	6.7-	5.6-	2.2-	4.5-	.0	4.2
MONTHLY AVERAGE	7.6-	4.5-	3.6-	1.5-	2.1-	2.0-	.1	2.0-	1.2	4.3

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.48

WINNIPEG CBC TOWER, STARBUCK

LAPSE RATES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH SEPTEMBER, 1970 - 1971

NEGATIVE VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	18.2-	10.9-	8.4-	5.4-	4.9-	4.5-	2.0-	4.0-	.5-	2.7
01	17.9-	11.0-	9.1-	5.9-	5.3-	5.4-	2.6-	5.6-	1.3-	2.7
02	17.2-	10.9-	9.1-	6.2-	5.8-	5.7-	3.2-	5.7-	1.9-	1.6
03	17.9-	11.7-	9.8-	7.0-	6.6-	6.5-	4.0-	6.3-	2.8-	.5
04	16.5-	11.4-	9.9-	7.0-	7.2-	7.1-	4.5-	7.0-	3.1-	.5
05	20.1-	13.3-	10.7-	7.4-	7.8-	6.9-	4.0-	6.0-	2.1-	1.4
06	17.9-	12.5-	10.5-	7.1-	7.9-	7.3-	4.2-	6.7-	2.4-	1.6
07	10.7-	8.1-	8.2-	5.6-	6.0-	7.1-	4.2-	8.2-	3.4-	1.2
08	2.3	.3-	2.2-	1.3-	2.5-	4.1-	2.3-	5.8-	2.2-	1.2
09	8.4	6.0	3.1	3.0	4.2	1.0	1.5	2.2-	.3	2.6
10	9.2	7.5	5.2	5.3	6.1	3.6	4.2	1.1	3.4	5.4
11	10.5	8.4	5.8	6.4	6.7	3.9	5.2	1.1	4.5	7.7
12	9.0	7.9	5.8	6.3	6.9	4.4	5.6	2.0	5.0	7.9
13	9.3	7.8	5.9	6.4	6.6	4.4	5.7	2.2	5.2	8.0
14	9.5	7.8	5.8	6.4	6.4	4.3	5.5	2.2	5.1	7.8
15	8.8	7.4	5.5	6.1	6.1	4.2	5.3	2.2	4.9	7.5
16	6.8	6.2	4.6	5.3	5.7	3.7	4.8	1.7	4.5	7.1
17	3.9	4.5	3.4	4.4	5.1	3.2	4.5	1.4	4.3	7.0
18	2.4-	1.1	1.1	2.5	4.1	2.5	3.9	1.1	3.8	6.5
19	7.9-	2.8-	2.1-	.2-	1.3	.2	1.8	.7-	2.0	4.8
20	11.9-	5.7-	4.8-	2.3-	.6-	1.9-	.2	3.1-	.7	4.4
21	14.2-	7.3-	6.0-	3.5-	1.6-	2.6-	.6-	3.7-	.1-	3.2
22	16.6-	9.3-	7.4-	4.5-	3.3-	3.6-	1.2-	3.9-	.2-	3.3
23	17.1-	10.4-	8.2-	5.1-	4.8-	4.5-	1.8-	4.2-	.4-	3.2
MONTHLY AVERAGE	5.3-	2.5-	2.5-	.7-	.2-	1.3-	.5	2.4-	.9	4.1

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.49

WINNIPEG CBC TOWER, STARBUCK

LAPSE RATES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH OCTOBER , 1969 - 1971

NEGATIVE VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	14.5-	8.6-	7.1-	4.4-	3.8-	4.0-	1.7-	4.3-	.8-	2.5
01	14.5-	9.2-	7.6-	5.0-	4.9-	4.9-	2.4-	4.9-	1.2-	2.3
02	14.2-	9.5-	7.8-	5.1-	5.6-	5.2-	2.6-	4.7-	1.2-	2.1
03	14.9-	9.9-	8.0-	5.3-	5.9-	5.1-	2.7-	4.4-	1.2-	1.7
04	14.1-	9.8-	8.3-	5.4-	6.2-	5.9-	3.0-	5.6-	1.3-	2.5
05	13.0-	9.3-	7.6-	4.8-	6.3-	5.4-	2.6-	4.6-	.9-	2.6
06	12.7-	9.2-	7.7-	5.0-	6.3-	5.6-	2.9-	4.9-	1.3-	2.0
07	11.1-	8.5-	7.3-	4.8-	6.3-	5.7-	3.1-	5.0-	1.6-	1.7
08	3.6-	4.3-	5.0-	3.5-	4.9-	5.5-	3.5-	6.1-	2.8-	.4
09	4.2	1.8	.2	.4	.0-	1.4-	.5-	2.8-	.8-	.9
10	6.1	5.3	3.2	3.4	4.7	2.0	2.7	.5-	1.7	3.9
11	8.1	6.8	5.0	5.4	5.7	3.7	4.6	1.6	4.1	6.5
12	9.0	7.5	5.6	6.1	6.2	4.2	5.2	2.2	4.7	7.2
13	9.1	7.4	5.7	6.1	6.0	4.2	5.3	2.5	4.9	7.2
14	8.8	7.3	5.6	6.1	6.0	4.3	5.3	2.5	5.0	7.3
15	7.6	6.6	5.2	5.7	5.8	4.2	5.2	2.6	4.9	7.1
16	6.4	5.9	4.6	5.2	5.5	3.9	4.9	2.2	4.6	6.7
17	2.1	3.5	2.8	3.8	4.7	3.1	4.3	1.5	4.1	6.5
18	4.5-	.3-	.0-	1.5	3.1	1.8	3.1	.5	3.2	5.7
19	9.9-	3.8-	2.5-	.3-	1.2	.4	2.2	.3-	2.7	5.5
20	12.3-	5.6-	4.1-	1.6-	.1-	.7-	1.2	1.2-	1.8	4.9
21	13.5-	6.7-	4.9-	2.5-	1.0-	1.4-	.3	1.8-	1.1	3.9
22	15.6-	8.1-	6.1-	3.5-	1.8-	2.2-	.3-	2.5-	.3	3.2
23	15.2-	8.5-	6.6-	3.9-	3.1-	3.0-	.9-	3.0-	.1	3.0
MONTHLY AVERAGE	5.1-	2.4-	2.1-	.4-	.3-	1.0-	.7	1.7-	1.2	4.1

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.50

WINNIPEG CBC TOWER, STARBUCK

LAPSE RATES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH NOVEMBER , 1969 - 1971

NEGATIVE VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	13.8-	8.2-	6.4-	4.0-	3.5-	3.3-	1.3-	3.1-	.2-	2.4
01	13.3-	8.2-	6.0-	3.8-	3.9-	3.0-	1.3-	2.1-	.0-	1.9
02	11.6-	7.8-	6.0-	3.8-	4.7-	3.7-	1.7-	2.6-	.1-	2.1
03	10.4-	6.4-	5.3-	3.3-	3.1-	3.3-	1.4-	3.4-	.5-	2.2
04	9.3-	6.1-	5.2-	3.6-	3.3-	3.6-	2.0-	3.8-	1.4-	.9
05	8.3-	5.5-	5.2-	3.4-	3.3-	3.9-	2.0-	4.5-	1.4-	1.4
06	8.0-	5.8-	5.1-	3.4-	3.9-	3.9-	2.1-	3.9-	1.2-	1.3
07	7.0-	5.0-	4.8-	3.3-	3.3-	3.8-	2.3-	4.4-	1.8-	.5
08	5.8-	4.0-	4.2-	2.8-	2.5-	3.5-	2.0-	4.6-	1.8-	.8
09	1.0-	1.5-	2.6-	1.7-	1.8-	3.3-	1.9-	4.8-	1.9-	.8
10	8.9	3.9	1.2	1.2	.0-	1.8-	.9-	3.6-	1.3-	.9
11	3.9	3.1	1.2	1.5	2.3	.0	.9	2.2-	.1	2.4
12	5.0	3.9	2.3	2.8	3.0	1.2	2.1	.5-	1.7	3.9
13	5.4	4.5	2.8	3.4	3.7	1.8	2.8	.1-	2.3	4.7
14	4.6	4.2	2.9	3.5	3.9	2.2	3.2	.4	2.8	5.1
15	3.7	3.3	2.4	3.1	2.9	1.9	3.0	.8	3.0	5.1
16	1.3	1.9	1.4	2.4	2.5	1.4	2.6	.3	2.7	4.9
17	2.8-	.5-	.2-	1.1	1.3	.8	2.2	.2	2.6	4.9
18	6.2-	2.5-	1.6-	.0-	.4	.1	1.6	.1-	2.1	4.4
19	9.0-	4.0-	2.9-	1.1-	.1	.4-	1.0	.9-	1.4	3.8
20	10.2-	4.9-	3.7-	1.9-	.5-	1.0-	.3	1.5-	.7	2.9
21	12.5-	5.7-	4.6-	2.6-	.1-	1.4-	.0-	2.6-	.0	2.5
22	13.0-	6.6-	5.0-	3.3-	1.3-	1.8-	.6-	2.3-	.3-	1.5
23	14.4-	7.4-	6.1-	3.7-	1.7-	2.7-	.8-	3.7-	.4-	2.5
MONTHLY AVERAGE	5.1-	2.7-	2.5-	1.0-	.6-	1.4-	.0-	2.1-	.3	2.7

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.51

WINNIPEG CBC TOWER, STARBUCK

LAPSE RATES IN DEGREES F BY HEIGHTS AND BY HOURS FOR THE MONTH DECEMBER , 1969 - 1971

NEGATIVE VALUE = INVERSION

HEIGHT / HOUR	200-35	400-35	600-35	810-35	400-200	600-200	810-200	600-400	810-400	810-600
00	8.8-	5.9-	4.9-	3.7-	3.5-	3.3-	2.3-	3.2-	1.8-	.5-
01	8.3-	5.5-	5.2-	4.2-	3.2-	4.0-	3.0-	4.8-	2.9-	1.1-
02	9.3-	5.8-	5.8-	4.7-	3.0-	4.4-	3.5-	5.9-	3.7-	1.7-
03	8.4-	6.0-	5.7-	4.2-	3.9-	4.5-	3.1-	5.2-	2.8-	.4-
04	7.8-	5.4-	5.9-	4.5-	3.5-	5.0-	3.7-	6.6-	3.7-	1.0-
05	7.5-	5.7-	6.1-	5.0-	4.3-	5.6-	4.4-	6.9-	4.4-	2.0-
06	7.2-	6.0-	6.6-	5.4-	5.1-	6.4-	5.0-	7.7-	4.9-	2.1-
07	8.1-	6.8-	7.2-	5.5-	5.7-	6.8-	4.9-	7.9-	4.4-	1.1-
08	8.0-	6.3-	6.8-	5.2-	4.9-	6.3-	4.5-	7.7-	4.2-	.9-
09	4.8-	4.2-	5.4-	4.3-	3.6-	5.7-	4.1-	7.9-	4.4-	1.0-
10	1.8-	2.4-	4.1-	3.3-	3.0-	5.1-	3.8-	7.1-	4.1-	1.2-
11	3.0	.3	2.1-	1.9-	1.7-	4.3-	3.1-	6.9-	3.9-	1.0-
12	5.2	2.2	.6-	.7-	.1-	3.0-	2.3-	6.0-	3.4-	.9-
13	6.3	3.1	.2	.2-	.4	2.2-	2.0-	5.0-	3.1-	1.4-
14	6.0	3.7	.9	.7	1.9	1.0-	.6-	4.0-	1.9-	.0
15	4.1	2.7	.7	.7	1.4	.6-	.2-	2.8-	1.0-	.7
16	.1	.7	.4-	.0-	1.2	.7-	.0	2.6-	.5-	1.3
17	3.8-	1.5-	1.7-	.8-	.3	.8-	.0-	2.0-	.1-	1.6
18	5.3-	2.2-	2.3-	1.1-	.2	1.0-	.0-	2.3-	.1-	1.8
19	5.3-	2.6-	2.6-	1.5-	.4-	1.4-	.4-	2.4-	.4-	1.4
20	6.4-	3.1-	3.2-	2.0-	.4-	1.9-	.8-	3.4-	1.0-	1.2
21	6.7-	3.5-	3.5-	2.2-	.8-	2.2-	1.0-	3.7-	1.1-	1.2
22	7.8-	4.4-	4.3-	3.0-	1.6-	2.8-	1.7-	4.0-	1.7-	.4
23	7.4-	4.8-	4.5-	3.2-	2.6-	3.2-	2.1-	3.8-	1.8-	.0
MONTHLY AVERAGE	4.1-	2.9-	3.6-	2.7-	1.9-	3.5-	2.3-	5.0-	2.6-	.2-

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 5.52

Average Number of Hours/Day With Inversions by Levels and Months,

Winnipeg C.B.C. Tower, Oct. 1969- Dec. 1971

	35'-200'	35'-400'	35'-600'	35'-810'	200'-400'	200'-600'	200'-810'	400'-600'	400'-810'	600'-810'
Jan	20	19	22	21	18	24	21	24	24	12
Feb	19	19	20	19	19	21	19	24	20	5
Mar	18	18	19	18	17	19	15	23	15	4
Apr	14	14	15	13	12	15	12	17	11	0
May	11	11	12	11	10	10	7	13	6	0
Jun	11	11	12	11	10	11	9	13	8	0
Jul	12	11	12	11	11	9	9	12	7	0
Aug	12	12	12	12	11	12	11	12	9	1
Sep	14	14	14	14	13	13	12	12	12	0
Oct	15	15	15	14	14	10	12	16	10	0
Nov	17	17	17	16	15	16	14	20	13	0
Dec	18	18	21	22	18	24	23	24	24	14

All data for layers including the 600' level should be treated with caution (see chapter five)

TABLE 5.53

Time of Occurrence of the Most Stable Lapse Rate (^{o}F./1000') by Height.

Layer	All Year Hour	All Year Lapse Rate Value	Winter Hour	Winter Lapse Rate Value	Summer Hour	Summer Lapse Rate Value
35 - 200'	0100	-18.6	00000	-15.7	03	-25.7
200 - 400'	0600	-6.7	0700	-5.7	0500	-9.0
400 - 600'*	0700	-3.3	0700	-4.3	0500	-3.9
600 - 810'*	0900	-2.4	0900	-4.2	0700	-1.6

* 400 - 600' and 600 - 810' lapse rates have been calculated by applying a -0.6^{o}F. correction to the 600' temperature and should be treated with caution. The hour of occurrence will not be affected.

Table 5.54

Mean Values of Lapse Rate in °F Over 10 Height Intervals for each Month

October 1969- December 1971, C.B.C. Tower Starbuck

Height Range	35'-200'	35'-400'	35'-600'	35'-810'	200'-400'	200'-600'	200'-810'	400'-600'	400'-810'	600'-810'
Jan	-9.9	-6.1	-5.7	-4.1	-3.1	-3.9	-2.5	-4.8	-2.3	+0.1
Feb	-12.7	-7.5	-6.4	-4.4	-3.2	-3.9	-2.1	-4.5	-1.6	+1.1
Mar	-15.3	-9.0	-7.2	-4.7	-3.8	-3.9	-1.9	-3.9	-1.0	+1.7
Apr	-3.6	-1.9	-1.9	-0.4	-0.5	-1.2	+0.4	-1.8	+0.8	+3.5
May	-2.1	0.0	-0.2	+1.0	+1.6	+0.5	+1.8	-0.4	+2.0	+4.3
Jun	-3.6	-1.0	-1.2	+0.5	+1.1	-0.1	1.6	-1.4	+1.9	+5.1
Jul	-6.3	-2.6	-2.1	-0.1	0.3	-0.4	+1.5	-1.1	+2.0	+5.1
Aug	-7.6	-4.5	-3.6	-1.5	-2.1	-2.0	+0.1	-2.0	+1.2	+4.3
Sep	-5.3	-2.5	-2.5	-0.7	-0.2	-1.3	+0.5	-2.4	+0.9	+4.1
Oct	-5.1	-2.4	-2.1	-0.4	-0.3	-1.0	+0.7	-1.7	+1.2	+4.1
Nov	-5.1	-2.7	-2.5	-1.0	-0.6	-1.4		-2.1	+0.3	+2.7
Dec	-4.1	-2.9	-3.6	-2.7	-1.9	-3.5	-2.3	-5.0	-2.6	-0.2
Annual	-6.7	-3.6	-3.2	-1.5	-1.1	-1.8	-0.2	-2.6	+0.2	+3.0

All data for layers including the 600' level should be treated with cation (see chapter five)

TABLE 5.55

Average Lapse Rates at Rye, England (51°N.), June 1945 - 1948

Layer Heights in Feet	Average Height of Layer Feet	Lapse Rate (°F./1000')
3.5 - 50	27	-10.1
50 - 155	100	-2.0
155 - 350	250	+0.1
3.5 - 155	79	-4.5

TABLE 5.56

Average Lapse Rate at Oklahoma City, U.S.A. (36°N.) December 1966 - May, 1967

Layer Heights in Feet	Average Height of Layer Feet	Lapse Rate (°F./1000')
6.5 - 148	77	-4.0
148 - 295	222	+0.61
295 - 591	438	+1.12
591 - 872	726	+1.30
872 - 1164	1018	+1.42
1164 - 1456	1310	+1.60

TABLE 5.57

Comparison of Ismailia, Rye, Oklahoma City & Winnipeg Results in the Lower 400'

Location	Layer Feet	Mean Height of Layer Feet	Lapse Rate °F./1000'
Rye	3.5 - 155	79	-4.5
Oklahoma City	6.5 - 148	77	-4.0
Winnipeg	35 - 200	117	-6.7
Ismailia	53 - 200	125	-4.1
Oklahoma City	6.5 - 300	153	-1.6
Rye	3.5 - 350	177	-2.0
Winnipeg	35 - 400	218	-3.6
Ismailia	Not available		

Table 5.58

Maximum and Average Values of Positive Lapse Rate (^{o}F/1000'), for each Month, Winnipeg C.B.C. Tower, Oct.1969 - Dec.1971

35'-200' Level

Year	1969			1970			1971		
Month	Max. L.R.	Time	Avg. L.R.	Max. L.R.	Time	Avg. L.R.	Max. L.R.	Time	Max. L.R.
Jan.				24.4	17	3.8	17.2	13	6.2
Feb.				8.7	0	4.1	15.1	12	5.0
Mar.				15.4	13	4.5	38.9	12	5.6
Apr.				25.0	12	4.7	26.4	10	6.2
May				35.4	15	4.9	18.4	14	8.1
Jun.				21.9	9	7.5	34.5	13	6.5
Jul.				21.2	16	6.7	28.1	8	6.6
Aug.				25.9	13	9.8	16.6	8	8.9
Sep.				30.1	17	8.0	25.8	11	7.0
Oct.	18.7	13	5.2	20.7	14	7.4	22.5	11	5.3
Nov.	22.2	13	4.7	18.5	14	6.6	16.7	13	4.3
Dec.	44.1	6	3.9	22.0	10	5.7	15.1	13	4.4
				35'-400' Level					
Jan.				14.6	17	3.9	11.0	13	4.5
Feb.				27.8	11	4.1	8.3	12	4.6
Mar.				6.6	14	3.9	14.7	12	4.8
Apr.				9.7	12	2.9	10.5	13	5.2
May				19.0	15	4.0	12.4	14	6.7
Jun.				13.3	9	6.3	15.7	14	5.8
Jul.				13.8	12	5.9	14.0	11	5.9
Aug.				12.8	13	7.1	11.3	14	6.6
Sep.				14.5	11	6.1	23.0	11	6.1
Oct.	16.2	12	4.8	10.9	12	6.0	12.4	9	5.2
Nov.	9.1	13	4.3	11.6	14	5.3	9.3	13	4.0
Dec.	6.0	13	3.7	10.6	10	4.6	9.8	13	4.5

Table 5.59

Maximum and Average Values of Positive Lapse Rate ($^{o}F/1000'$), for each Month, Winnipeg C.B.C. Tower, Oct. 1969 - Dec. 1971

35'-600' Level

Year	1969			1970			1971		
	Max. L.R.	Time	Avg. L.R.	Max. L.R.	Time	Avg. L.R.	Max. L.R.	Time	Avg. L.R.
Month									
Jan.				5.1	12	2.8	7.8	15	3.1
Feb.				5.5	14	3.0	5.9	15	3.2
Mar.				5.3	14	3.0	8.3	13	3.6
Apr.				8.2	12	2.4	7.4	13	4.0
May				13.6	15	3.1	8.7	14	5.0
Jun.				9.6	9	4.8	10.3	13	4.4
Jul.				8.7	12	4.5	9.8	11	4.6
Aug.				9.5	8	5.6	27.9	20	5.4
Sep.				10.8	16	4.7	10.9	11	4.6
Oct.	9.3	13	3.9	8.3	12	4.6	7.6	15	3.9
Nov.	8.2	13	3.4	9.3	14	4.0	5.9	12	2.9
Dec.	4.6	13	2.8	6.4	11	3.1	6.6	14	3.3
	35'-810' Level								
Jan.				5.7	13	3.0	7.1	15	3.1
Feb.				5.8	14	3.1	6.2	15	3.5
Mar.				5.9	13	3.1	6.8	13	3.7
Apr.				5.9	12	2.4	7.6	13	4.4
May				11.5	15	3.4	9.3	15	5.4
Jun.				8.8	9	5.1	8.8	13	4.9
Jul.				9.7	13	4.9	9.2	19	4.9
Aug.				8.6	13	5.6	8.2	14	5.4
Sep.				9.4	11	4.7	12.3	10	5.0
Oct.	8.5	12	4.1	7.8	12	4.9	7.4	14	4.2
Nov.	7.7	13	3.8	8.8	14	4.2	6.0	12	3.2
Dec.	5.2	13	3.2	6.1	11	3.2	6.3	12	3.6

Data for the 35 - 600' layer should be treated with caution (see chapter 5)

Table 5.60

Maximum and Average Values of Positive Lapse Rate ($^{o}F/1000'$), for each Month, Winnipeg C.B.C. Tower, Oct. 1969 - Dec 1971

200'-400' Level

Year	1969			1970			1971		
	Max. L.R.	Time	Avg. L.R.	Max. L.R.	Time	Avg. L.R.	Max. L.R.	Time	Avg. L.R.
Month									
Jan.				7.4	8	3.8	8.4	13	3.8
Feb.				8.2	14	3.9	8.1	14	4.1
Mar.				9.7	14	3.6	10.2	11	4.3
Apr.				5.8	13	2.3	10.0	11	4.8
May				8.4	11	3.3	15.8	0	5.6
Jun.				8.8	14	5.2	23.1	21	5.7
Jul.				20.8	12	5.2	20.9	8	5.5
Aug.				10.7	10	5.2	18.6	2	5.5
Sep.				19.1	12	4.9	20.7	11	5.4
Oct.	15.3	12	4.7	18.5	3	5.1	15.7	10	5.1
Nov.	11.1	3	4.0	7.9	22	4.6	7.1	14	4.1
Dec.	6.0	22	3.8	8.3	12	4.0	8.1	12	4.5

400'-810' Level

Jan.				5.0	8	2.8	5.2	14	2.5
Feb.				5.4	13	3.0	6.0	13	3.1
Mar.				5.7	14	2.5	5.6	18	3.1
Apr.				7.7	12	2.2	8.7	12	3.6
May				5.6	13	2.8	13.2	15	4.3
Jun.				6.1	12	4.0	7.4	18	3.9
Jul.				10.3	12	4.0	14.3	19	3.8
Aug.				9.8	16	4.1	14.7	14	4.1
Sep.				8.4	10	3.8	13.4	10	4.0
Oct.	8.2	11	3.9	7.5	22	3.9	7.0	13	3.4
Nov.	6.5	13	3.6	6.7	2	3.5	9.2	14	3.0
Dec.	5.0	13	2.8	5.2	13	2.9	6.3	5	3.1

Table 5.61

Maximum and Average Values of Positive Lapse Rate (°F/1000'), for each Month, Winnipeg C.B.C. tower, Oct. 1969 - Dec. 1971

400-600' Level

Year	1969			1970			1971		
Month	Max. L.R.	Time	Avg. L.R.	Max. L.R.	Time	Avg. L.R.	Max. L.R.	Time	Avg. L.R.
Jan.				3.4	12	1.6	3.9	15	1.4
Feb.				3.5	14	1.8	3.8	17	4.7
Mar.				4.5	14	1.7	8.2	16	1.8
Apr.				16.6	13	1.6	16.5	3	2.0
May				8.1	3	1.6	11.5	0	1.9
Jun.				11.3	21	2.2	8.2	13	2.0
Jul.				14.2	12	2.0	16.1	7	2.0
Aug.				12.9	18	2.4	20.5	14	3.0
Sep.				17.3	16	2.2	10.0	10	1.9
Oct.	13.4	13	2.5	6.5	10	2.0	6.3	5	1.7
Nov.	9.4	13	2.2	5.7	12	2.0	46.8	22	1.7
Dec.	12.5	15	1.5	3.2	2	1.5	6.7	5	1.6

600'-810' Level

Jan.				10.8	13	4.2	8.9	14	4.2
Feb.				9.4	5	4.4	10.1	13	6.2
Mar.				8.4	11	3.9	10.8	12	5.1
Apr.				7.0	16	3.1	14.4	12	5.7
May				10.3	12	4.1	37.9	23	6.9
Jun.				16.3	22	6.2	33.2	21	6.3
Jul.				23.6	13	6.3	26.7	19	6.2
Aug.				11.6	13	6.3	18.6	14	6.0
Sep.				17.1	10	5.8	17.5	8	6.3
Oct.	9.6	12	5.8	22.5	2	6.0	11.7	13	5.8
Nov.	29.6	6	5.2	11.8	9	5.4	9.3	12	4.7
Dec.	7.5	15	4.4	8.5	14	4.3	10.5	12	4.8

All data for the 600' level should be treated with caution (see chapter five)

Figure 5.16 (over)

Figure 5.17

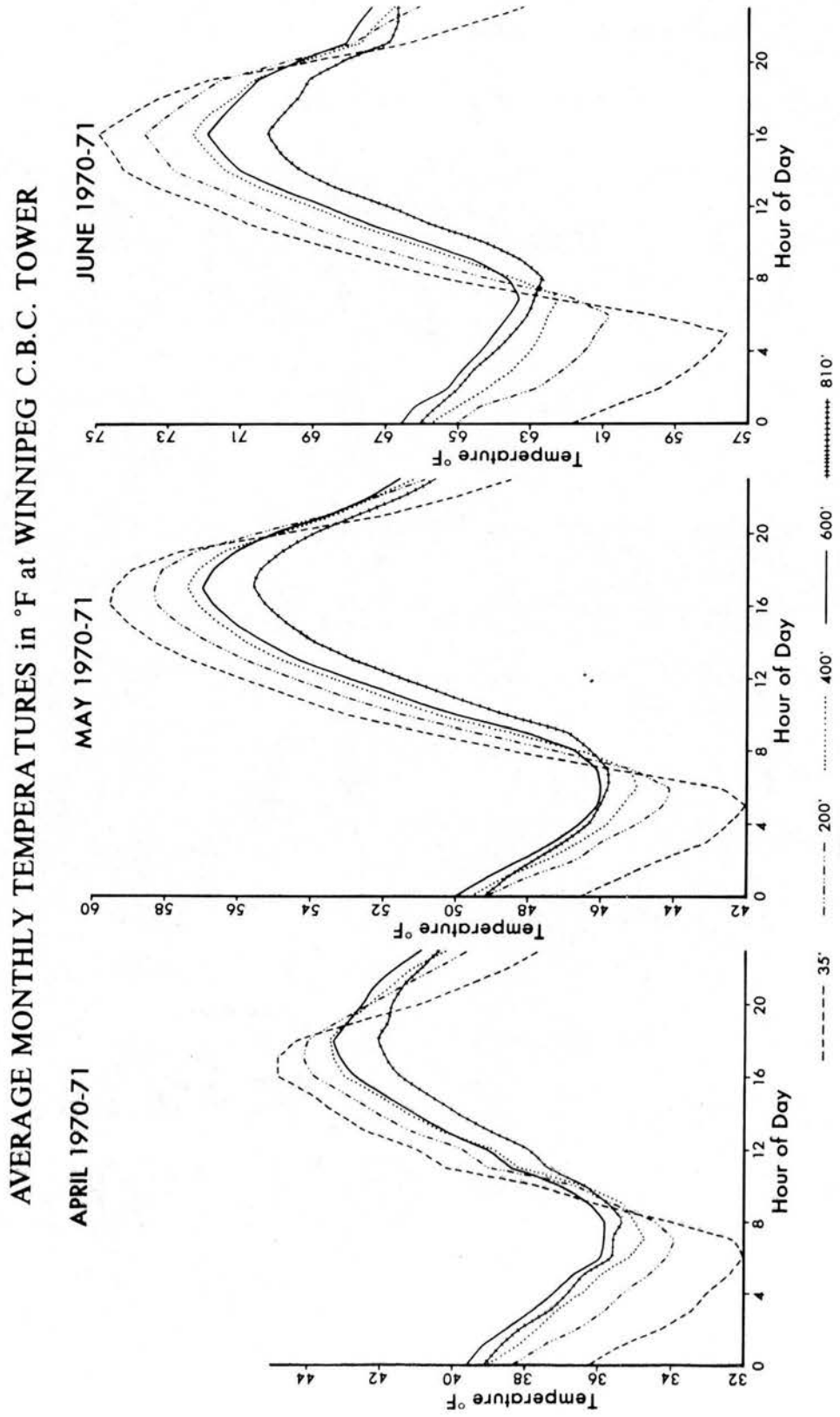

AVERAGE MONTHLY TEMPERATURES in °F at WINNIPEG C.B.C. TOWER
APRIL 1970-71
MAY 1970-71
JUNE 1970-71
Temperature °F
Hour of Day
35'
200'
400'
600'
810'

Figure 5.18 (over)

Figure 5.19

AVERAGE MONTHLY TEMPERATURES in °F at WINNIPEG C.B.C. TOWER

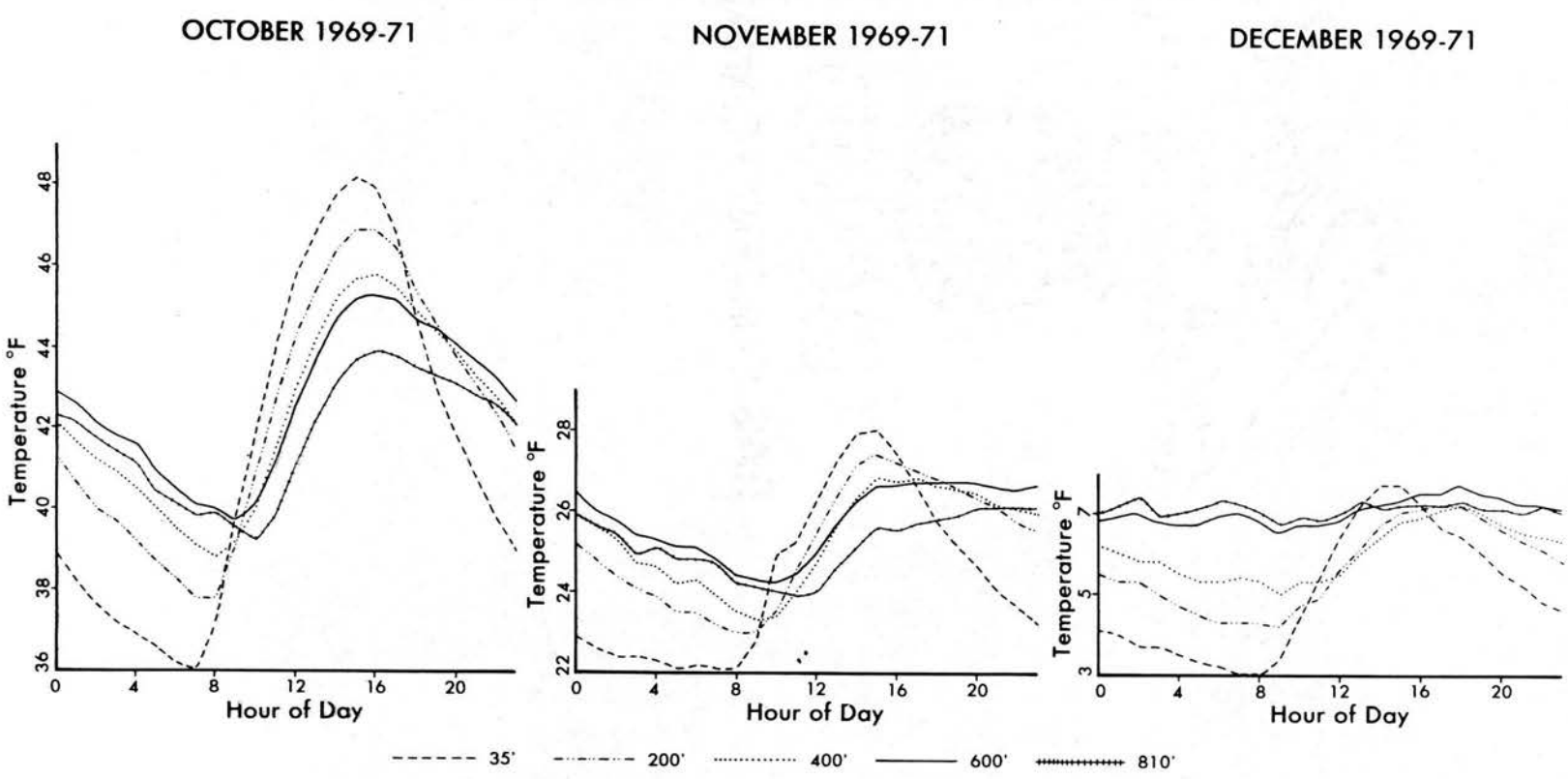


Table 5.62

Maximum Values of Positive Lapse Rates by Months and Heights

Winnipeg C.B.C. Tower, Oct. 1969- Dec. 1971

	35'-200'	200'-400'	400'-600'	600'-810'	35'-400'	35'-600'	35'-810'	200'-600'	200'-810'	400'-810'
Jan	24.4	8.4	3.9	10.8	14.6	7.8	7.1	7.8	5.6	5.2
Feb	15.1	8.2	3.8	10.1	27.8	5.9	6.2	5.9	5.8	6.0
Mar	38.9	10.2	8.2	10.8	14.7	8.3	6.8	8.3	6.1	5.7
Apr	26.4	10.0	16.6	14.4	10.5	8.2	7.6	8.2	7.7	8.7
May	35.4	15.8	11.5	37.9	19.0	13.6	11.5	13.6	8.7	13.2
Jun	34.5	23.1	11.3	33.2	15.7	10.3	8.8	10.3	9.9	7.4
Jul	28.1	20.9	16.1	26.7	14.0	9.8	9.7	9.8	11.4	14.3
Aug	25.9	18.6	20.5	18.6	12.8	27.9	8.6	27.9	11.0	14.7
Sep	30.1	20.7	17.3	17.5	23.0	10.9	12.3	10.9	10.1	13.4
Oct	22.5	18.5	13.4	22.5	16.2	9.3	8.5	9.3	7.0	8.2
Nov	22.2	11.1	46.8	29.6	11.6	9.3	8.8	9.3	8.0	9.2
Dec	44.1	8.3	12.5	10.5	10.6	6.6	6.3	6.6	6.0	6.3

All data for layers including the 600' level should be treated with caution (see chapter five)

Table 5.63

Diurnal Variation of Average Monthly Temperature (^{o}F.)

C.B.C Tower October 1969-December 1971

Height in Feet	35'	200'	400'	600'	810'
Month					
Jan	5.4	3.3	2.0	1.9	2.1
Feb	9.2	6.0	5.4	4.6	4.0
Mar	12.5	7.5	5.1	3.6	2.8
Apr	12.8	10.2	8.7	7.5	6.8
May	17.5	14.2	12.4	11.0	9.8
Jun	17.3	12.8	10.1	8.6	7.6
Jul	15.6	11.5	9.4	8.0	7.2
Aug	19.1	14.1	10.6	8.8	7.2
Sep	16.5	12.1	9.2	7.5	6.3
Oct	12.2	9.1	7.0	5.6	4.7
Nov	5.9	4.4	3.5	2.5	2.2
Dec	4.7	3.0	2.2	1.2	0.6

Table 5.64

Time of Occurrence of Maximum Temperatures

by Months and Heights

Month \ Height	35'	200'	400'	600'	810'
Jan	1500	1600	1600	0100	0100
Feb	1600	1800	2100	2100	2100
Mar	1500	1700	1800	1800	2000
Apr	1600	1700	1800	1800	1800
May	1600	1700	1700	1700	1700
Jun	1600	1600	1600	1600	1600
Jul	1500	1600	1700	1700	1700
Aug	1300	1300	1400	1500	1500
Sep	1400	1500	14-1500	15-1600	1500
Oct	1500	1500	1600	1600	1600
Nov	1500	1500	1500	17-2000	20-2300
Dec	1400	1700	1800	1800	1800
					1300
					0600

Table 5.65

Time of occurrence of Minimum Temperatures

by Months and Heights

Month \ Height	35'	200'	400'	600'	810'	Sunrise
Jan	0700	1100	1100	1100	1100	0822
Feb	0600	0700	0700	0900	0700	0740
Mar	0700	0800	0900	0880	0800	0643
Apr	0600	0700	0700	0700	0800	0537
May	0500	0600	0600	0600	0600	0444
Jun	0500	0600	0700	0700	0800	0419
Jul	0400	0500	0600	0600	0700	0436
Aug	0500	0600	0700	0800	0800	0518
Sep	0600	0600	0600	0600	0600	0605
Oct	0700	0700	0800	0900	0100	0651
Nov	05-0800	0800	0900	0100	0110	0741
Dec	0700	0900	0900	0900	0900	0821

Table 6.1

Average Duration (hr.) and Frequency* of Inversions > 2 Hours, Winnipeg C.B.C. Tower,

October 1969 - December 1971

Height Interval		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
35-200	Duration	10.3	11.7	12.3	9.3	8.9	8.3	8.5	8.8	9.1	9.6	11.4	8.8
	Frequency	73	61	60	37	51	62	67	74	65	76	71	82
35-400	Duration	11.3	12.2	12.7	10.4	8.6	8.0	8.9	9.0	8.1	10.3	10.5	10.8
	Frequency	71	58	58	31	49	61	61	71	69	70	74	74
35-600	Duration	15.2	12.8	13.4	10.4	8.5	8.1	9.7	9.9	9.0	10.7	9.1	12.2
	Frequency	59	60	60	35	53	67	60	68	69	71	76	73
35-810	Duration	14.6	14.3	12.4	11.3	8.1	8.0	9.3	9.8	8.9	10.7	11.9	13.2
	Frequency	61	52	54	30	50	63	57	66	63	67	60	72
200-400	Duration	9.1	7.6	9.0	7.2	5.0	5.6	5.6	6.6	5.7	7.4	7.8	7.2
	Frequency	71	72	67	39	54	66	66	76	71	75	71	86
200-600	Duration	12.1	9.8	10.6	10.4	6.0	6.4	6.6	7.8	7.0	8.7	9.4	9.7
	Frequency	67	69	68	32	57	74	71	73	72	75	76	89
200-810	Duration	10.3	9.8	9.3	9.1	6.9	5.7	5.6	6.6	6.8	8.3	9.6	11.9
	Frequency	72	64	68	32	46	66	62	72	62	64	58	72
400-600	Duration	8.7	9.8	8.3	7.6	5.5	6.6	6.3	7.4	6.9	7.2	8.4	8.8
	Frequency	99	75	95	49	73	82	81	79	91	101	101	115
400-810	Duration	7.6	8.6	6.8	6.3	4.9	4.7	4.0	5.2	5.0	6.8	7.6	11.0
	Frequency	88	64	77	34	44	58	63	68	71	65	78	78
600-810	Duration	5.7	4.5	4.3	4.5	3.6	3.8	3.1	3.6	3.7	4.6	4.3	6.9
	Frequency	77	69	63	22	29	24	25	39	40	47	74	94

* frequencies are not adjusted for variations in the sampling period. All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 6.2

Percent of Hours with Inversions ≥ 2 Hours, Winnipeg C.B.C. Tower, October 1969 - December 1971

Height Interval	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
35-200	54.0	57.3	54.5	37.8	32.3	36.1	42.1	47.3	43.5	35.5	38.2	32.8	42.6
35-400	57.7	56.8	54.4	35.3	30.0	34.3	40.0	46.4	41.1	34.9	36.7	41.3	42.6
35-600	64.5	61.7	59.4	39.4	32.1	38.1	42.9	48.9	45.7	36.8	32.7	46.1	45.7
35-810	64.0	58.8	49.5	37.2	28.8	35.4	39.2	47.0	41.3	34.7	33.7	49.2	43.3
200-400	46.1	44.0	44.6	30.8	19.2	25.9	27.3	36.4	29.8	26.8	26.2	32.0	32.4
200-600	58.3	54.3	53.3	36.5	24.4	33.2	34.6	41.3	37.1	31.6	33.7	44.7	40.2
200-810	53.3	50.4	46.8	32.0	19,7	26.4	25.7	34.5	31.0	25.7	26.3	44.3	34.7
400-600	61.9	59.1	58.3	40.9	29.6	38.0	37.7	42.4	46.2	37.6	40.1	47.8	45.0
400-810	48.1	44.2	38.7	23.5	15.4	19.1	18.6	25.7	26.1	21.4	28.0	44.0	29.4
600-810	31.6	23.5	20.0	10.9	7.4	6.4	5.7	10.2	10.9	10.5	15.0	33.6	15.5
Average	45.0	51.1	48.0	32.5	23.9	29.3	31.4	38.0	35.3	29.5	31.1	41.6	37.1

Data for all levels including the 600' level should be treated with caution (see chapter five)

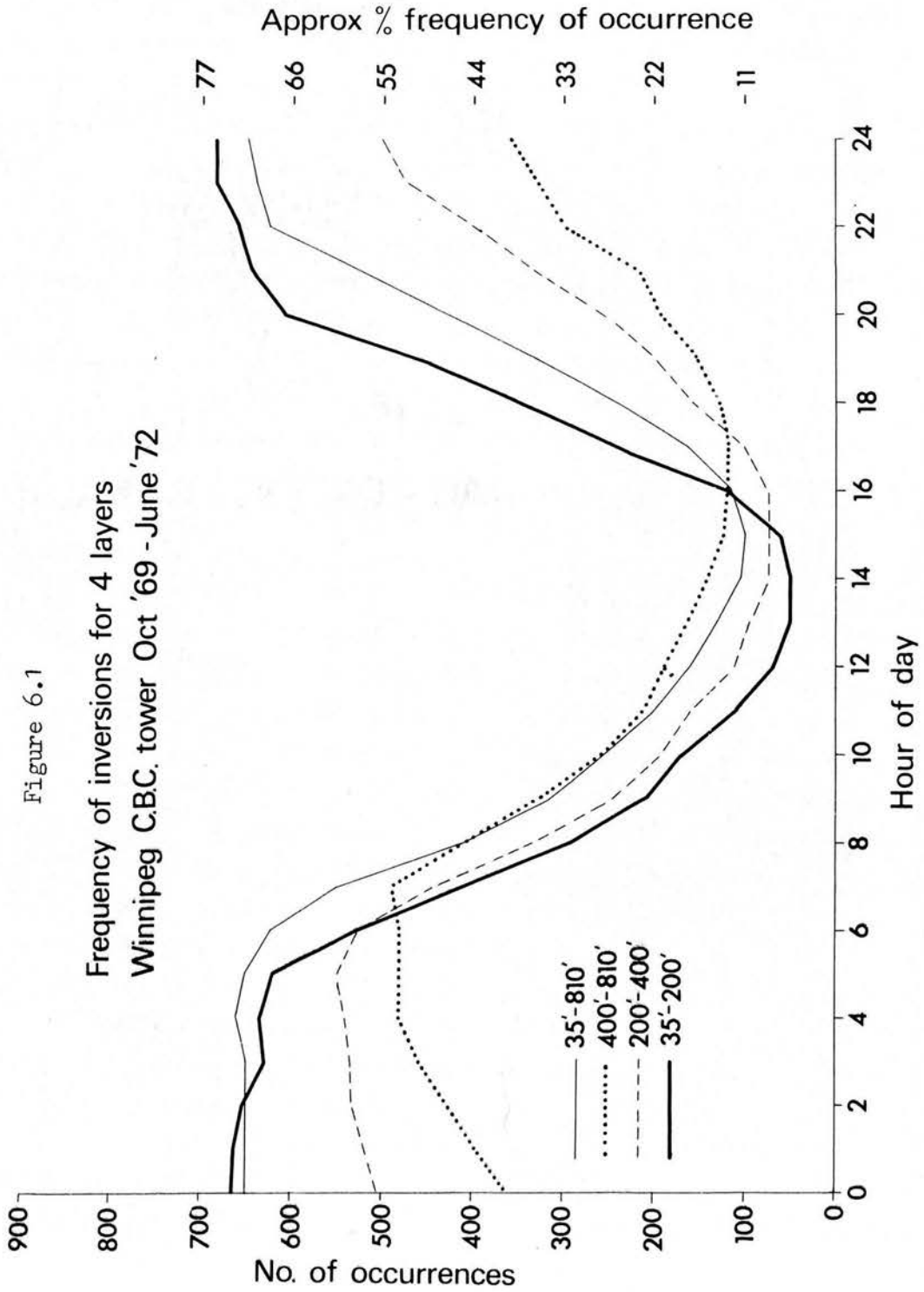

Approx % frequency of occurrence
-77
-66
-55
-44
-33
-22
-11
Frequency of inversions for 4 layers
Winnipeg C.B.C. tower Oct '69 - June '72
35'-810'
400'-810'
200'-400'
35'-200'
No. of occurrences
900
800
700
600
500
400
300
200
100
0
0
2
4
6
8
10
12
14
16
18
20
22
24
Hour of day

Figure 6.1

Figure 6.2

Frequency of Inversions for 4 Types

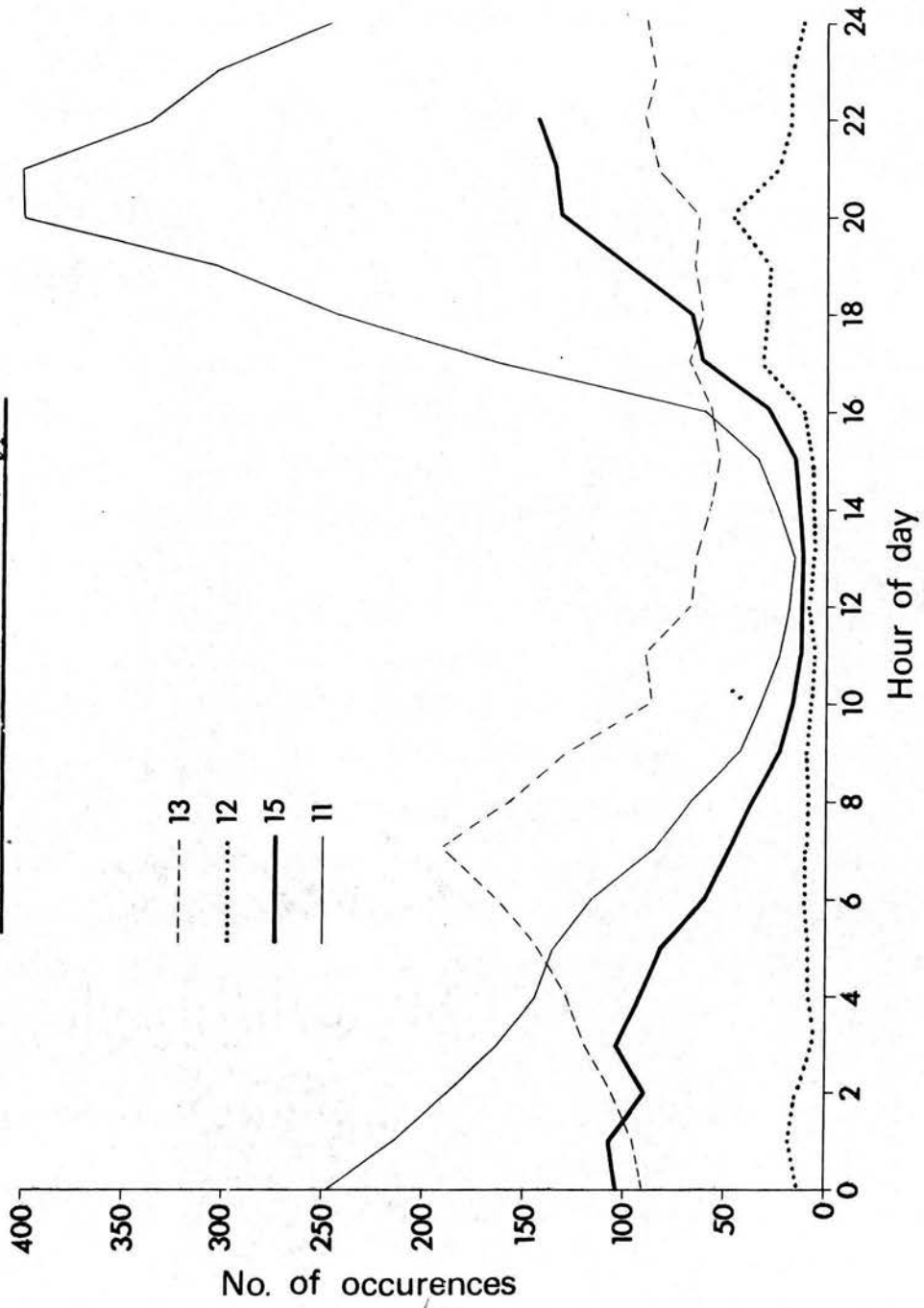


Table 6. 3

Frequency and % Frequency by Seasons for 15 Inversion Types,
Winnipeg C.B.C. Tower, Oct.1969 - Dec.1971

		SPRING		SUMMER		AUTUMN		WINTER		ALL YEAR	
	Sample Size in Hours	5692		4672		5378		5924		21666	
	Type of Lapse Rate	No. of Hours of Occ.	% Freq. of Occ.	No. of Hours of Occ.	% Freq. of Occ.	No. of Hours of Occ.	% Freq. of Occ.	No. of Hours of Occ.	% Freq. of Occ.	No. of Hours of Occ.	% Freq. of Occ.
1	Inv. 35'-200'	2410	46.6	1989	42.6	2213	41.1	2977	50.2	9589	44.3
5	Inv. 200'-400'	1868	32.8	1505	32.2	1631	30.3	2445	41.2	7449	34.4
8	Inv. 400'-600'	2595	45.5	1997	42.7	2354	43.8	3596	60.7	10542	48.7
10	Inv. 600'-810'	880	15.5	499	10.7	810	15.0	1948	32.9	4137	19.1
6	Inv. 200'-600'	2258	39.1	1773	37.5	1968	36.1	3159	50.3	9158	42.3
7	Inv. 200'-810'	1910	33.1	1443	30.4	1665	30.6	2968	49.4	7983	36.8
9	Inv. 400'-810'	1587	27.8	1122	24.0	1474	27.4	2802	47.2	6985	32.2
2	Inv. 35'-400'	2330	40.9	1919	41.0	2107	39.1	3056	51.6	9412	43.4
3	Inv. 35'-600'	2551	44.8	2072	44.2	2306	42.9	3479	58.7	10408	48.0
4	Inv. 35'-810'	2372	41.7	1935	44.3	2096	38.9	3434	58.0	9837	45.4
11	Ground Inv.but not to 810' - Neutral Aloft	973	17.0	817	17.4	936	17.4	1042	17.5	3768	17.4
12	Ground Inv. (to 200) Adiabatic Aloft	692	12.1	818	17.5	760	14.1	551	9.3	2821	13.0
13	Upper Inv. but not in 35'-200' layer (Neutral Below)	579	10.2	314	6.7	640	11.9	1015	17.1	2548	11.8
14	Upper Inv. and 35'-200' layer adiabatic	361	6.3	249	5.3	250	4.6	511	8.6	1371	6.3
15	Ground and Upper Inversion	412	7.2	351	7.5	344	6.3	533	8.9	1640	7.5

All data for layers involving the 600' level should be treated with caution (see chapter five)

Table 6.4

Frequency and % Frequency by Seasons for 15 Inversion Types,
Winnipeg C.B.C. Tower, Oct. 1969 - Dec 1971
600' Temperature Data has had -·6°F Correction

		SPRING		SUMMER		AUTUMN		WINTER		ALL YEAR	
	Sample Size in Hours	5692		4672		5378		5924		21666	
	Type of Lapse Rate	No. of Hours of Occ.	% Freq. of Occ.	No. of Hours of Occ.	% Freq. of Occ.	No. of Hours of Occ.	% Freq. of Occ.	No. of Hours of Occ.	% Freq. of Occ.	No. of Hours of Occ.	% Freq. of Occ.
1	Inv. 35'-200'	2410	46.6	1989	42.6	2213	41.1	2977	50.2	9589	44.3
5	Inv. 200'-400'	1868	32.8	1505	32.2	1631	30.3	2445	41.2	7449	34.4
8	Inv. 400'-600'	1468	25.7	1189	25.4	1431	26.6	2391	40.3	6748	31.1
10	Inv. 600'-810'	1737	30.5	930	19.9	1427	26.5	2965	50.0	7059	32.5
6	Inv. 200'-600'	1848	32.4	1484	31.8	1638	30.4	2669	45.0	7639	35.2
7	Inv. 200'-810'	1910	33.1	1443	30.4	1665	30.6	2968	49.4	7983	36.8
9	Inv. 400'-810'	1587	27.8	1122	24.0	1474	27.4	2802	47.2	6985	32.2
2	Inv. 35'-400'	2330	40.9	1919	41.0	2107	39.1	3056	51.6	9412	43.4
3	Inv. 35'-600'	2304	40.5	1939	41.5	2075	38.5	3193	53.9	9511	43.8
4	Inv. 35'-810'	2372	41.7	1935	44.3	2096	38.9	3434	58.0	9837	45.4
11	Ground Inv. but not to 810'- Neutral Aloft	973	17.0	817	17.4	936	17.4	1042	17.5	3768	17.4
12	Ground Inv. (to 200') Adiabatic Aloft	59	1.0	86	1.9	113	2.1	89	1.5	349	1.6
13	Upper Inv. but not in 35'-200' layer (Neutral Below)	558	9.8	258	5.5	528	9.8	985	16.6	2329	10.7
14	Upper Inv. and 35'-200' layer adiabatic	343	6.0	247	5.2	248	4.6	530	8.9	1368	6.3
15	Ground and Upper inversion	452	7.9	240	5.1	284	5.2	667	11.2	1643	7.6

All data for layers including the 600' level should be treated with caution (see chapter five)

TABLE 6.5

Frequency of Highs and Lows in the Winnipeg Area by Months according to Sands (1966)

	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.
HIGH	36	36	55	64	81	97	91	77	61	52	46	40
LOW	34	47	43	50	20	40	34	42	60	50	46	60

A high is taken to be the sum of features 101, 102, 103, and 104.

A low is taken to be feature 66. (See Chapter Three)

Table 6.6

% Occurence of 35'-200' Inversions by Hour of Day and Month,

Winnipeg C.B.C. Tower, Oct. 1969-Dec. 1971

Hour	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2.7	4.9	5.0	2.7			2.9			3.9	2.8	1.2
1	2.7	4.9	3.3			6.4	1.4	4.0	1.5	1.3		1.2
2	1.3	1.6	1.6	2.7	3.9	6.4	1.4	1.3	3.0	2.6		2.4
3	2.7		5.0				1.4			1.3	1.4	4.8
4	4.1	3.2		2.7	5.8	1.6	4.4	5.4	4.6	3.9	4.2	3.6
5		3.2	3.3			3.2		1.3	6.1	3.9	2.8	6.0
6	4.1	3.2	3.3	2.7		1.6				1.3		2.4
7	1.3	3.2		2.7		1.6			1.5		2.8	3.6
8	2.7	1.6								2.6	4.2	4.8
9	1.3		3.3							1.3	1.4	
10	1.3			2.7				1.3			1.4	
11	2.7		1.6									
12	4.1	1.6	5.0					2.7				
13		1.6									1.4	
14	2.7		1.6	5.4					1.5		4.2	
15	4.1	3.2				1.6	2.9		3.0		4.2	2.4
16	6.4	4.9	11.6	2.7							5.6	4.8
17	17.8	18.0	8.3	10.8		1.6		1.3	12.3	21.0	32.2	20.7
18	6.8	19.6	20.0	10.8	3.9		8.9	6.7	23.0	35.5	8.4	21.9
19	2.7	13.1	15.0	32.4	9.8	16.1	19.4	24.3	20.0	9.2	7.0	1.2
20	8.2	4.9	3.3	16.2	54.9	35.4	28.3	28.3	13.8	2.6	4.2	3.6
21	5.4	3.2	5.0		11.7	14.5	20.8	12.1	4.6		2.8	3.6
22			1.6	5.4	5.8	9.6	4.4	8.1	3.0	2.6	5.6	2.4
23	4.1	3.2	1.6	2.7	3.9		2.9	2.7	1.5	6.5	2.8	4.8
Number	73	61	60	37	51	62	67	74	65	76	71	82
Avg. Duration	10.3	11.7	12.1	3.9	8.9	8.3	8.5	8.8	9.1	9.6	11.4	8.8

Note. % occurrence = 100 times total hourly occurrence/ total monthly occurrence.

Table 6.7

% Occurence of 200'-400' Inversions by Hour of Day and Month,

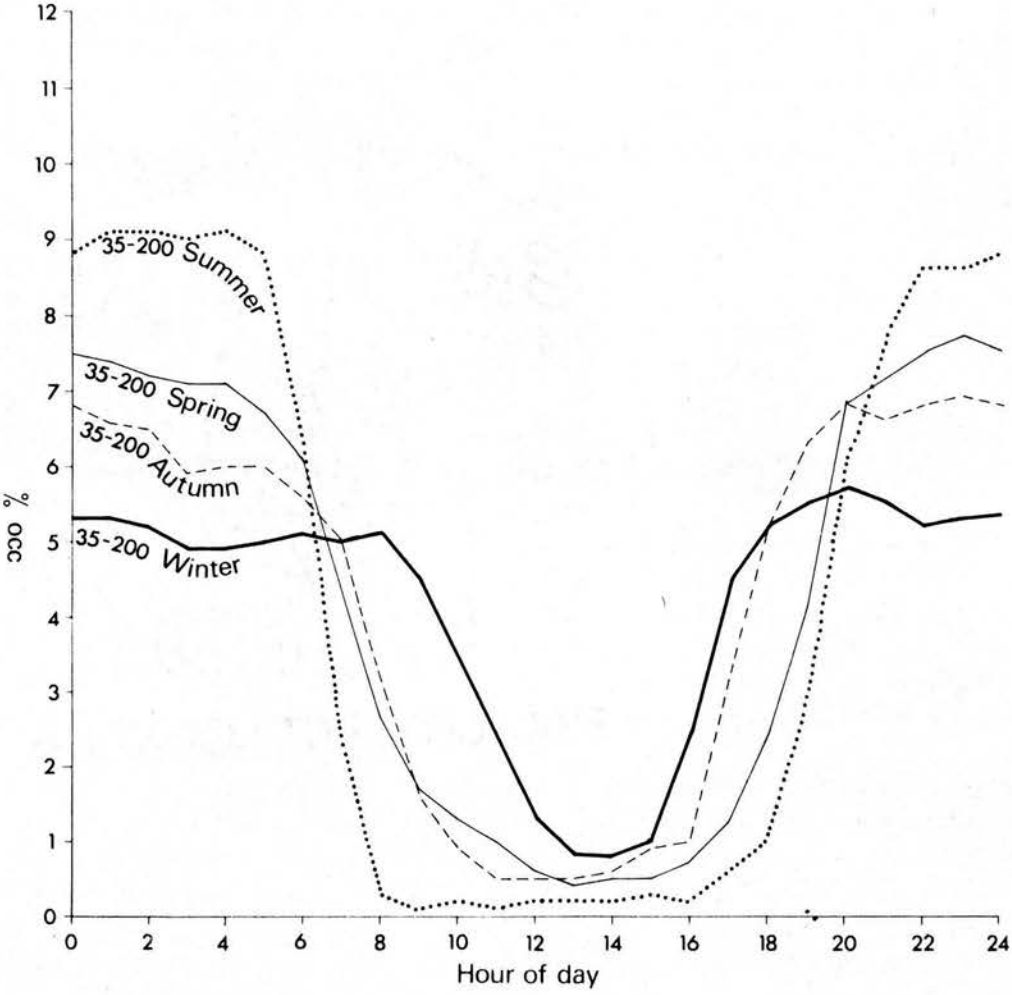
Winnipeg C.B.C. Tower, Oct.1969 - Dec. 1971

Hour	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	7.0	6.9	14.9	7.6	5.5	6.0	13.6	9.2	7.0	10.6	5.6	3.4
1	7.0	4.1	4.4	2.5	14.8	9.0	3.0	3.9	5.6	4.0	5.6	2.3
2	4.2	1.3	11.9	10.2	7.4	15.1	9.0	7.8	7.0	1.3	5.6	3.4
3	4.2	5.5	5.9	2.5	9.2	1.5	4.5	6.5			1.4	8.1
4	2.8	2.7	4.4	5.1	7.4	6.0	9.0	1.3	5.6	4.0	2.8	3.4
5	7.0	8.3	1.4	2.5	7.4	3.0	4.5	6.5	4.2	4.0	7.0	2.3
6	1.4		1.4	5.1	3.7	3.0	3.0	2.6	9.8	1.3	4.2	9.3
7	7.0	2.7	2.9	2.5		1.5		1.3		5.3	2.8	2.3
8	1.4	5.5	1.4	2.5			1.5		4.2	2.6	4.2	3.4
9	1.4	2.7	1.4						2.8	2.6	2.8	2.3
10	1.4	1.3		2.5						1.3	2.8	3.4
11	2.8	1.3									1.4	1.1
12		1.3		5.1				2.6				1.1
13	5.6	1.3	1.4							1.3	1.4	
14		1.3	1.4	2.5						2.6		3.4
15	2.8	2.7							1.4		2.8	4.6
16			1.4			1.5					2.8	3.4
17		9.7	4.4			3.0	1.5	1.3	1.4	1.3	2.8	4.6
18	2.8	11.1	7.4	7.6		1.5		2.6	2.8	12.0	11.2	4.6
19	7.0	6.9	7.4	7.6	1.8	4.5	6.0		12.6	12.0	9.8	5.8
20	8.4	6.9	4.4	5.1	7.4	9.0	6.0	6.5	7.0	6.6	5.6	4.6
21	11.2	4.1	7.4	17.9	9.2	7.5	16.6	17.1	16.9	5.3	2.8	6.9
22	5.6	6.9	7.4	5.1	11.1	12.1	13.6	15.7	7.0	8.0	9.8	6.9
23	8.2	4.1	5.9	5.1	14.8	15.1	7.5	14.4	4.2	13.3	4.2	8.1
Number	71	72	67	39	54	66	66	76	71	75	71	86
Avg. Duration	9.1	7.6	9.0	7.2	5.0	5.6	5.6	6.6	5.7	7.4	7.8	7.2

Table 6.8

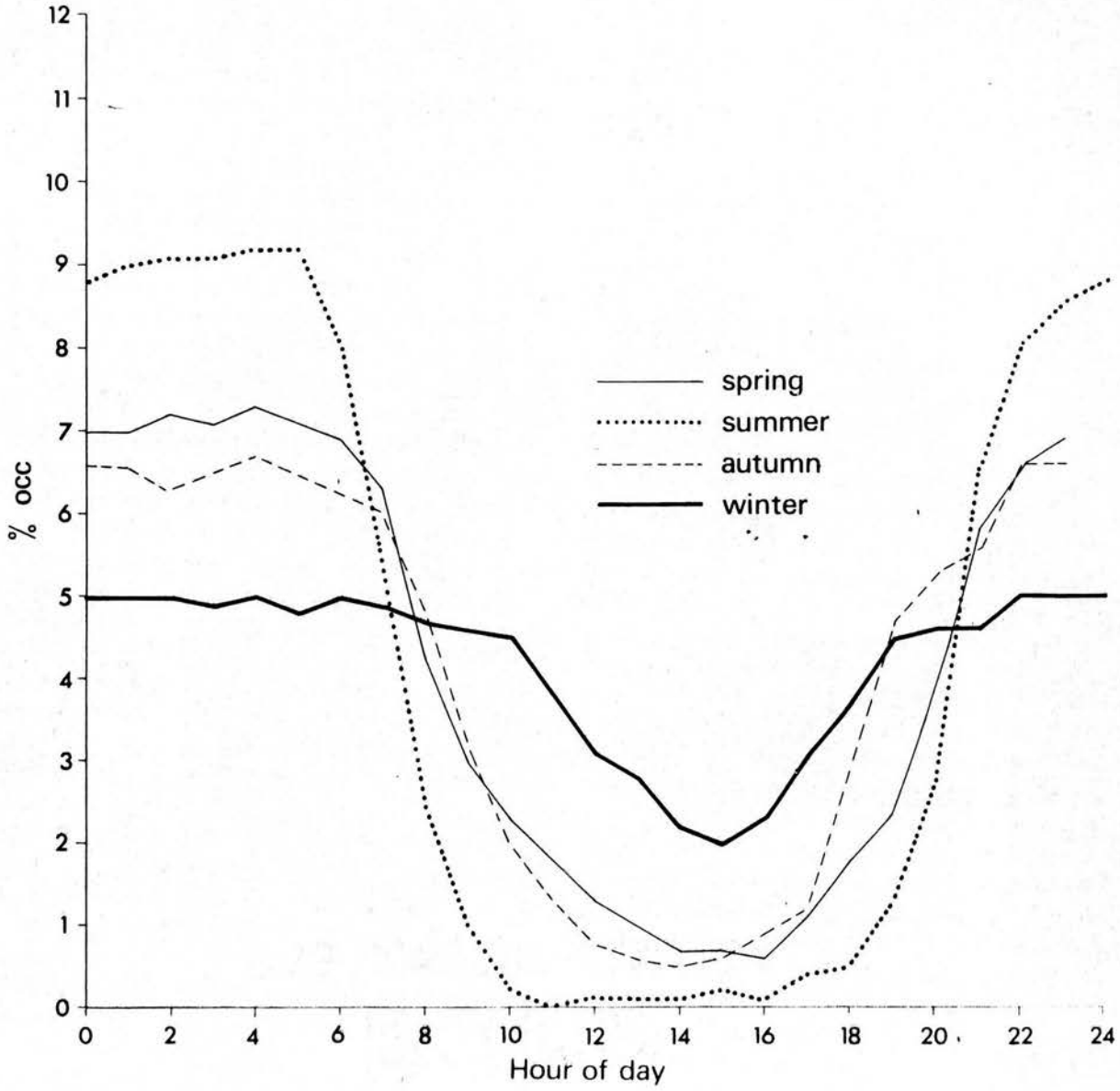
% Occurence of 400'-810' Inversions by Hour of the day and Month,
Winnipeg C.B.C. Tower, Oct. 1969 - Dec. 1971

Hour	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5.0	6.6	9.4	12.2	12.3	10.9	6.1	10.1	7.6	7.9	4.9	5.2
1	7.0	5.3	6.3	6.1	9.5	10.9	11.1	7.5	2.1	6.9	2.6	4.3
2	3.0	2.6	4.2	6.1	4.1	4.8	2.4	8.8	4.3	1.9	6.9	4.3
3	3.0	1.3	4.2	6.1	8.2	7.3	6.1	6.3	7.6	4.9	4.9	5.2
4	3.0	2.6	3.1	2.0	8.2	3.6	8.6	2.5	3.2	0.9	4.9	6.9
5	8.0	6.6	5.2	6.1	1.3	1.2	2.4	1.2	3.2	6.9		3.4
6	3.0	4.0	3.1	8.1	5.4	2.4	1.2	1.2	3.2	2.9	2.9	3.4
7	4.0	5.3	1.0			2.4	1.2		3.2	4.9	2.9	3.4
8	3.0	8.0	3.1					2.5	1.0	1.9	8.9	1.7
9	2.0	1.3	2.1				1.2				1.9	3.4
10	3.0		4.2	4.0			1.2			1.9		2.6
11	2.0	5.3	2.1	2.0	1.3	1.2			2.1	0.9		4.3
12	5.0	2.6	1.0	4.0		1.2					1.9	3.4
13	3.0		1.0		1.3						2.9	2.6
14	2.0	5.3	1.0	2.0					1.0		0.9	
15	2.0	4.0	1.0	2.0		1.2	1.2		1.0		0.9	6.0
16		2.6	2.1		1.3	1.2	1.2	1.2	4.3	1.9	3.9	3.4
17	3.0	1.3	2.1	2.0	1.3	2.4	2.4	1.2	1.0	4.9	1.9	7.8
18	3.0	2.6	4.2	2.0	1.3	6.0	2.4	1.2	5.4	12.8	9.9	4.3
19	9.0	8.0	8.4	8.1	1.3	7.3	6.1	5.0	13.1	8.9	8.9	6.0
20	9.0	5.3	10.5	12.2	10.9	6.0	12.3	7.5	14.2	5.9	7.9	5.2
21	9.0	6.6	6.3	2.0	12.3	6.0	12.3	11.3	6.5	10.8	7.9	5.2
22	5.0	6.6	7.3	2.0	4.1	12.1	11.1	18.9	7.6	3.9	3.9	3.4
23	3.0	5.3	6.3	10.2	15.0	10.9	7.4	12.6	6.5	7.9	6.9	3.4
Number	99	75	95	49	73	82	81	79	91	101	101	115
Avg. Duration	8.7	9.8	8.3	7.6	5.5	6.6	6.3	7.4	6.9	7.2	8.4	8.8



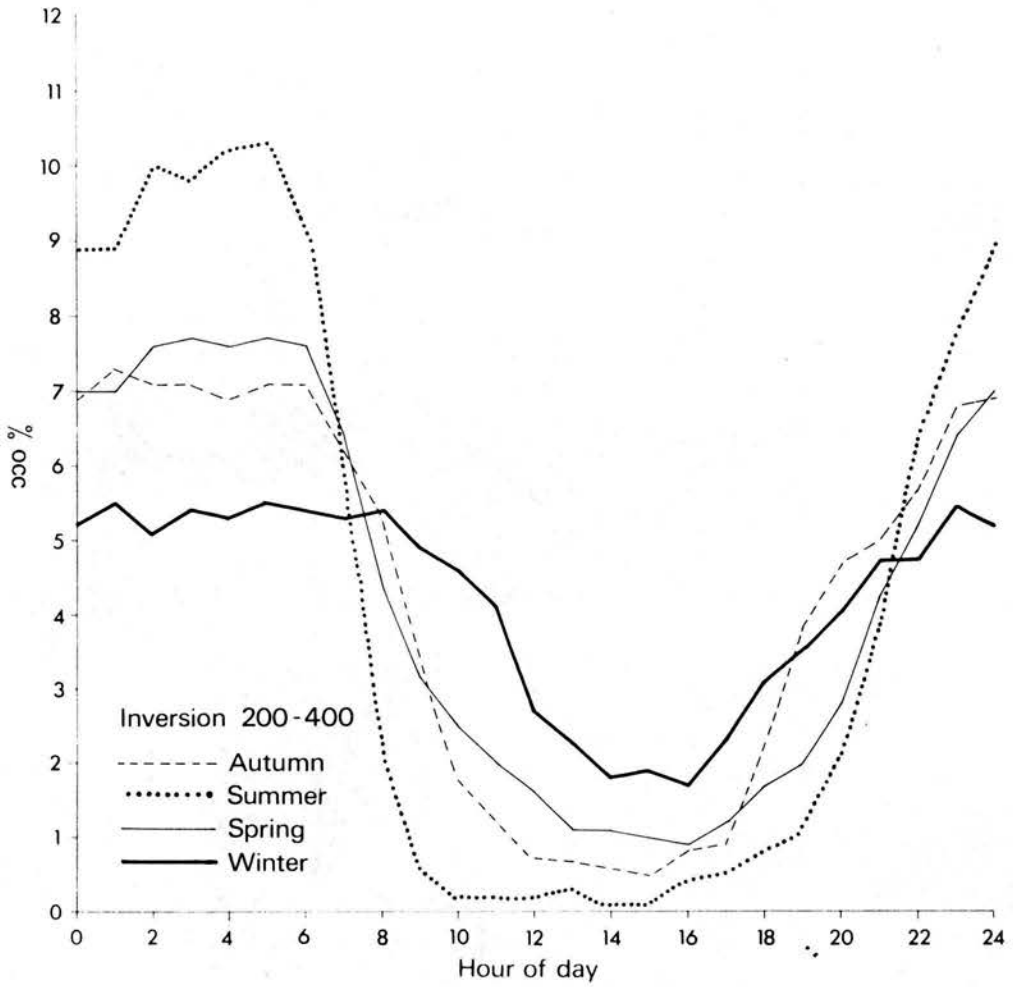
Percent frequency of occurrence of type 1 inversion
by hours and seasons, Winnipeg C.B.C. tower Oct 1969 - June 1972

Figure 6.3



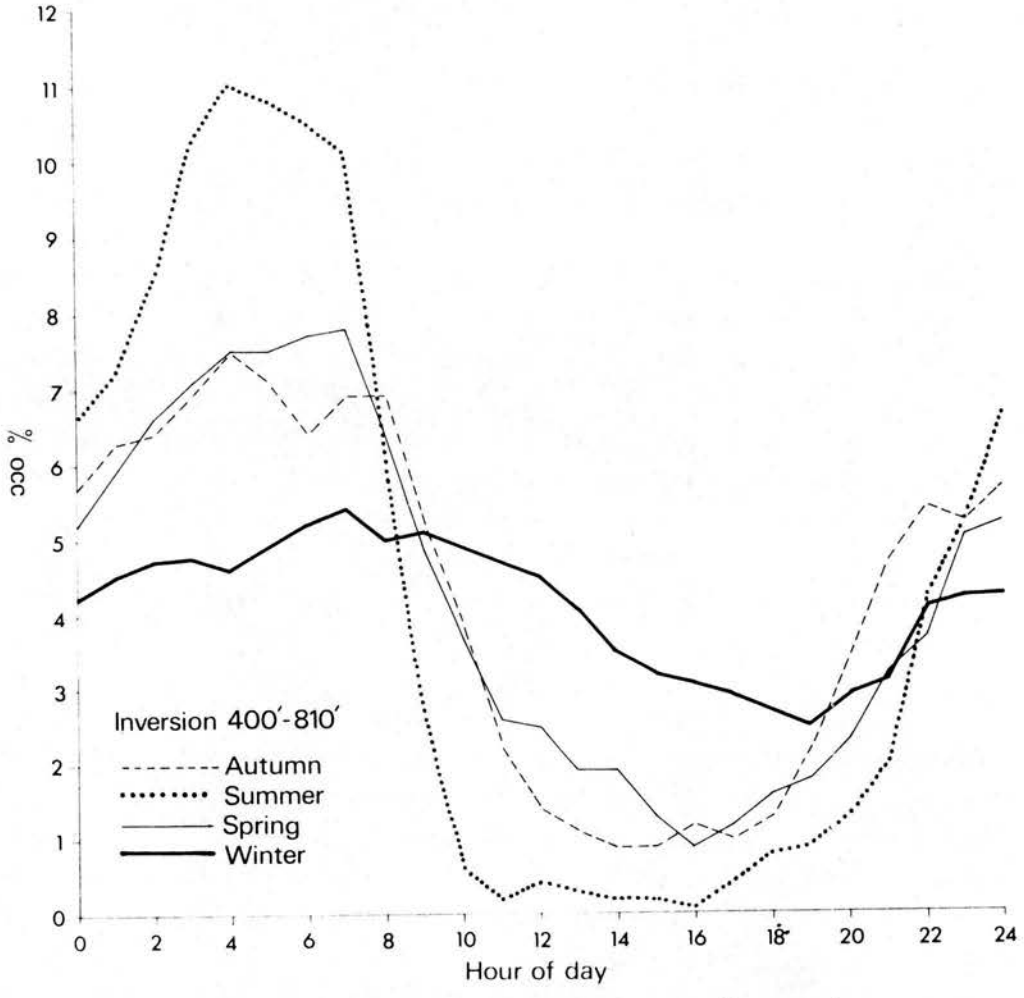
Percent frequency of occurrence of type 4 inversion by hours and seasons, Winnipeg C.B.C. tower, Oct 1969 - June 1972

Figure 6.4



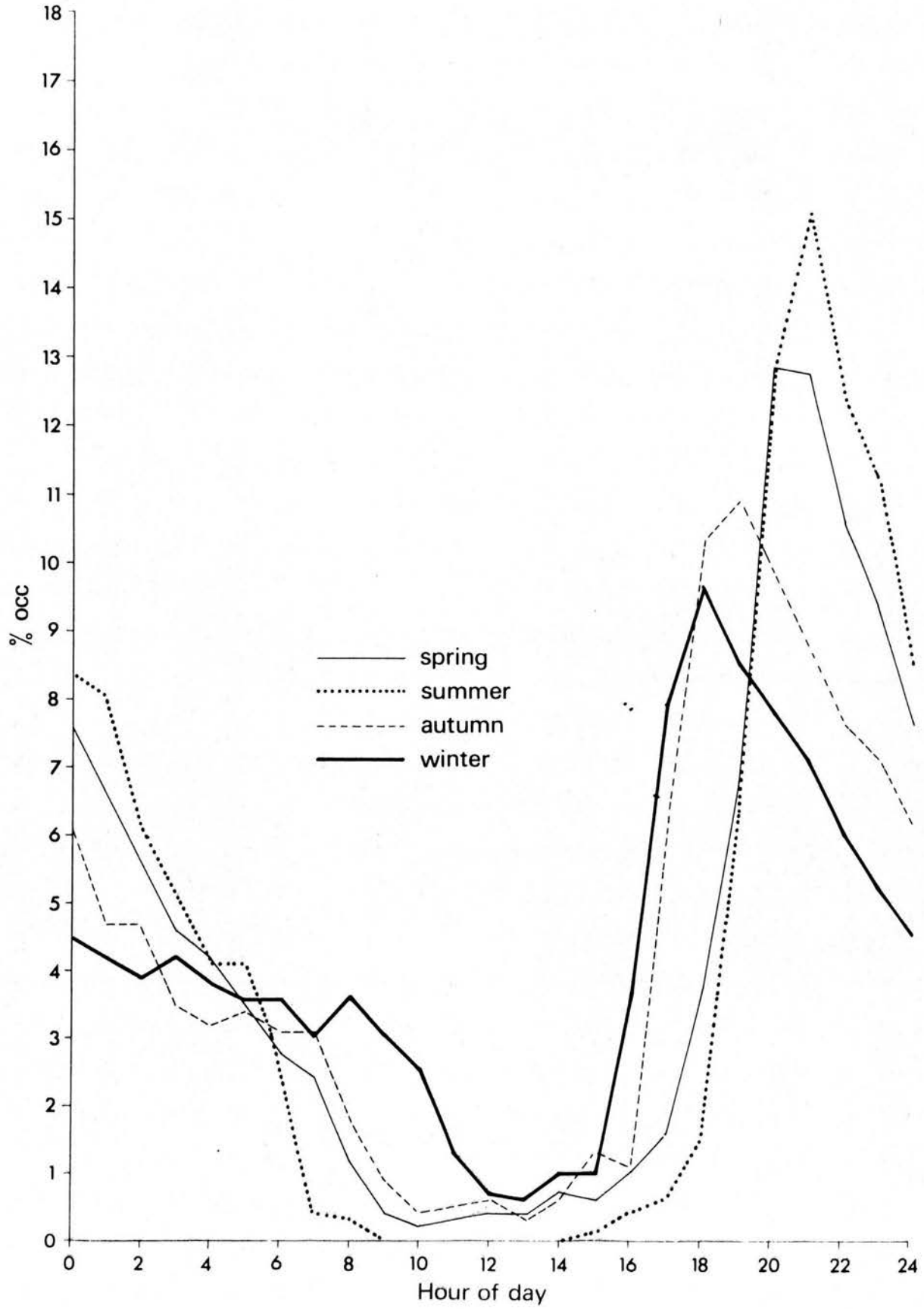
Percent frequency of occurrence of type 5 inversion
by hours and seasons, Winnipeg C.B.C. tower, Oct 1969 - June 1972

Figure 6.5



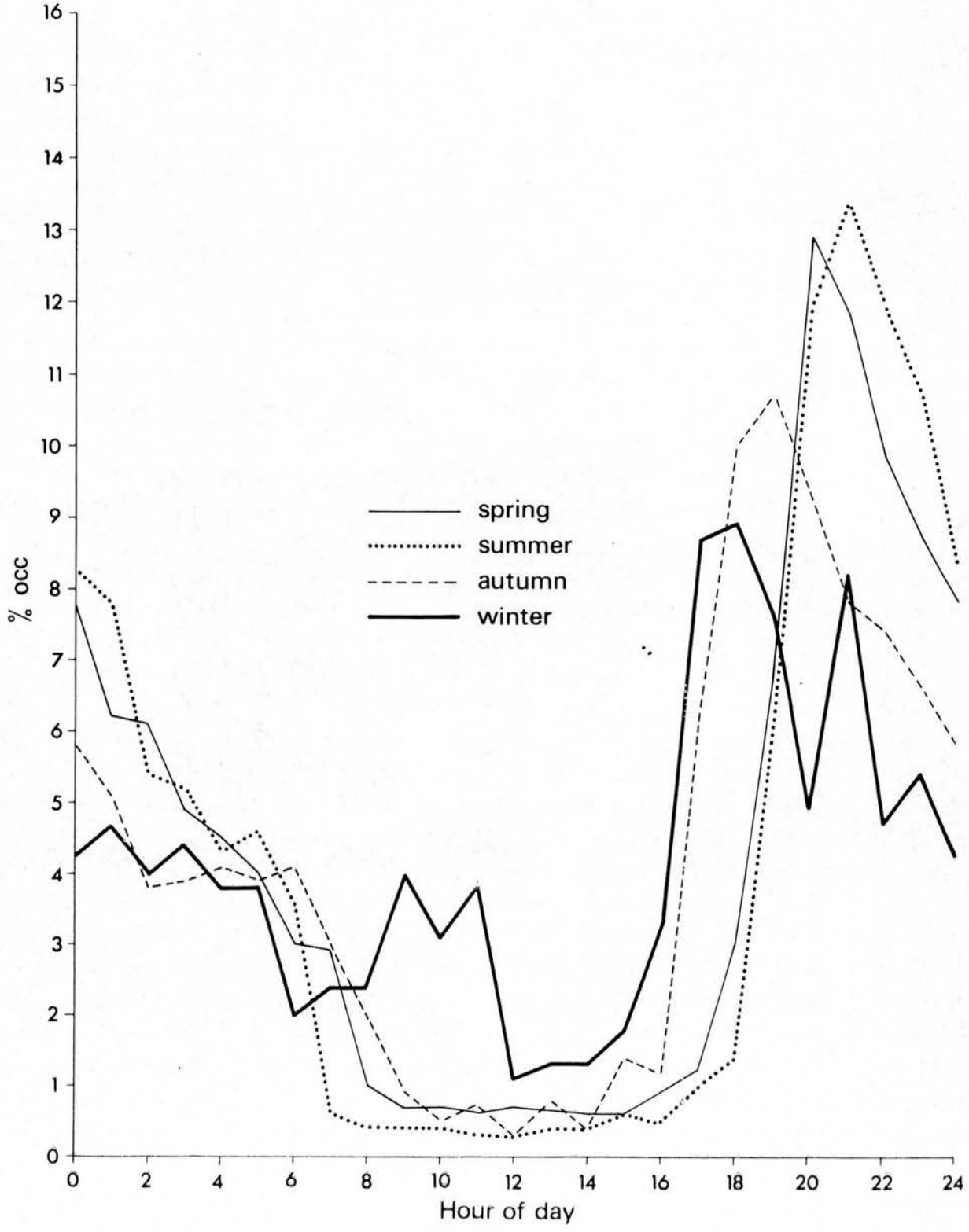
Percent frequency of occurrence of type 9 inversion
by hours and seasons, Winnipeg C.B.C. tower, Oct 1969 - June 1972

Figure 6.6



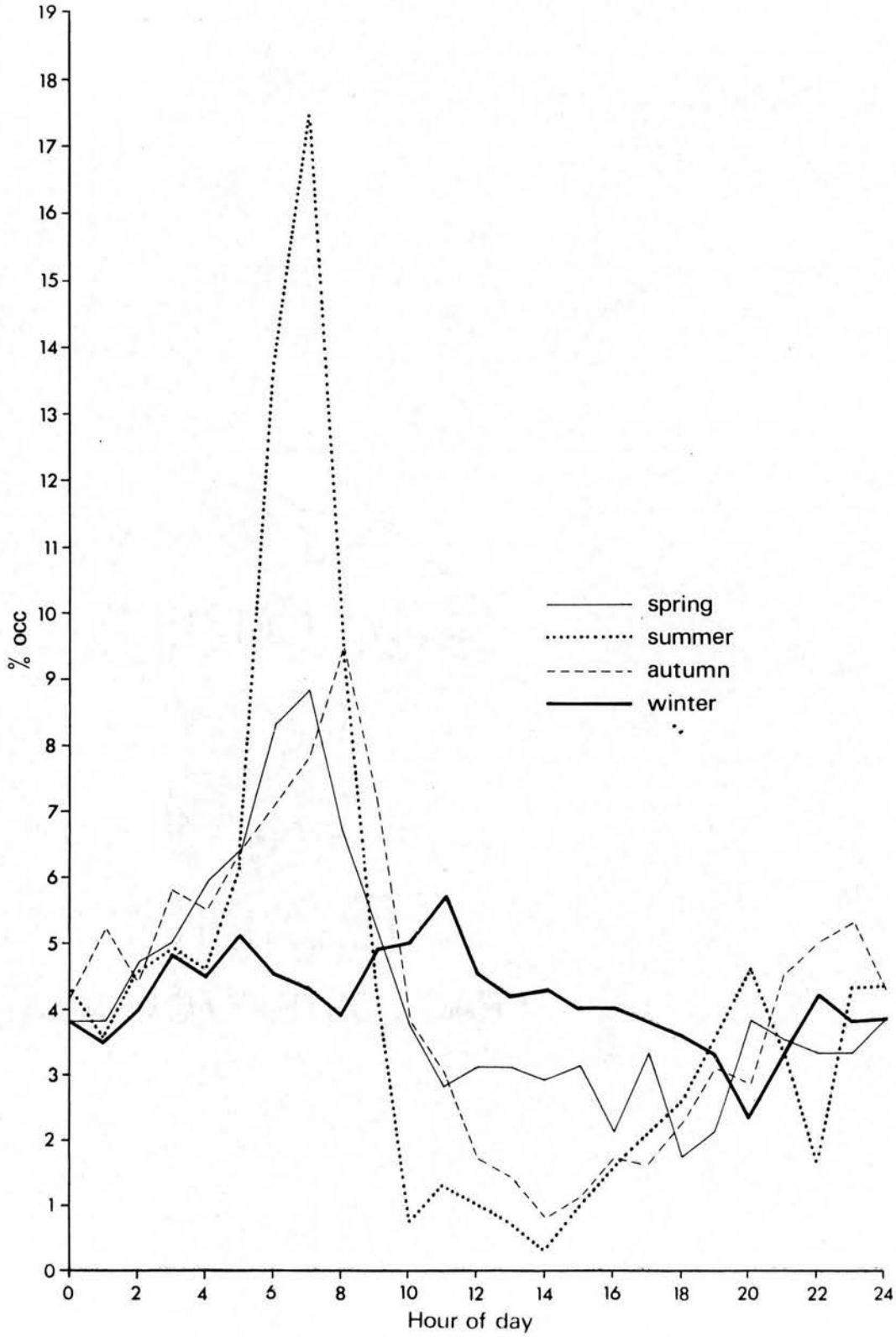
Percent frequency of occurrence of type 11 inversion
by hours and seasons, Winnipeg C.B.C. tower, Oct 1969 - June 1972

Figure 6.7



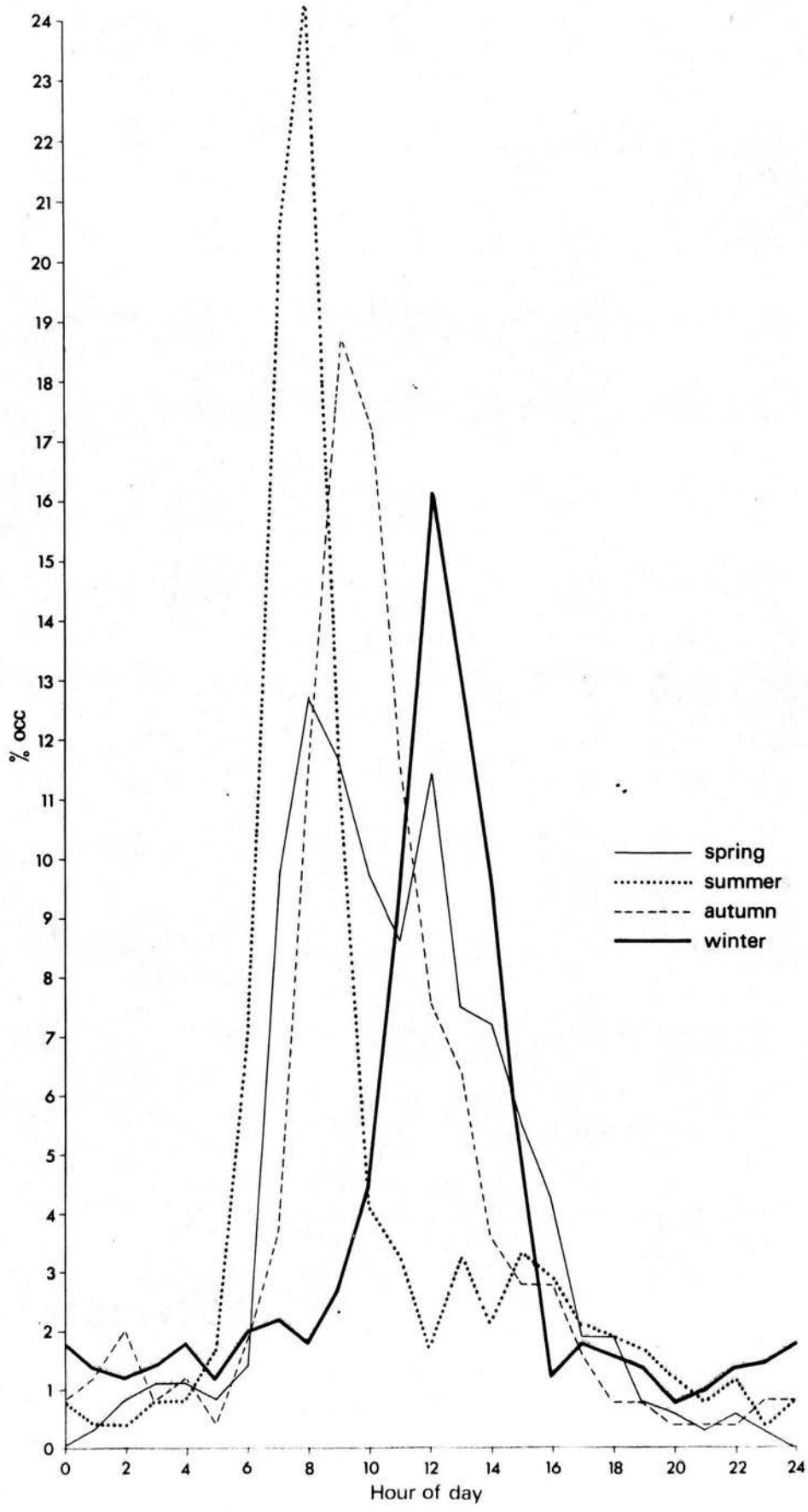
Percent frequency of occurrence of type 12 inversion
by hours and seasons, Winnipeg C.B.C. tower, Oct 1969 - June 1972

Figure 6.8



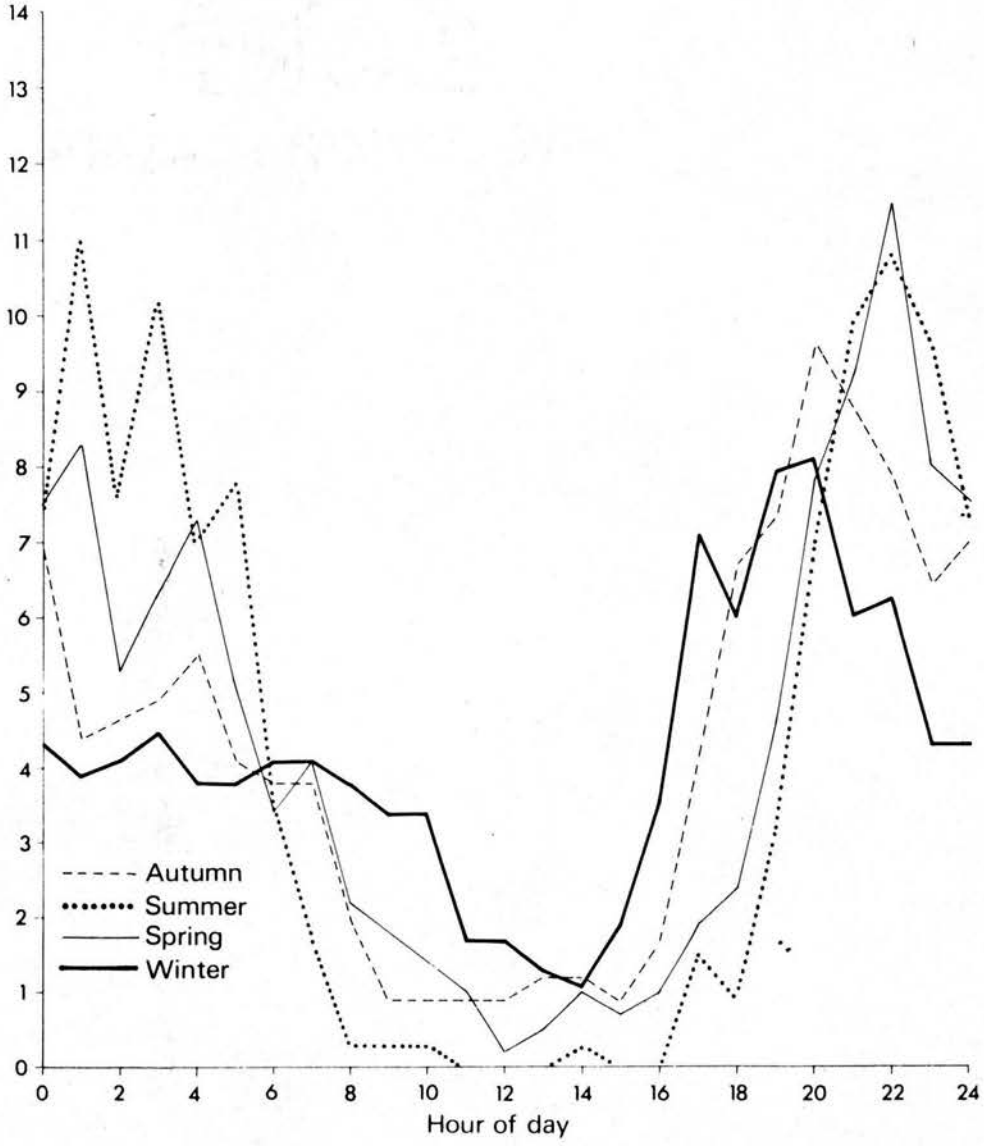
Percent frequency of occurrence of type **13** inversion
by hours and seasons, Winnipeg CBC tower Oct 1969 - June 1972

Figure 6.9



Percent frequency of occurrence of type 14 inversion
by hours and seasons, Winnipeg CBC tower, Oct 1969 - June 1972

Figure 6.10



Percent frequency of occurrence of type 15 inversion
by hours and seasons, Winnipeg C.B.C. tower, Oct 1969 - June 1972

Figure 6.11

Table 6.9

Average Monthly Cumulative Frequency Distribution (%) of the Duration of Inversions in the 35-200' layer, Winnipeg C.B.C. Tower, October 1969 - December 1971

Duration in Hours	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2	100.0*	100.0	100.0	100.0*	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
4	82.1	95.0*	93.3	83.7	92.1	93.5	86.5	95.9	90.7	88.1	95.7*	87.8*
6	71.2	75.4	85.0	72.9	86.2	85.4	74.6	81.0	70.7	75.0	76.0	67.0*
8	58.9	68.8	71.6	62.1	76.4	70.9	74.6	71.6	63.0	65.7	61.9	46.3
10	47.9	63.9	60.0	59.4	66.0	56.4	67.1	62.1	61.5	60.5	53.5	42.6
12	41.0	54.0	58.3	51.3*	45.0*	37.0*	38.8*	50.0*	49.2	46.0	46.4	34.1
14	35.6	47.5	50.0*	35.1	7.8	1.6	4.4	8.1	35.3*	40.7	35.2	26.8
16	27.3	39.3	33.3	21.6*			1.4	1.3	9.2	26.3*	22.5	23.1
18	17.8	27.8	18.3	5.4					1.5	3.9	18.3	15.8
20	12.3	9.8	11.6								9.8	10.9
22	6.8	8.1	5.0								8.4	4.8
24	6.8	8.1	5.0								7.0	2.4
48	5.4	6.5	3.3								7.0	1.2
72											1.4	
72												
Total Number	73	61	60	37	51	62	67	74	65	76	71	82
Average Daily Dark Hours	15.3	13.8	12.2	10.2	8.7	7.7	8.1	9.4	11.2	13.0	14.8	15.8

* denotes most frequent value

Table 6.10

Average Monthly Cumulative Frequency Distribution (%) of the Duration of Inversions in the 35'-400' layer, Winnipeg C.B.C. Tower, October 1969 - December 1971

Duration in Hours	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
4	90.1*	98.2	86.2	90.3	93.8	93.4	88.5	95.7	79.7	95.7	85.1*	89.1
6	69.0	84.4	77.5	83.8	85.7	78.6	81.9	81.6	65.2	78.5	67.5	75.6
8	59.1	70.6	70.6	70.9	73.4	65.5	70.9	71.8	53.6	71.4	54.0	54.0
10	52.1	62.0	60.3	61.2	61.2	55.7	68.8	66.1	49.2	61.4	47.2	43.2
12	46.4	51.7	58.6	51.6	42.8*	31.1*	50.8*	53.5*	46.3	54.2	40.5	40.5
14	42.2	43.1	51.7*	45.1*		3.2	6.5	11.2	27.5*	45.7	32.4	32.4
16	33.8	43.1	36.2*	25.8					4.3	31.4*	21.6	29.7
18	26.7	32.7*	20.6	12.9						5.7	14.8	22.9
20	19.7	13.7	12.0	6.4							6.7	16.2
22	14.0	6.8	8.6	3.2							4.0	10.8
24	9.8	5.1	6.8								4.0	9.4
48	7.0	1.7	6.8								4.0	6.7
72		1.7	1.7								2.7	1.3
72											1.3	
Total Number	71	58	58	31	49	61	61	71	69	70	74	74
Average Daily Dark Hours	15.3	13.8	12.2	10.2	8.7	7.7	8.1	9.4	11.2	13.0	14.8	15.8

* denotes most frequent value

Table 6.11**

Average Monthly Cumulative Frequency Distribution (%) of the Duration of Inversions in the 35'-600' layer, Winnipeg C.B.C. Tower, October 1969- December 1971

Duration in Hours	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
4	94.9	96.6*	90.0	82.8	90.5	92.5	91.5	95.5	85.5	92.9	80.2*	86.3*
6	84.7*	81.6	76.6	68.5	83.0	76.1	85.0	88.2	71.0	80.2	67.1	68.4
8	66.1	70.0	66.6	60.0	69.8	64.1	76.6	82.3	62.3	73.2	57.8	54.7
10	59.3	58.3	58.3	51.4	60.3	55.2	76.6	75.0	56.5	66.1	46.0	46.5
12	55.9	50.0	56.6	42.8	45.2*	37.3*	63.3*	63.2*	52.1	56.3	35.5	38.3
14	47.4	41.6	50.0	40.0*	5.6	7.4	15.0	17.6	37.6*	47.8	30.2	35.6
16	44.0	40.0	38.3*	20.0					11.5	30.9*	23.6	35.6
18	33.8	30.0	21.6	14.2						9.8	14.4	30.1
20	32.2	16.5	11.6	2.8							6.5	27.3
22	20.3	11.6	8.3	2.8								
24	20.3	5.0	6.6	2.8							5.2	19.1
48	20.3*	5.0	6.6	2.8							5.2	16.4
72	1.6	3.3	3.3	2.8							2.6	15.0
72			1.6									
Total Number	59	69	60	35	53	67	60	68	69	71	76	73
Average Daily Dark Hours	15.3	13.8	12.2	10.2	8.7	7.7	8.1	9.4	11.2	13.0	14.8	15.8

* denotes most frequent value

** This table should be interpreted with caution due to the possibility of error at the 600' temperature sensor

Table 6.12

Average Monthly Cumulative Frequency Distribution (%) of the Duration of Inversions in the 35' - 810' layer, Winnipeg C.B.C. Tower, October 1969 - December 1971

Duration in Hours	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0*
4	90.1*	94.2	92.5	96.6*	90.0	93.6	94.7	93.9	87.3	88.0	93.3*	84.7*
6	75.4*	86.5	79.6	76.6	80.0	76.1	84.2	87.8	71.4	79.1	76.6	69.4
8	60.6	78.8*	68.5	70.0	68.0	65.0	78.9	80.3	63.4	71.6	65.0	58.3
10	55.7	63.4	64.8	60.0	56.0	53.9	71.9	71.2	58.7	65.6	56.6	47.2
12	47.5	53.8	59.2	46.6	36.0*	34.9*	52.6*	59.0*	47.6	59.7	45.0	43.0
14	45.9	48.0	51.8	40.0	4.0	4.7	10.5	18.1	34.9*	47.7*	38.3	41.6
16	32.7	44.2	35.1*	23.3				1.5	6.3	28.3*	28.3	40.2
18	27.8	32.6	14.8	6.6						8.9	16.6	33.3
20	24.5	21.1	11.1	3.3						1.4	10.0	30.5
22	21.3	13.4	7.4	3.3						1.4	5.0	22.2
24	19.6	11.5	5.5	3.3						1.4	5.0	18.0
48	19.6*	9.6	5.5	3.3						1.4	5.0	15.2
72	4.9	3.8	1.8	3.3							1.6	1.3
72	1.6										1.6	
Total Number	61	52	54	30	50	63	57	66	63	67	60	72
Average Daily Dark Hours	15.3	13.8	12.2	10.2	8.7	7.7	8.1	9.4	11.2	13.0	14.8	15.8

* denotes most frequent value

Table 6.13

Average Monthly Cumulative Frequency Distribution (%) of the Duration of Inversions in the 200'-400' layer, Winnipeg C.B.C. Tower, October 1969 - December 1971

Duration in Hours	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2	100.0	100.0*	100.0*	100.0	100.0	100.0	100.0	100.0	100.0*	100.0	100.0*	100.0
4	88.7*	81.9*	80.5	82.0*	81.4*	83.3*	78.7*	80.2	70.4	85.3*	71.8	74.4
6	61.9	63.8	65.6	53.8	51.8	54.5	53.0	63.1	45.0	60.0	53.5	50.0
8	49.2	48.6	52.2	43.5	25.9	39.3	37.8	50.0	35.2	52.0	40.8	39.5
10	42.2	34.7	41.7	35.8	12.9	21.2	27.2	39.4*	28.1	42.6	26.7	26.7
12	33.8	26.3	26.8	20.5	9.1	9.0	9.0	17.1	16.9	30.6	22.5	20.9
14	21.1	16.6	22.3	17.9	3.7	1.5		2.6	8.4	18.6	18.3	13.9
16	16.9	13.8	14.9	7.6					1.4	8.0	12.6	11.6
18	14.0	4.1	10.4	5.1						1.3	9.8	5.8
20	11.2	4.1	8.9	5.1							5.6	5.8
22	9.8	1.3	7.4	2.5							4.2	5.8
24	8.4	1.3	7.4	2.5							4.2	3.4
48	7.0	1.3	5.9	2.5							2.8	3.4
72											2.8	1.1
72												
Total Number	71	72	67	39	54	66	66	76	71	75	71	86
Average Daily Dark Hours	15.3	13.8	12.2	10.2	8.7	7.7	8.1	9.4	11.2	13.0	14.8	15.8

* denotes most frequent value

Table 6.14**

Average Monthly Cumulative Frequency Distribution (%) of the Duration of Inversions in the 200'-600' layer, Winnipeg C.B.C. Tower, October 1969 - December 1971

Duration in Hours	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0*	100.0*	100.0*	100.0
4	91.0*	86.9	82.3*	75.0	82.4*	82.4*	85.9*	80.8	79.1	84.0	80.2	80.8*
6	73.1	75.3	61.7	71.8	61.4	60.4	66.1	75.3	61.1	73.3	63.1	58.4
8	61.1	60.8	55.8	62.5	45.6	47.2	47.8	67.1	44.4	62.6	48.6	46.0
10	46.2	47.8*	47.0	53.1	28.0	29.7	35.2	53.4	37.5	54.6	35.5	40.4
12	40.2	31.8	42.6	43.7	10.5	18.9	16.9	28.7*	25.0	42.6	28.9	31.4
14	37.3	24.6	27.9	34.3	1.7	5.4	4.2	1.3	16.6	26.6	18.4	29.7
16	31.3	20.2	20.5	15.6				1.3	6.9	14.6	17.1	26.9
18	22.3	11.5	11.7	9.3						4.0	15.7	21.3
20	19.4	8.5	8.8	3.1							11.8	15.7
22	13.4	8.6	8.8	3.1							6.5	11.2
24	11.9	7.2	8.8	3.1							5.2	8.9
48	11.9	4.3	8.8	3.1							3.9	7.8
72	1.4		2.9	3.1							2.6	1.1
72	1.4										1.3	
Total Number	67	69	68	32	57	74	71	73	72	75	76	89
Average Daily Dark Hours	15.3	13.8	12.2	10.2	8.7	7.7	8.1	9.4	11.2	13.0	14.8	15.8

* denotes most frequent value

** This table should be interpreted with caution due to the possibility of error at the 600' temperature sensor

Table 6.15

Average Monthly Cumulative Frequency Distribution (%) of the Duration of Inversions in the 200'-810' layer, Winnipeg C.B.C. Tower, October 1969 - December 1971

Duration in Hours	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2	100.0	100.0*	100.0	100.0	100.0	100.0*	100.0	100.0	100.0	100.0	100.0	100.0*
4	83.3	78.1	89.7*	90.6*	82.6	72.2*	83.8	84.7*	87.0*	85.9	86.2*	80.5*
6	66.6*	68.7	63.2	68.7	63.0	54.5	59.6*	65.2	58.0	71.8*	62.0	61.1
8	47.2	50.0	47.0	62.5	41.3*	39.3	33.8	48.6	45.1	56.2	51.7	56.9
10	37.5	48.4	36.7	43.7	19.5*	21.2	24.1	33.3	33.8	48.4	44.8	43.0
12	33.3	35.9	23.5	34.3	10.8	10.6	3.2	18.0	24.1	40.6	36.2	37.5
14	27.7	28.1	17.6	18.7		1.5	3.2	2.7	12.9	26.5	25.8	34.7
16	22.2	20.3	16.1	6.2					6.4	12.5	20.6	34.7
18	15.2	14.0	10.2	6.2						3.1	13.7	29.1
20	15.2	10.9	7.3	3.1							6.8	29.1
22	15.2	9.3	7.3	3.1							5.1	22.2
24	13.8	7.8	5.8	3.1							5.1	18.0
48	13.8	7.8	5.8	3.1							5.1	13.8
72		1.5	1.4	3.1							1.7	1.3
72			1.4									
Total Number	72	64	68	32	46	66	62	72	62	64	58	72
Average Daily Dark Hours	15.3	13.8	12.2	10.2	8.7	7.7	8.1	9.4	11.2	13.0	14.8	15.8

* denotes most frequent value

Table 6.16**

Average Monthly Cumulative Frequency Distribution (%) of the Duration of Inversions in the 400'-600' layer, Winnipeg C.B.C. Tower, October 1969 - December 1971

Duration in Hours	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2	100.0*	100.0*	100.0	100.0*	100.0*	100.0	100.0	100.0	100.0	100.0	100.0*	100.0*
4	76.6	81.3	82.1*	75.5	69.8	89.0	77.7	88.6	83.5*	84.1*	70.2	76.5
6	57.5	69.3	57.8	59.1	47.9	68.2	60.4*	72.1	62.6	57.4	51.4	53.9
8	42.2	52.0	41.0	42.8	38.3	50.0*	51.8	59.4	46.1	47.5	40.5	41.7
10	32.3	45.3	32.6	30.6	21.9	28.0	28.3	43.0*	31.8	36.6	31.6	33.9
12	27.2	34.6	25.2	24.4	10.9	15.8	13.5	18.9	20.8	28.7	25.7	24.3
14	20.2	26.6	16.8	16.3	4.1	7.3	4.9	2.5	14.2	19.8	19.8	22.6
16	15.1	24.0	12.6	10.2	1.3		1.2	1.2	5.4	8.9	15.8	19.1
18	13.1	17.3	8.4	6.1	1.3			1.2	2.1	2.9	11.8	17.3
20	10.1	12.0	7.3	4.0	1.3			1.2			6.9	14.7
22	9.0	12.0	5.2	4.0				1.2			5.9	11.3
24	9.0	10.6	5.2	4.0				1.2			4.9	10.4
48	8.0	9.3	5.2	4.0				1.2			4.9	7.8
72			1.0								1.9	0.8
72											0.9	
Total Number	99	75	95	49	73	82	81	79	91	101	101	115
Average Daily Dark Hours	15.3	13.8	12.2	10.2	8.7	7.7	8.1	9.4	11.2	13.0	14.8	15.8

* denotes most frequent value

**This table should be interpreted with caution due to the possibility of error at the 600' temperature sensor

Table 6.17

Average Monthly Cumulative Frequency Distribution (%) of the Duration of Inversions in the 400'- 810' layer, Winnipeg C.B.C. Tower, October 1969 - December 1971

Duration in Hours	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2	100.0	100.0*	100.0	100.0*	100.0	100.0	100.0	100.0*	100.0	100.0	100.0	100.0
4	78.4*	79.6*	75.3*	76.4	77.2*	74.1*	66.6*	70.5	77.4*	81.5*	80.7*	82.0*
6	47.7	59.3	48.0	58.8	47.7	41.3	31.7	45.5	40.8	56.9	55.1	58.9
8	36.3	50.0	31.1	44.1	29.5	25.3	15.8	30.8	25.3	46.1	42.3	53.8
10	28.4	40.6	18.1	26.4	11.3	12.0	6.3	17.6	16.9	32.3	39.7	41.0
12	23.8	31.2	16.8	17.6		6.8		8.8	8.4	24.6	25.6	34.6
14	17.0	21.8	11.6	11.7		1.7		2.9	4.2	15.3	19.2	33.3
16	14.7	15.6	9.0						2.8	4.6	16.6	30.7
18	11.3	14.0	7.7							1.5	11.6	28.2
20	9.0	12.5	6.4							1.5	6.4	25.6
22	6.8	10.9	5.1							1.5	5.1	17.9
24	5.6	9.3	3.8							1.5	2.5	15.3
48	5.6	6.2	3.8							1.5	2.5	8.9
72												
72												
Total Number	88	64	77	34	44	58	63	68	71	65	78	78
Average Daily Dark Hours	15.3	13.8	12.2	10.2	8.7	7.7	8.1	9.4	11.2	13.0	14.8	15.8

* denotes most frequent value

Table 6.18**

Average Monthly Cumulative Frequency Distribution (%) of the Duration of Inversions in the 600-810' layer, Winnipeg C.B.C. Tower, October 1969 - December 1971

Duration in Hours	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2	100.0	100.0*	100.0*	100.0*	100.0*	100.0	100.0*	100.0*	100.0	100.0*	100.0	100.0
4	70.1*	63.7	58.7	59.0	55.1	66.6*	48.0	56.4	67.5*	68.0	64.8*	74.4
6	37.6	36.2	28.5	40.9	31.0	20.8	24.0	28.2	25.0	46.8	28.3	53.1
8	29.8	13.0	19.0	18.1	10.3	12.5	4.0	12.8	25.5	25.5	22.9	37.2
10	14.2	11.5	12.6	13.6	3.4	8.1		7.6	7.5	12.7	12.1	25.5
12	11.6	5.7	4.7	9.0		4.1			2.5	2.1	5.4	18.0
14	7.7	5.7	4.7	4.5							2.7	14.8
16	6.4	4.3	3.1								1.3	12.7
18	5.1	2.8	1.5								1.3	10.6
20	3.8	2.8										9.5
22	3.8	1.4										4.2
24	2.5											2.1
48	2.5											1.0
72												
72												
Total Number	77	69	63	22	29	24	25	39	40	47	74	94
Average Number of Dark Hours	15.3	13.8	12.2	10.2	8.7	7.7	8.1	9.4	11.2	13.0	14.8	15.8

* denotes most frequent value

**This table should be interpreted with caution due to the possibility of error at the 600' temperature sensor

Table 6.19

Average Intensity of Lapse Rates (^{o}F) during Inversions, Winnipeg C.B.C. Tower, October 1969 - December 1971

Height Interval	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
35-200	22.3	24.8	32.6	20.5	18.9	21.6	22.6	26.0	21.2	22.3	21.7	18.1
35-400	13.8	15.9	20.0	14.8	11.6	13.9	14.5	17.3	14.3	15.4	14.8	12.8
35-600*	10.7	12.0	14.2	10.7	8.5	10.0	10.3	12.7	10.5	11.8	11.5	12.1
35-810	8.3	9.3	12.4	8.1	6.5	7.4	7.2	9.2	8.0	9.1	8.3	9.5
200-400	10.7	11.9	13.0	11.5	8.8	10.2	11.4	14.1	11.8	13.0	13.4	14.2
200-600*	8.4	9.1	9.4	8.5	6.3	7.3	7.4	9.8	8.7	9.5	9.7	10.4
200-810	6.9	7.2	7.4	6.2	5.2	5.4	5.6	7.5	6.7	7.8	7.6	9.7
400-600*	8.3	8.6	7.7	7.3	5.4	6.5	5.7	7.7	7.1	7.9	8.1	10.3
400-810	7.2	7.1	6.8	6.4	5.5	5.3	4.7	6.2	6.1	7.5	7.1	8.8
600-810*	7.6	7.9	7.8	7.2	7.2	6.1	6.2	8.5	7.5	8.1	9.4	

* Values for these levels should be treated with caution due to the possibilty of error at the 600' temperature level

Table 6.20

Maximum Intensity of Inversions in $^{o}F/1000'$, by Heights and Months,

Winnipeg C.B.C. Tower, Oct. 1969 - Dec. 1971

	35'-200'	200' 400'	400'-600'*	600'-810'*	35'-400'	35'-600'*	35'-810'	200'-600'*	200'810'	400'-810'
Jan	-92.7	-56.2	-64.8	-33.7	-51.2	-36.9	-28.8	-40.1	-30.4	-41.3
Feb	-100.6	-64.7	-63.4	-57.5	-58.0	-40.2	-30.2	-40.9	-30.4	-40.9
Mar	-139.7	-78.9	-48.4	-41.9	-74.3	-54.3	-42.4	-47.7	-31.2	-33.8
Apr	-116.8	-50.9	-74.9	-25.1	-66.9	-48.1	-34.3	-40.3	-32.7	-47.3
May	-106.7	-57.9	-54.0	-41.1	-49.4	-32.2	-22.8	-33.9	-26.7	-28.7
Jun	-112.8	-48.7	-43.3	-34.0	-58.8	-38.5	-26.7	-34.9	-25.1	-26.4
Jul	-85.3	-45.4	-45.3	-32.0	-44.4	-34.8	-28.6	-41.4	-31.3	-30.9
Aug	-80.9	-52.6	-53.8	-47.1	-48.3	-35.3	-24.9	-40.5	-27.5	-33.5
Sep	-92.9	-64.9	-56.7	-27.4	-54.2	-37.8	-30.2	-38.6	-27.5	-30.8
Oct	-105.9	-60.1	-50.7	-51.2	-61.9	-46.9	-33.5	-42.7	-37.3	-38.3
Nov	-111.4	-68.8	-61.4	-47.8	-59.1	-47.6	-35.0	-43.6	-34.8	-37.7
Dec	-80.6	-63.2	-82.3	-56.8	-58.4	-48.5	-35.4	-55.4	-43.5	-46.0
Annual	-139.7	-78.9	-82.3	-57.5	-74.3	-54.3	-42.4	-55.4	-43.5	-47.3

*Values for these levels should be treated with caution due to the possibility of error at the 600' temperature sensor

TABLE 6.21

Observed Maximum Temperature Differences

by Layers in the Lower 810'.

LAYER	MAXIMUM TEMPERATURE DIFFERENCE °F.
35 - 810'	32.9
35 - 600'	30.9
35 - 400'	25.0
35 - 200'	22.7
200 - 400'	15.8
200 - 600'	Not available
200 - 810'	Not available
400 - 600'	16.5
600 - 810'	11.5

Table 6. 22

Maximum Values of Lapse Rates (°F/1000') During Inversions (-ve L.R.) for Each Month,
Winnipeg C.B.C.Tower, Oct. 1969 - Dec. 1971

(a) 35'-200' Layer

	1969						1970						1971					
	Year L.R. Value	Hr.	Day	Sky	Wind 35'	Wind 810'	L.R. Value	Hr.	Day	Sky	Wind 35'	Wind 810'	L.R. Value	Hr.	Day	Sky	Wind 35'	Wind 810'
Month																		
Jan.							-74.4	7	19	1/10 F	240/5	310/16	-92.7	1	21	1/10 Ci	180/10	210/16
Feb.							-91.9	8	4	10/10 As	350/08	330/16	100.6	4	22	0/10	170/7	250/14
Mar.							-139.7	4	16	12,000 0/10	180/12	240/22	-88.6	2	29	0/10	280/8	320/21
Apr.							-116.8	7	1	1/10 Ci	160/10	250/20	-82.9	4	5	0/10	190/9	220/18
May							-65.3	4	23	2/10 Ac	30/8	190/7	106.7	3	27	0/10	190/8	230/23
Jun.							-78.7	5	3	2/10 Ac, Ci	180/9	210/21	112.8	5	1	0/10	330/7	
Jul.							-85.3	5	25	0/10 Ci	200/6	210/12	-75.8	2	2	1/10 Ac, Ci	140/8	160/20
Aug.							-80.9	5	31	1/10 Ac	180/6	180/16	-75.9	4	28	0/10	180/11	240/11
Sep.							-92.9	1	19	1/10 Ci	180/6	220/10	-92.6	6	2	1/10 Ac	220/4	190/8
Oct.	-63.9	4	28		170/07	180/29	-105.9	7	17	0/10	290/9	320/22	-76.4	6	6	1/10 F	290/8	320/12
Nov.	-79.6	21	6		40/8	90/9	-59.5	19	5	0/10	200/8	230/15	111.4	23	9	2/10 F, St	40/01	20/5
Dec.	-71.5	6	20		170/07	240/18	-69.2	3	31	5/10 Sc, Ac	130/8	190/10	-80.6	4	2	0/10	190/11	260/10

(b) 35'-400' Layer

Jan.							-43.7	7	19	1/10 F	240/05	310/16	-51.2	6	17	0/10	360/7	310/6
Feb.							-58.0	3	7	0/10	340/08	20/20	-56.2	8	23	0/10 Ci	170/8	250/11
Mar.							-74.3	7	20	7/10	210/05	290/22	-38.1	2	29	0/10	280/8	320/21
Apr.							-66.9	7	1	1/10 Ci	160/10	250/20	-46.9	6	5	0/10 Ci	190/9	230/20
May							-36.5	2	23	1/10 Ac	20/8	190/10	-49.4	3	27	0/10	190/8	230/23
Jun.							-47.8	4	4	0/10 Ci	290/8	50/18	-58.8	4	2	1/10 Sc, Ac	200/8	250/22
Jul.							-44.4	4	25	1/10 Ci	200/6	210/12	-40.3	5	30	2/10 Ac, Ci	210/7	260/13
Aug.							-47.6	6	5	0/10	220/5	290/15	-48.3	2	28	0/10	180/8	240/12
Sep.							-53.4	6	18	1/10 Ci	220/6	270/18	-54.2	6	2	1/10 Ac	220/4	190/8
Oct.	-34.9	5	28		170/09	180/30	-61.9	6	17	0/10	270/10	320/18	-60.3	4	10	1/10 Cs	290/6	300/11
Nov.	-42.8	7	4		300/8	350/24	-40.0	7	5	0/10	270/6	300/1	-59.1	1	10	5/10 F	10/2	360/9
Dec.	-48.1	6	20		170/07	240/18	-40.5	5	31	1/10 Ac	120/12	150/19	-58.4	6	2	1/10 Ci	180/14	240/20

Wind is expressed as Direction/Speed (Degrees/M.P.H.); Sky Cover is in Tenths of Sky Obscurity.

Table 6.23

Maximum Values of Lapse Rates (°F/1000) During Inversions (-ve L.R.) for Each Month,
Winnipeg C.B.C. Tower, Oct. 1969 - Dec. 1971

(a) 35'-600' Layer *

Year	1969						1970						1971					
Month	I.R. Value	Hr.	Day	Sky	Wind 35'	Wind 810'	L.R. Value	Hr.	Day	Sky	Wind 35'	Wind 810'	L.R. Value	Hr.	Day	Sky	Wind 35'	Wind 810'
Jan.							-36.9	7	19	1/10 F	240/05	310/16	-34.3	6	17	0/10	360/7	310/6
Feb.							-39.0	3	7	0/10	340/08	20/20	-40.2	6	23	0/10	170/11	230/21
Mar.							-54.3	4	16	0/10	180/12	240/22	-31.4	8	4	4/10 Ac, Ci	170/10	170/11
Apr.							-48.1	7	1	1/10 Ci	160/10	250/20	-37.1	7	7	1/10 Ci	110/10	150/34
May							-25.3	2	23	1/10 Ac	20/8	190/10	-32.2	3	27	0/10	190/8	230/23
Jun.							-36.4	1	6	1/10 Ci	190/14	250/25	-38.5	4	2	1/10 F, Ci	200/8	250/22
Jul.							-29.3	4	25	1/10 Ci	180/7	220/11	-34.8	2	31	6/10 Ac, Ci	190/11	240/44
Aug.							-33.8	6	5	0/10	220/5	280/15	-35.3	5	28	1/10 Ci	180/9	260/12
Sep.							-37.8	7	18	2/10 Ac, Ci	210/4	260/12	-36.7	6	2	1/10 Ac	220/11	190/8
Oct.	-22.8	7	28		180/08	200/32	-40.0	6	16	0/10	150/8	200/22	-46.9	2	10	3/10 Sc	220	300/14
Nov.	-31.9	5	6		200/07	350/18	-28.0	22	5	0/10	210/7	210/22	-47.6	23	10	2/10 F, St	20	270/25
Dec.	-34.8	1	20		180/05	230/4	-33.2	5	31	1/10 Ac	120/12	150/19	-48.5	8	2	1/10 Ci	17	240/23

(b) 35'-810' Layer

Jan.							-28.8	7	19	1/10 F	-36, 240/05	310/16	-26.7	1	19	0/10	150/9	190/14
Feb.							-30.2	1	23	0/10	200/11	260/30	-29.9	6	23	0/10	170/11	230/21
Mar.							-42.4	4	16	0/10	180/12	240/22	-24.0	7	4	1/10 Ci	170/10	210/8
Apr.							-34.3	7	1	1/10 Ci	160/10	250/20	-28.9	7	7	1/10 Ci	110/10	150/34
May							-17.7	3	23	2/10 Ac	30/8	190/7	-22.8	5	9	2/10 Ci	150/16	200/43
Jun.							-25.3	1	6	1/10 Ci	190/14	250/25	-26.7	4	2	1/10 F, Ci	200/8	250/22
Jul.							-21.0	3	9	0/10	170/11	200/39	-28.6	3	31	9/10 Ac	230/8	270/39
Aug.							-24.9	5	21	5/10 Ac, Ci	110/6	170/39	-24.3	5	28	1/10 Ci	110/10	260/1
Sep.							-30.2	3	19	0/10 Ci	130/11	190/19	-25.4	6	2	1/10 Ac	220/4	190/8
Oct.	-18.7	7	28		180/08	200/32	-31.3	4	5	2/10 Ci	160/10	200/17	-33.5	2	10	3/10 Sc	220/7	300/10
Nov.	-24.7	5	6		200/07	350/18	-20.1	22	5	0/10	210/9	260/20	-35.0	23	10	2/10 F, St	200/10	270/25
Dec.	-34.9	2	16		170/22	230/32	-25.6	5	31	1/10 Ac	120/12	150/19	-35.4	49	2	3/10 Ac, Ci	170/12	230/30

Wind is Expressed as Direction / Speed (Degrees/M.P.H.); Sky is in Tenths of Sky Obscurity

Values for the 35 - 600' layer may be Approximately 2.2°F. too low and should be treated with caution

Table 6.24

Maximum Values of Lapse Rates (°F/1000') During Inversions (-ve L.R.) For Each Month,

Winnipeg C.B.C. Tower, Oct. 1969 - Dec. 1971

200'-400' Layer

Year	1969						1970						1971					
Month	L.R. Value	Hr.	Day	Sky	Wind 35'	Wind 810'	L.R. Value	Hr.	Day	Sky	Wind 35'	Wind 810'	L.R. Value	Hr.	Day	Sky	Wind 35'	Wind 810'
Jan.							-56.2	9	19	2/10 Ac, F, IF,	270/11	320/18	-55.3	10	7	1/10 Ci	150/15	180/31
Feb.							-45.2	4	7	0/10	20/12	20/22	-64.7	5	15	9/10 F, IF	150/10	130/23
Mar.							-78.5	7	21	3/10 Ci	150/10	140/14	-50.5	8	4	0/10 Ci	170/10	170/11
Apr.							-50.0	10	1	1/10 Ci	150/10	210/18	-50.9	8	5	0/10 Ci	210/11	230/31
May							-31.8	2	23	1/10 Ac	20/8	190/10	-57.9	6	9	1/10 Ci	160/16	190/36
Jun.							-48.7	4	4	0/10 Ci	290/8	50/18	-41.6	23	1	0/10	140/10	240/12
Jul.							-42.1	6	16	1/10 Ci	250/7	290/16	-45.4	23	30	3/10 Ci	180/12	210/34
Aug.							-49.2	6	11	4/10 Sc, Ac, Ci		190/25	-52.6	7	28	7/10 Ac, Ci	190/6	240/11
Sep.							-64.9	8	18	1/10 Ci	210/4	260/12	-53.9	5	7	0/10	140/10	180/29
Oct.	-36.5	7	28		180/8	200/32	-55.9	2	19	0/10	150/12	180/42	-60.1	7	13	10/10 Ac	180/10	200/25
Nov.	-40.3	3	6		180/7	290/19	-54.2	8	5	0/10	250/6	300/6	-68.8	5	30	2/10 F, IF	300/3	160/14
Dec.	-56.9	4	16		180/22	230/40	-53.1	7	12	5/10 Ac, Ci	170/16	250/27	-63.2	6	24	1/10 Ci	180/14	240/20

400'-810' Layer

Jan.							-35.0	0	25	10/10 F, IF	200/08	240/08	-40.3	12	7	0/10		
Feb.							-40.9	8	23	2/10 Ac	200/21	240/48	-33.3	8	25	8/10 Ac		
Mar.							-33.8	10	17	1/10 Ci	170/22	180/44	-33.6	7	31	10/10 F, IF, St		
Apr.							-13.8	9	1	1/10 Ci	160/08	210/19	-47.3	9	7	1/10 Ci		
May							-13.1	8	2	9/10 Sc, Ac	180/22	200/42	-28.7	20	9	8/10 Sc, Ac, As		
Jun.							-26.4	2	8	4/10 Ci	160/12	170/41	-22.3	4	11	4/10 Ac, St		
Jul.							-27.7	5	9	2/10 Cb, Ac	170/12	210/33	-30.9	1	31	1/10 Ci		
Aug.							-33.5	7	21	9/10 Ac, Cs	130/10	150/34	-25.3	7	21	3/10 Sc, Ci, Ac		
Sep.							-25.8	9	30	1/10 Ci	160/12	200/12	-30.8	7	7	1/10 Ci		
Oct.	-14.2	23	28		140/12	160/47	-38.3	4	5	2/10 Ci	160/10	200/17	-31.0	8	21	5/10 Ci		
Nov.	-37.7	10	27		180/20	220/31	-28.2	6	25	10/10 Fs, Sc	150/21	140/32	-32.6	14	30	2/10 Ci		
Dec.	-46.0	2			170/22	230/32	-41.4	10	29	0/10	150/21	170/30	-42.7	10	2	3/10 Ci		

Wind is Expressed as Direction/Speed (Degrees/M.P.H.); Sky is in Tenths of Sky Obscurity

TABLE 6.25

Average Wind Speed and Wind Shear during Maximum Inversions.

LAYER	35' WIND	WIND SHEAR	810' WIND
35 - 200'	7.7	8.5	16.2
35 - 400'	7.6	6.3	13.9
35 - 600'	8.6	10.2	18.8
35 - 810'	10.0	13.0	23.0
200 - 400'	10.3	11.4	21.7
400 - 600'	11.9	5.4	17.3
600 - 810'	15.1	14.1	29.2

TABLE 6.26

Frequency of Occurrence of Maximum Inversion by Time of Day.

TIME PERIOD	LAYER (Heights in Feet) 35-200	35-810	200-400	400-600	600-810'
2300 - 400	17	17	9	7	11
0500 - 1000	7	8	16	14	10
1100 - 1600	0	0	0	3	3
1700 - 2300	3	2	2	3	3

TABLE 7.1

Generalized Airflow Types Affecting Winnipeg

WINTER	SUMMER
N. airflow from Arctic Ocean (cA)	N. airflow from Arctic Ocean (mP - mA)
NW flow from the Yukon (mP_{NW})	N. airflow from the Yukon (mP_{nw})
W flow from S. Alberta (mP_{w})	W flow from S. Alberta (mP_{w})
SW flow from Montana (mP_{sw})	SW flow from Montana (mP_{sw})
	S/SE flow from U.S.A. (mT)

Table 7.2

List of Days Selected for Detailed Analysis

Period	Dates
1	14th. - 18th. January, 1972
2	23rd. - 26th. January, 1972
3	17th. - 19th. February, 1971
4	27th. - 30th. July, 1971
5	10th. - 19th. August, 1970

Figure 7.1

Fig. 7.1 WEATHER OF JANUARY 14, 1972

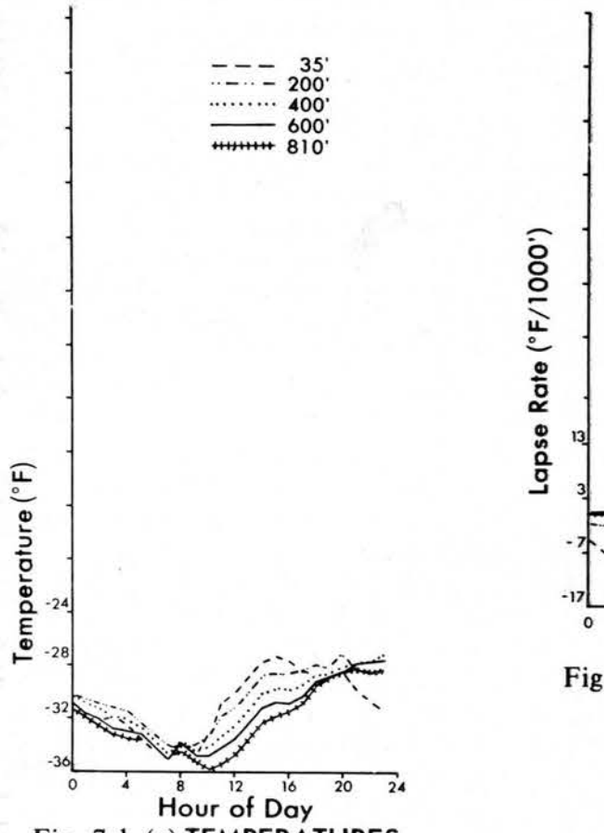


Fig. 7.1 (a) TEMPERATURES

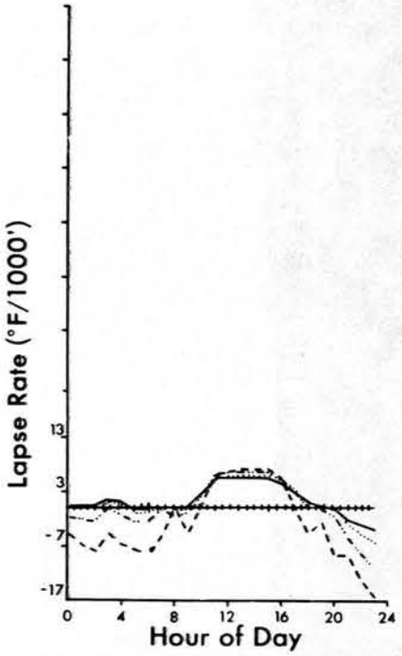


Fig. 7.1 (b) LAPSE RATES

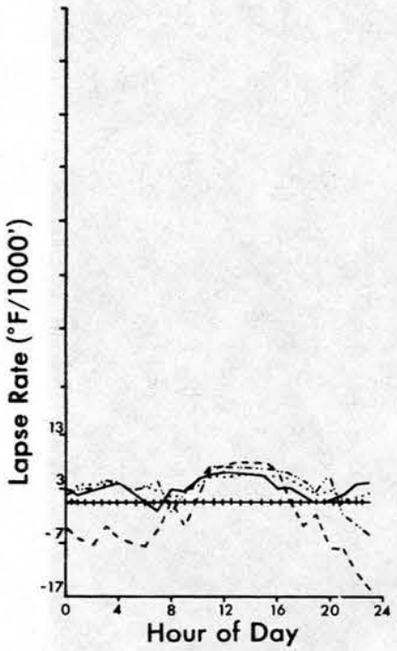


Fig. 7.1 (c) LAPSE RATES

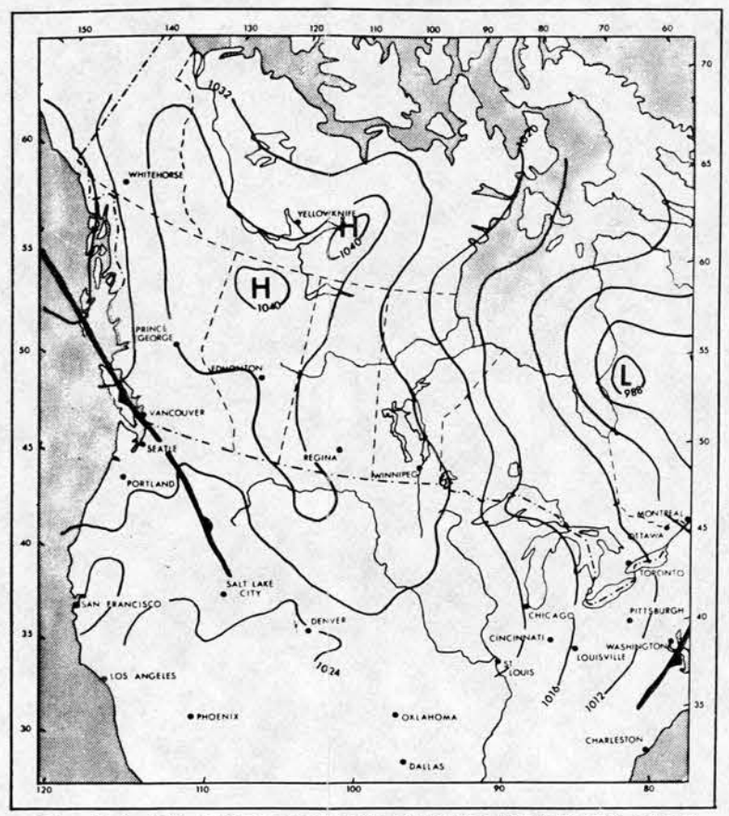


Fig. 7.1 (d) ABSTRACT OF DAILY WEATHER MAP

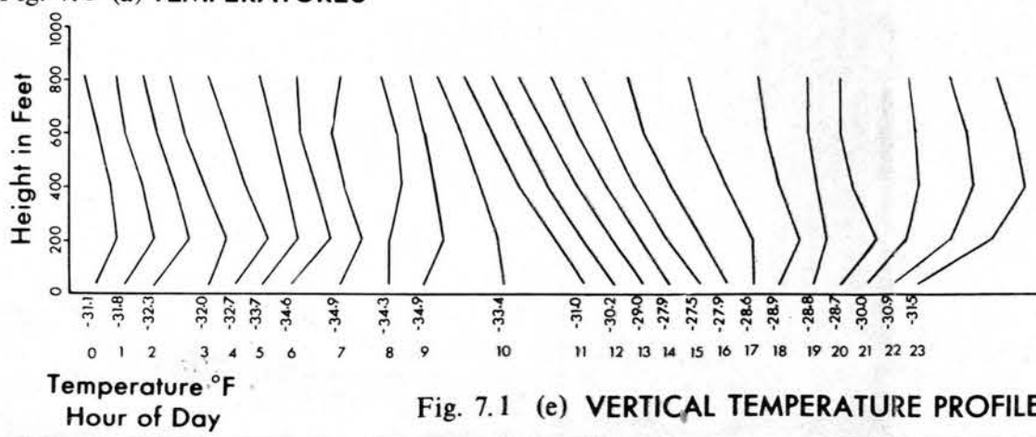


Fig. 7.1 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.2

Fig. 7.2 WEATHER OF JANUARY 15, 1972

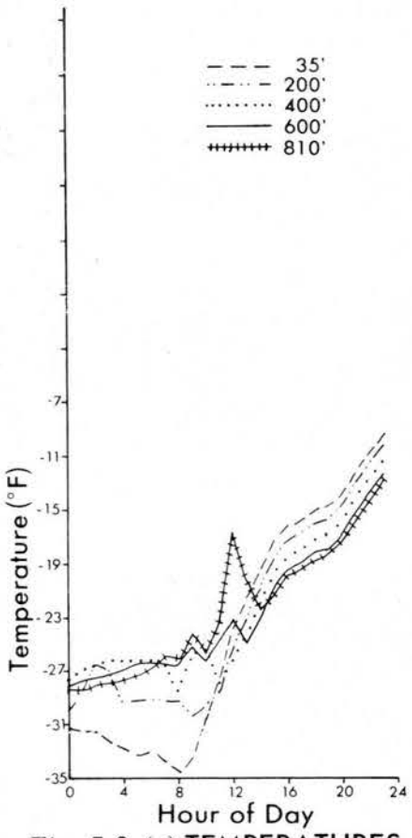


Fig. 7.2 (a) TEMPERATURES

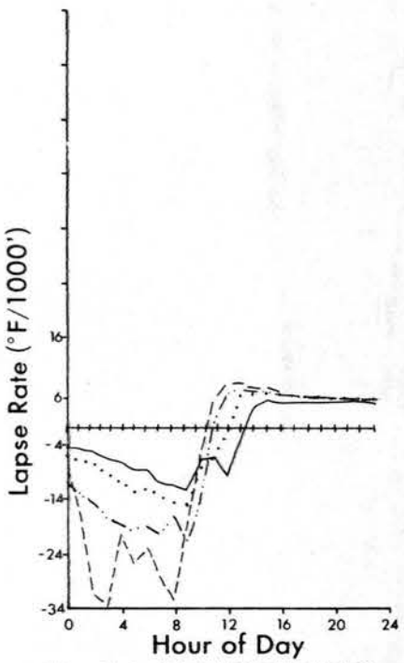


Fig. 7.2 (b) LAPSE RATES

35-200'
35-400'
35-600'
35-810'

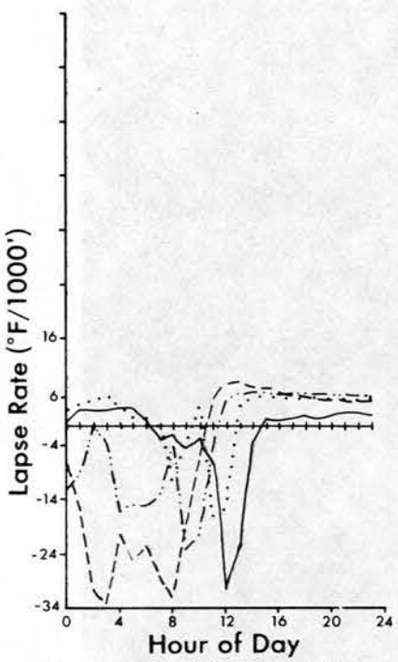


Fig. 7.2 (c) LAPSE RATES

35-200'
200-400'
400-600'
600-810'

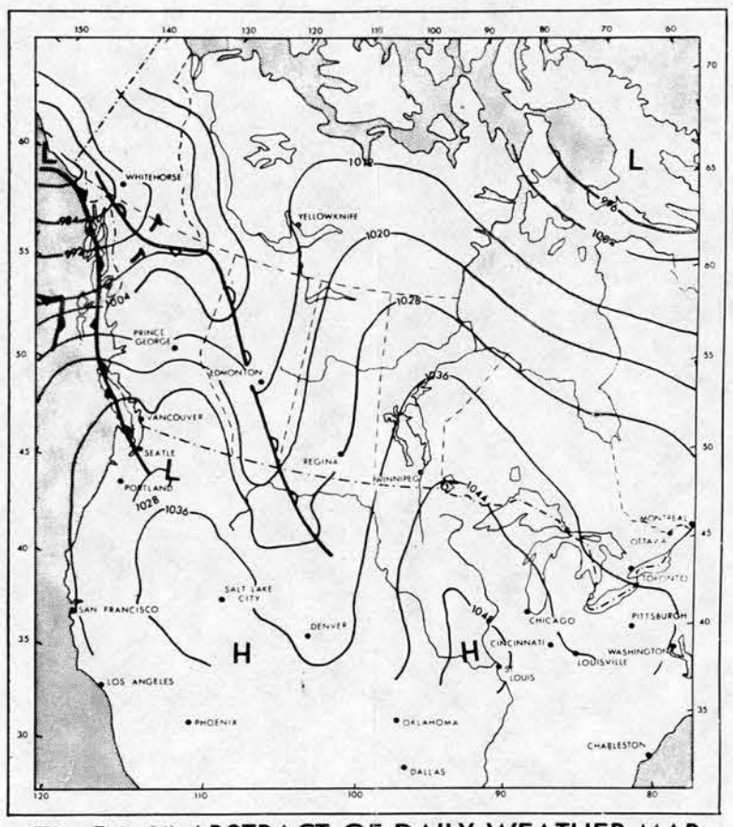


Fig. 7.2 (d) ABSTRACT OF DAILY WEATHER MAP

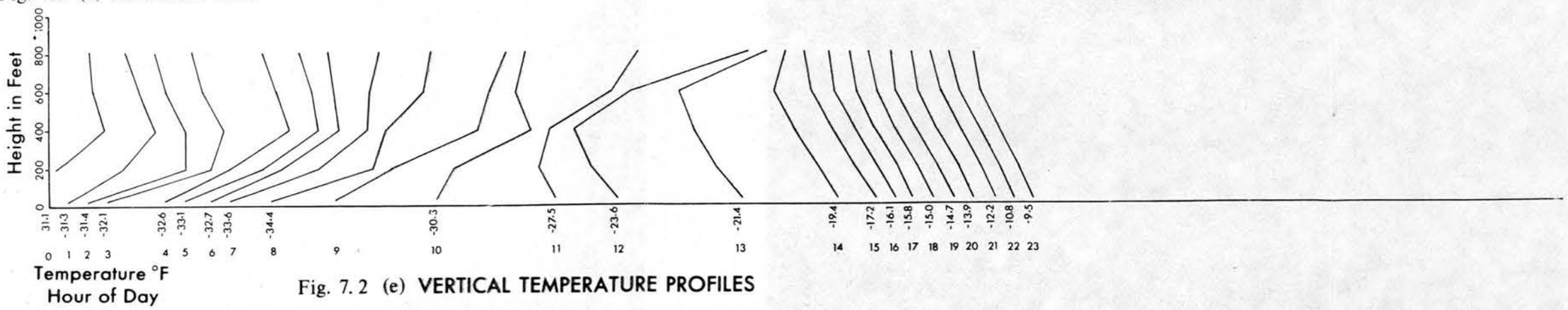


Fig. 7.2 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.3

Fig. 7.3 WEATHER OF JANUARY 16, 1972

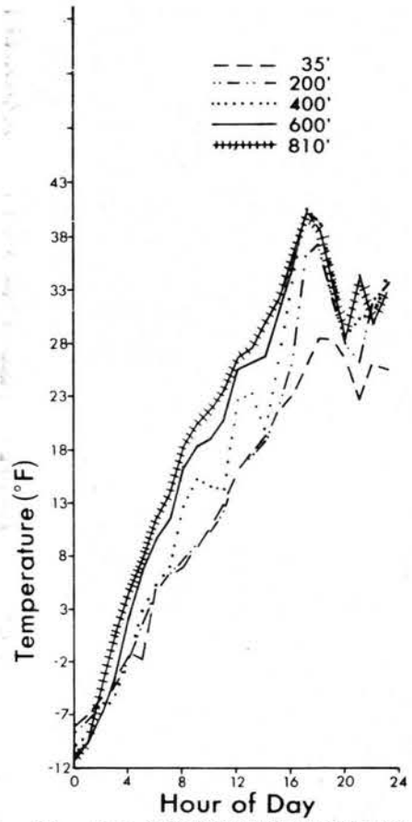


Fig. 7.3 (a) TEMPERATURES

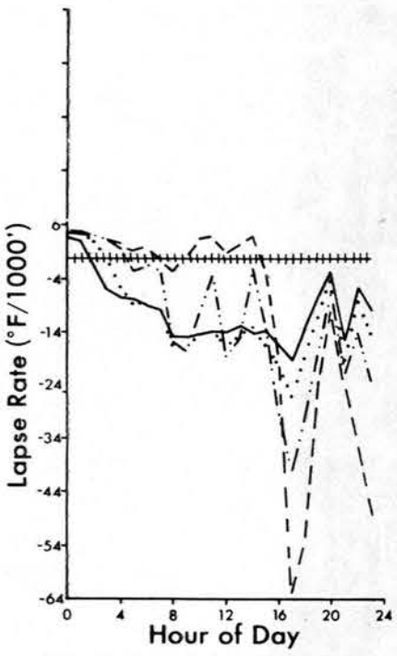


Fig. 7.3 (b) LAPSE RATES

35-200'
35-400'
35-600'
35-810'

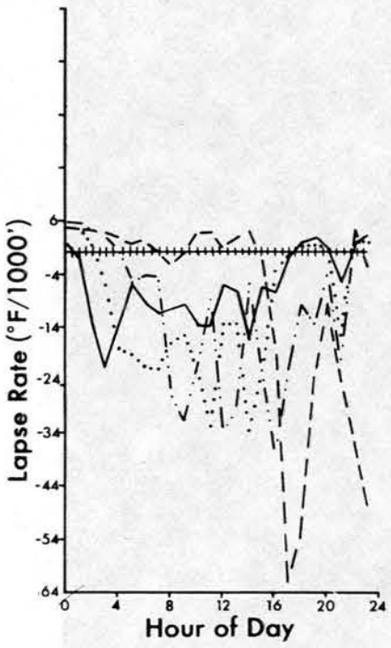


Fig. 7.3 (c) LAPSE RATES

35-200'
200-400'
400-600'
600-810'

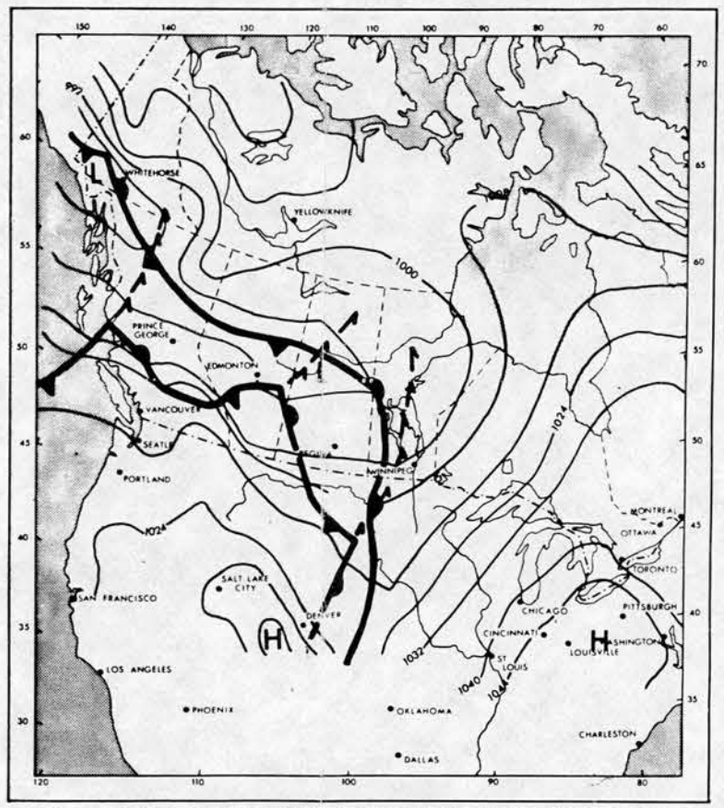


Fig. 7.3 (d) ABSTRACT OF DAILY WEATHER MAP

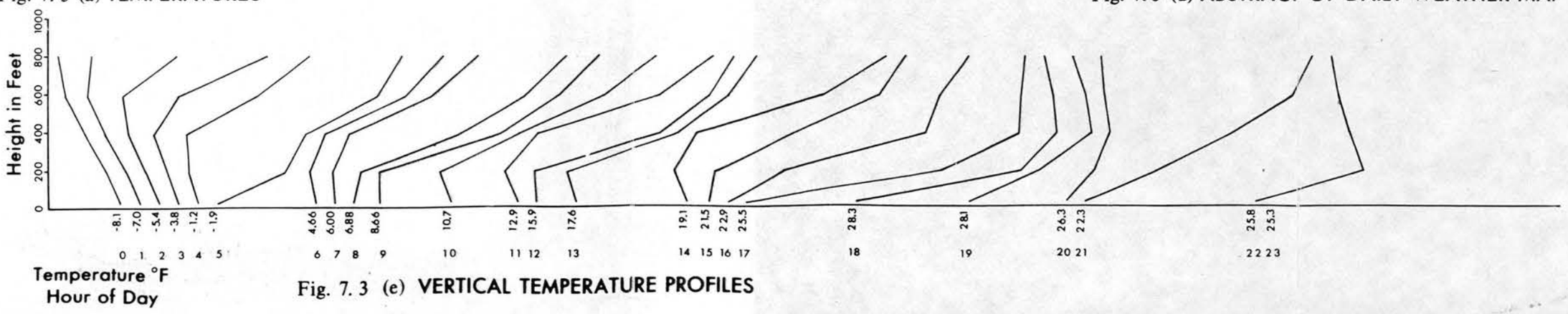


Fig. 7.3 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.4

Fig. 7.4 WEATHER OF JANUARY 17, 1972

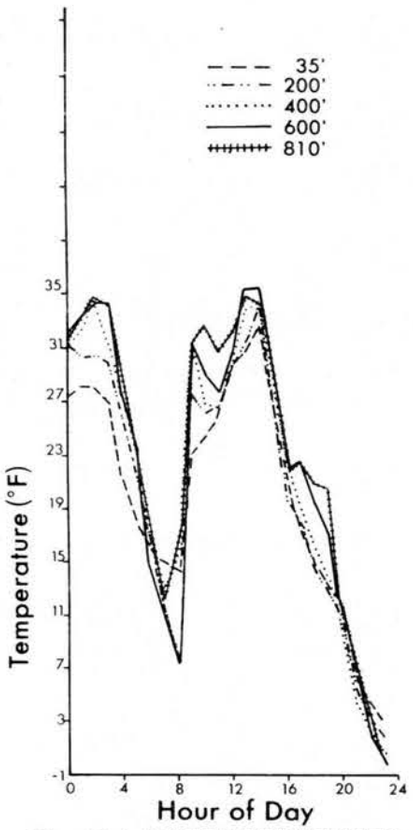


Fig. 7.4 (a) TEMPERATURES

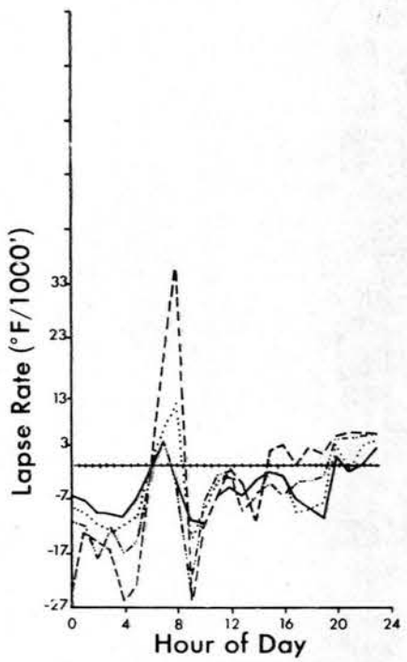


Fig. 7.4 (b) LAPSE RATES

35-200'
35-400'
35-600'
35-810'

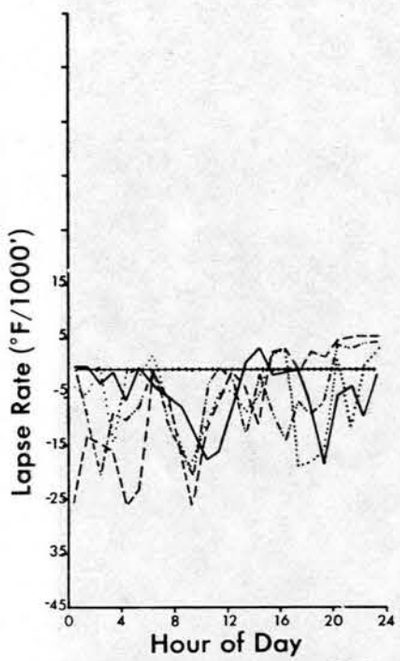


Fig. 7.4 (c) LAPSE RATES

35-200'
200-400'
400-600'
600-810'

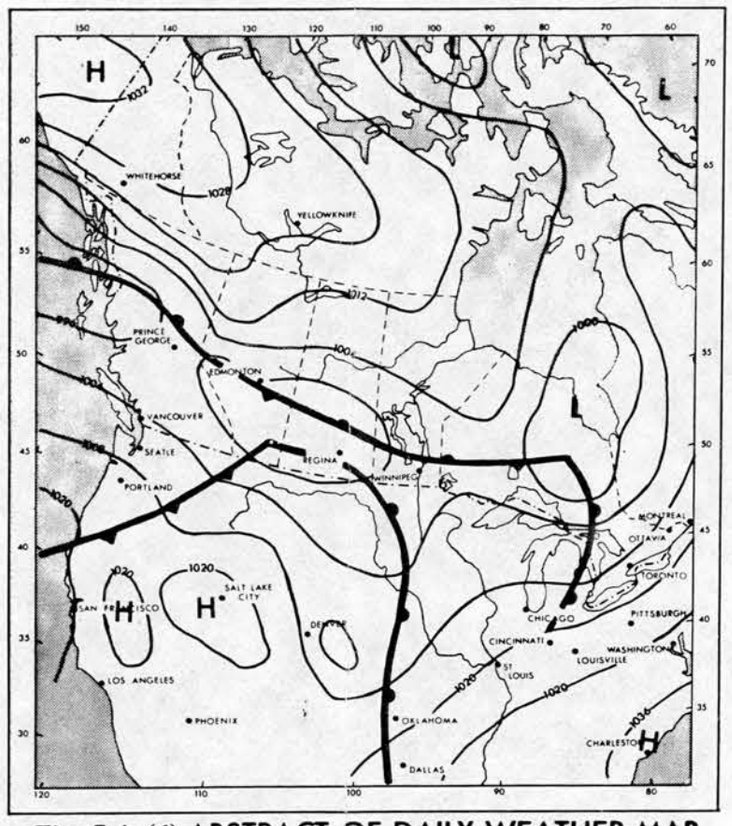


Fig. 7.4 (d) ABSTRACT OF DAILY WEATHER MAP

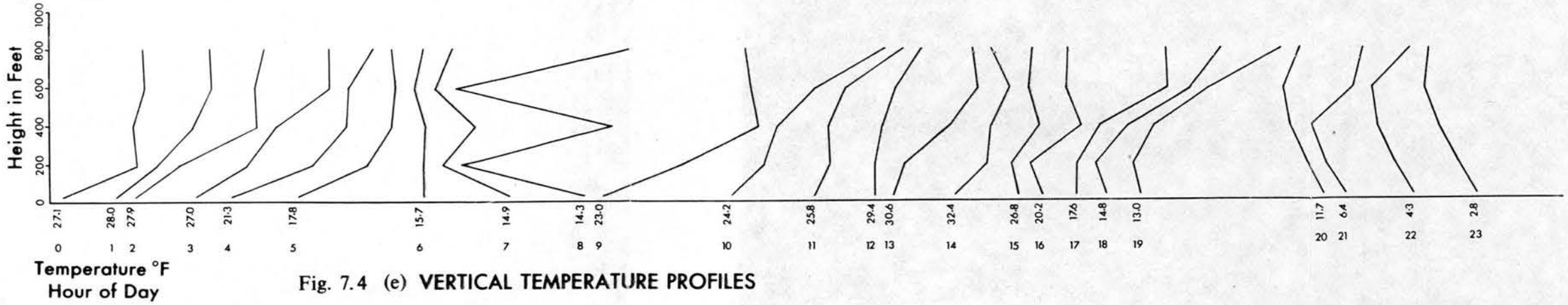


Fig. 7.4 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.5

Fig. 7. 5 WEATHER OF JANUARY 18, 1972

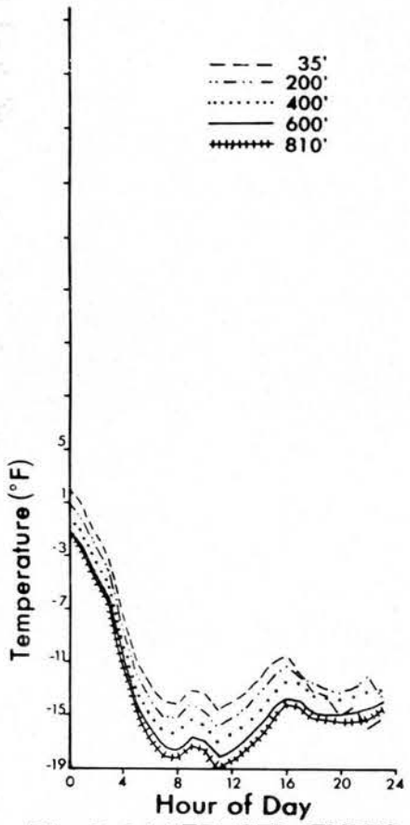


Fig. 7. 5 (a) TEMPERATURES

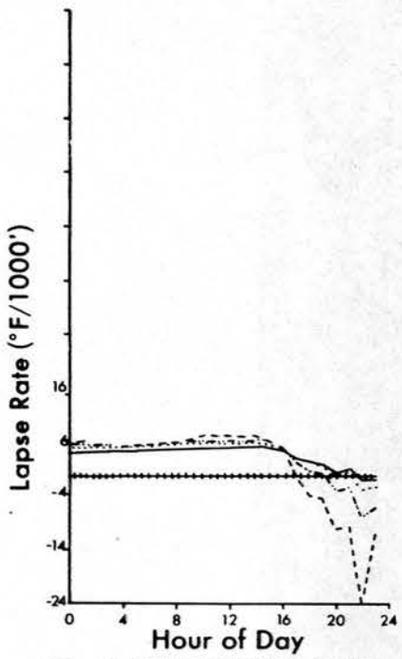


Fig. 7. 5 (b) LAPSE RATES

35-200'
35-400'
35-600'
35-810'

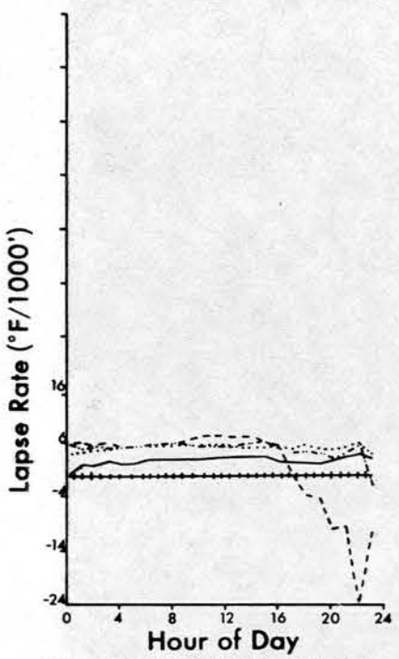


Fig. 7. 5 (c) LAPSE RATES

35-200'
200-400'
400-600'
600-810'

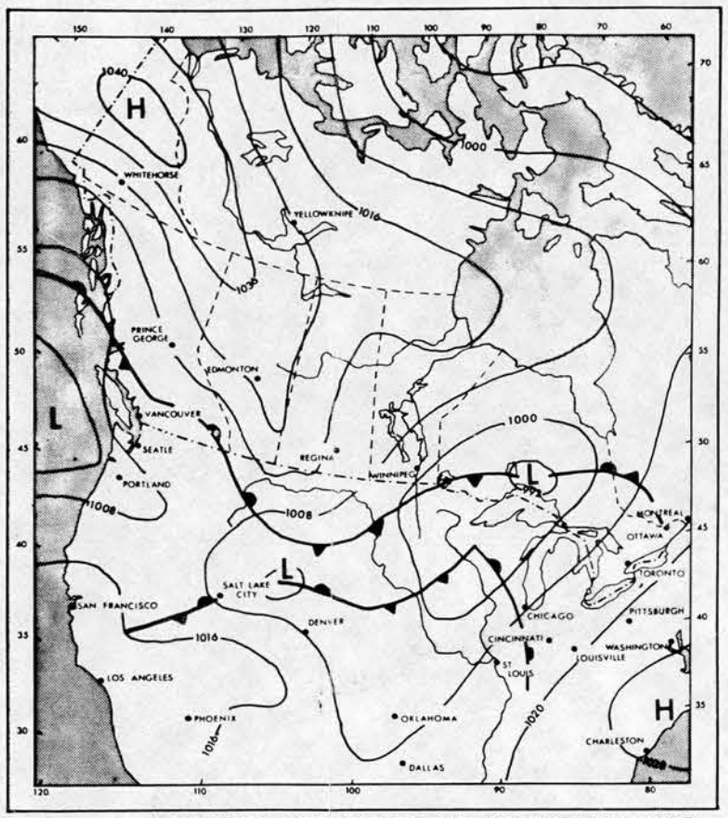


Fig. 7.5 (d) ABSTRACT OF DAILY WEATHER MAP

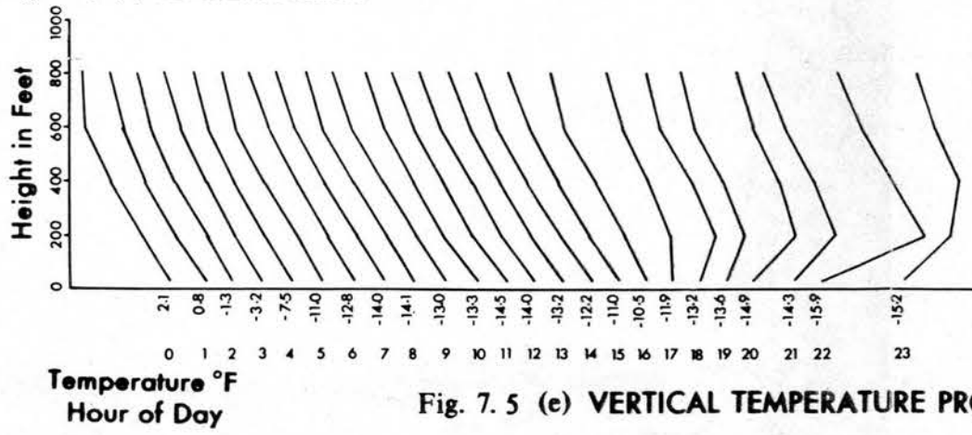


Fig. 7. 5 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.6

Fig. 7.6 WEATHER OF JANUARY 23, 1972

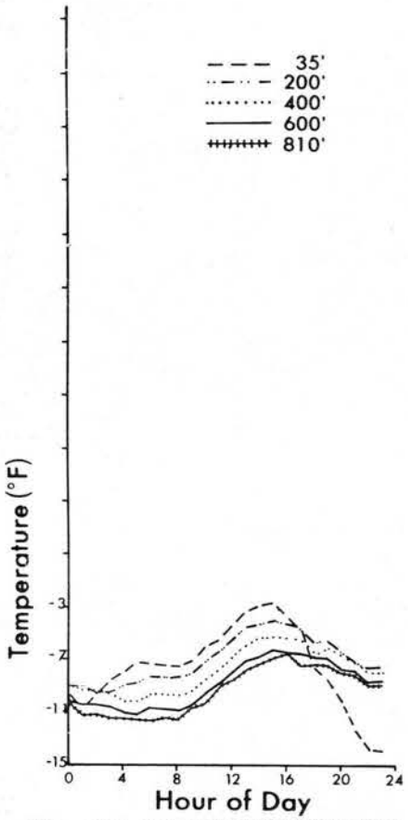


Fig. 7.6 (a) TEMPERATURES

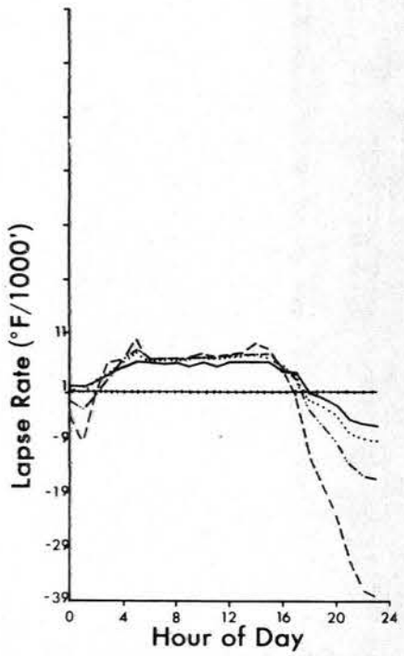
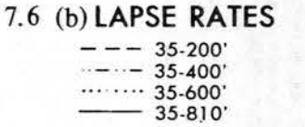


Fig. 7.6 (b) LAPSE RATES



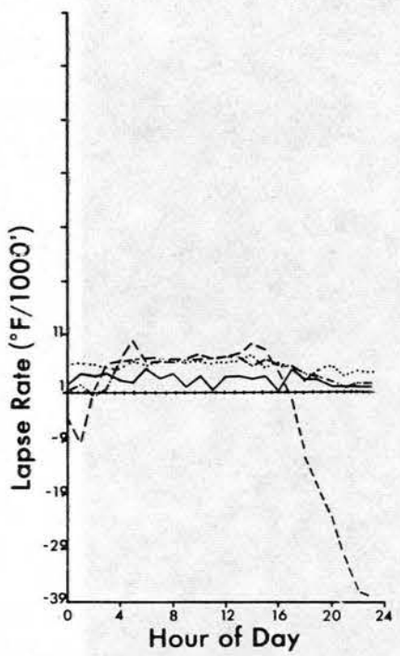
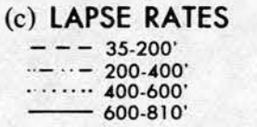


Fig. 7.6 (c) LAPSE RATES



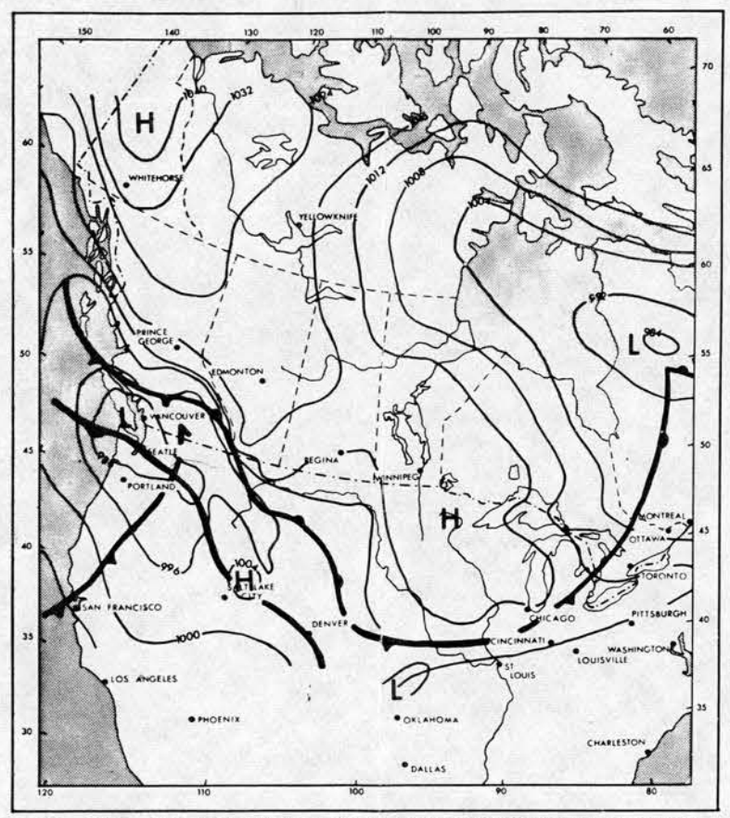


Fig. 7.6 (d) ABSTRACT OF DAILY WEATHER MAP

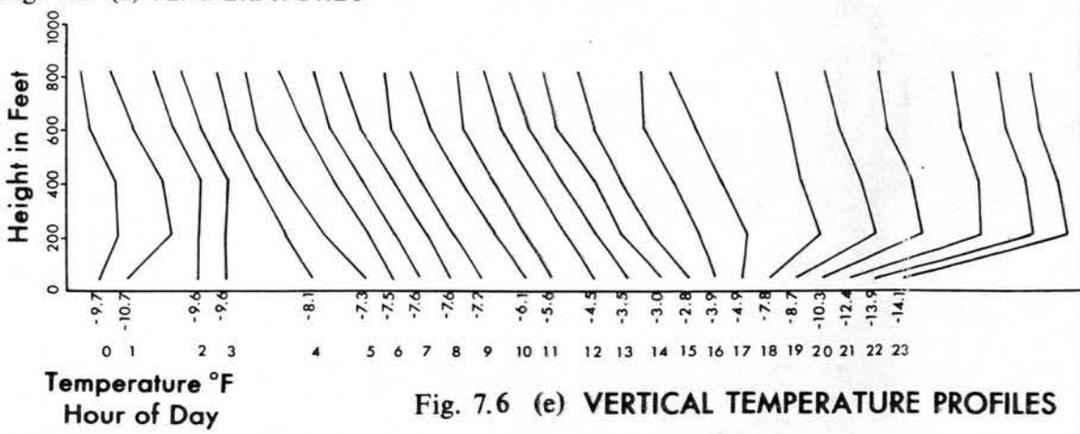


Fig. 7.6 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.7

[redacted]

Fig. 7.7 WEATHER OF JANUARY 24, 1972

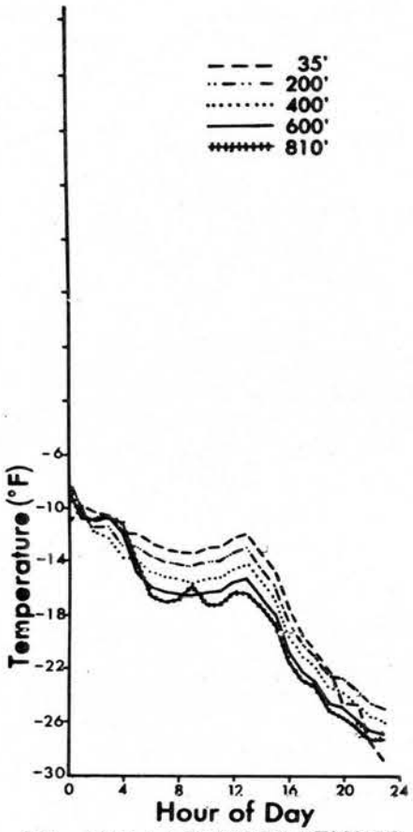


Fig. 7.7 (a) TEMPERATURES

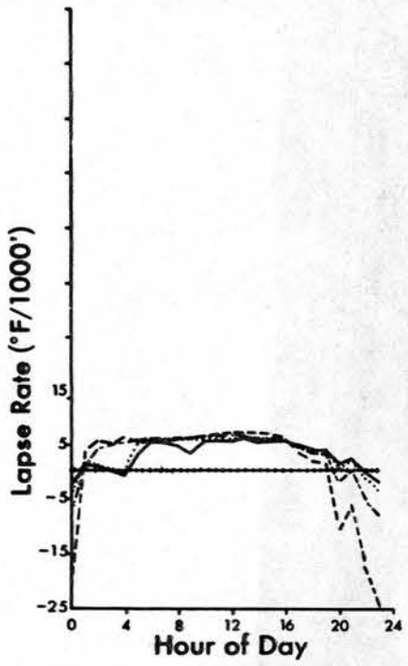
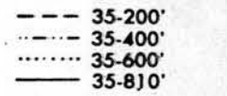


Fig. 7.7 (b) LAPSE RATES



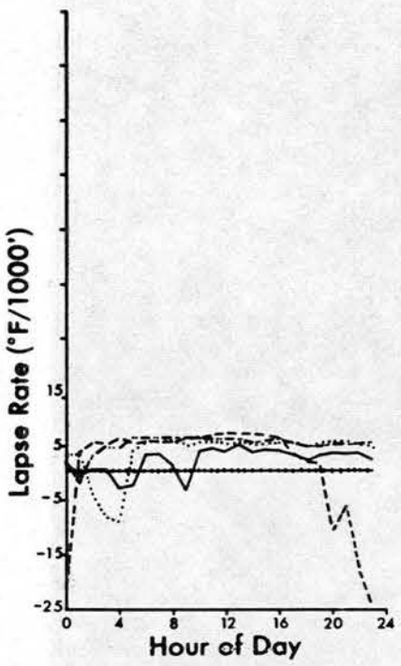
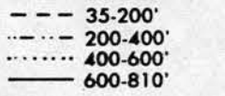


Fig. 7.7 (c) LAPSE RATES



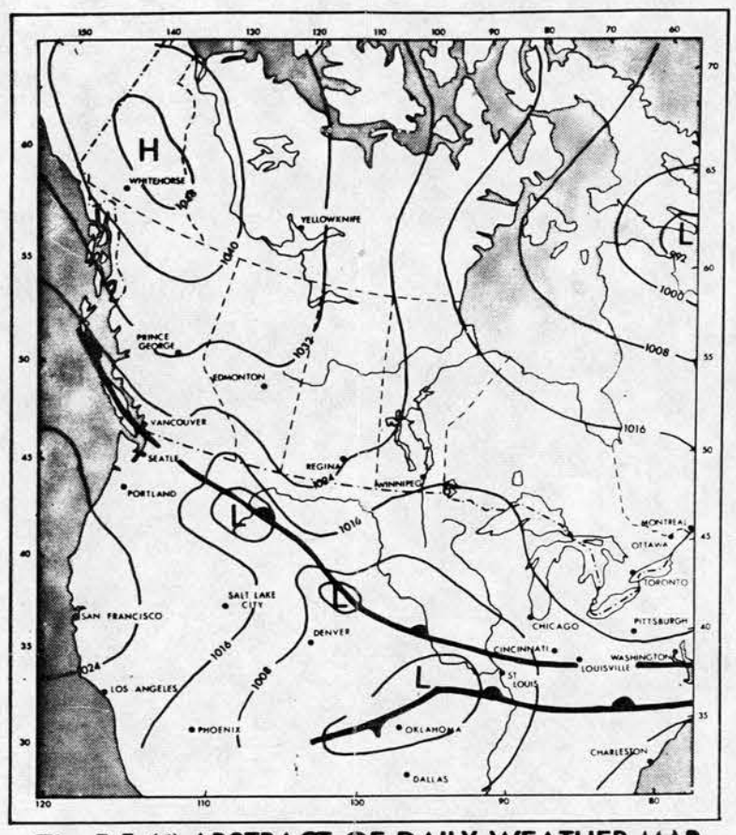


Fig. 7.7 (d) ABSTRACT OF DAILY WEATHER MAP

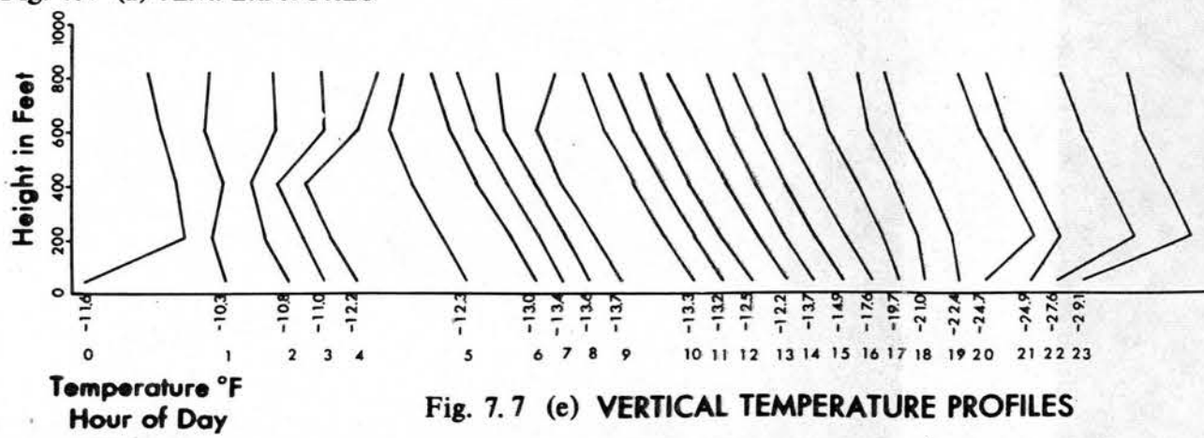


Fig. 7.7 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.8

Fig. 7.8 WEATHER OF JANUARY 25, 1972

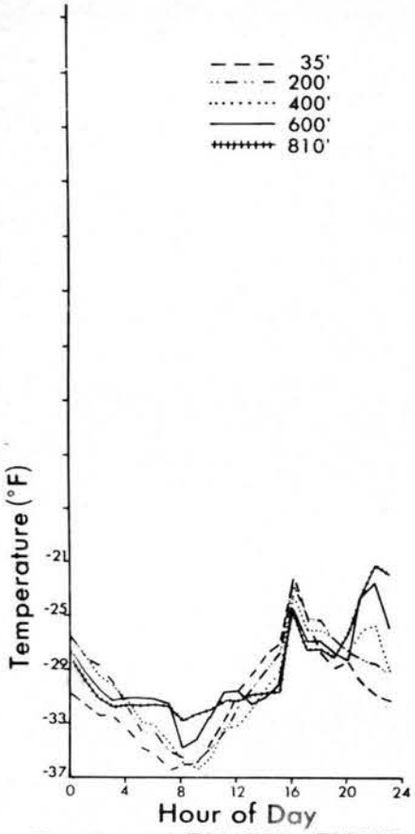


Fig. 7.8 (a) TEMPERATURES

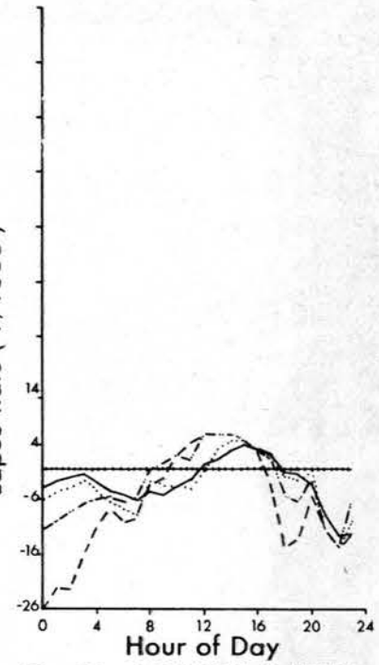


Fig. 7.8 (b) LAPSE RATES

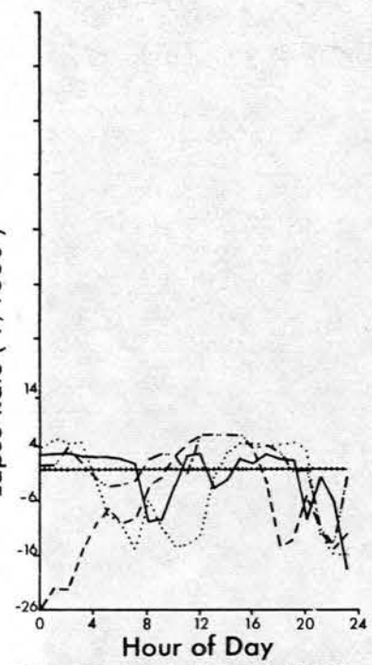
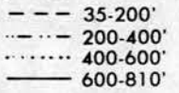


Fig. 7.8 (c) LAPSE RATES



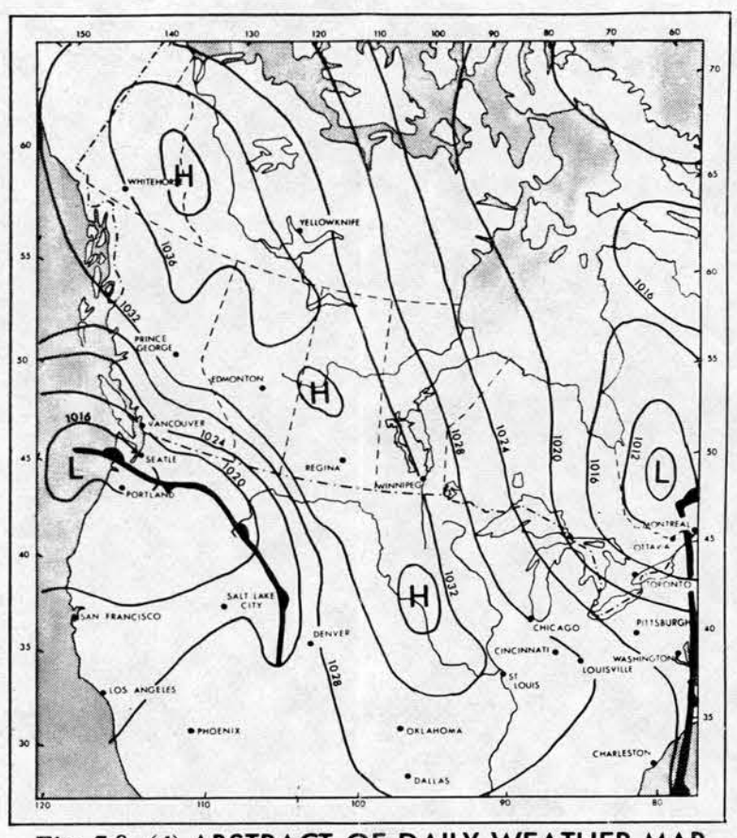


Fig. 7.8 (d) ABSTRACT OF DAILY WEATHER MAP

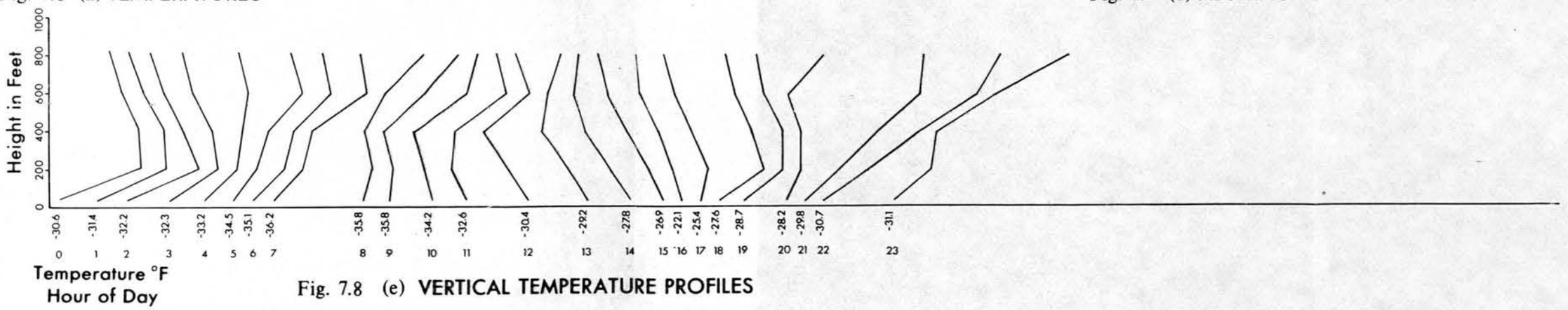


Fig. 7.8 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.9

Fig. 7. 9 WEATHER OF JANUARY 26, 1972

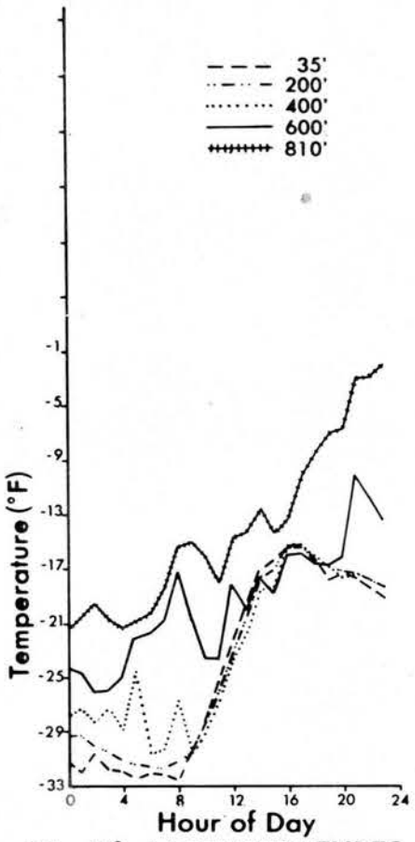


Fig. 7.9 (a) TEMPERATURES

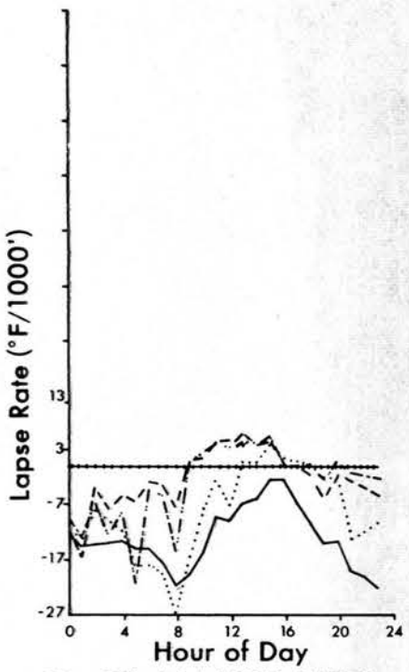


Fig. 7.9 (b) LAPSE RATES

35-200'
35-400'
35-600'
35-810'

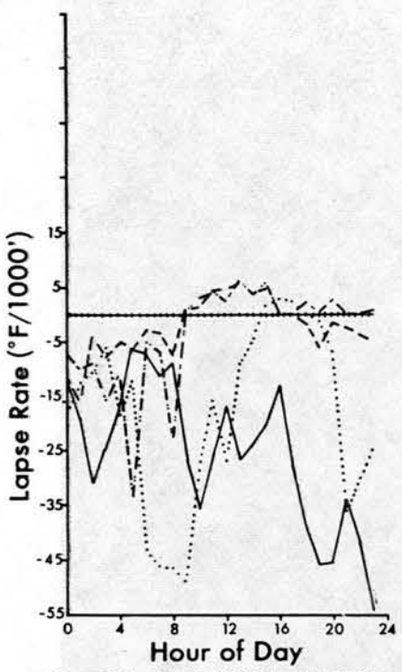


Fig. 7.9 (c) LAPSE RATES

35-200'
200-400'
400-600'
600-810'

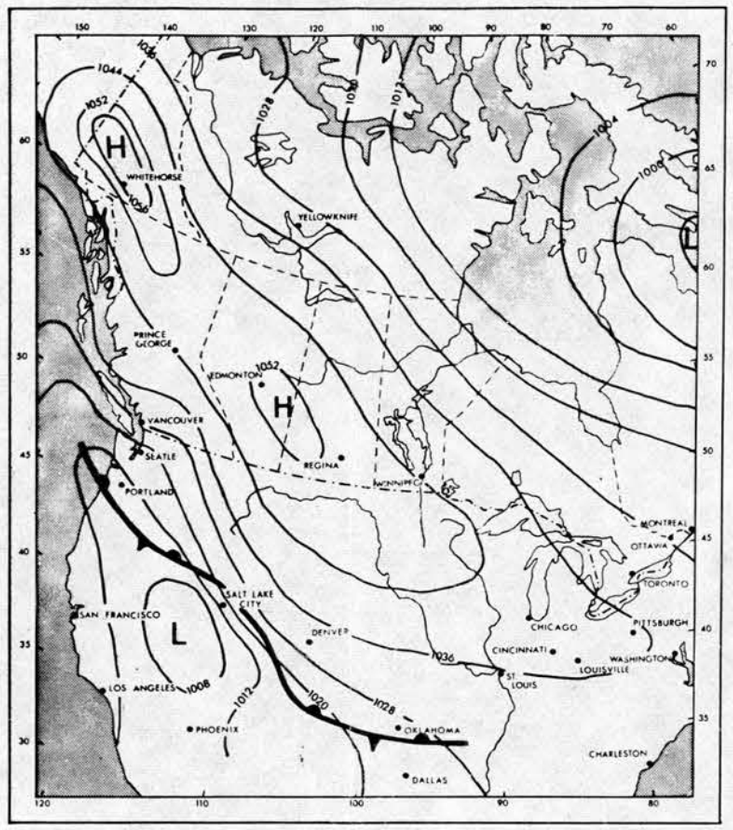


Fig. 7.9 (d) ABSTRACT OF DAILY WEATHER MAP

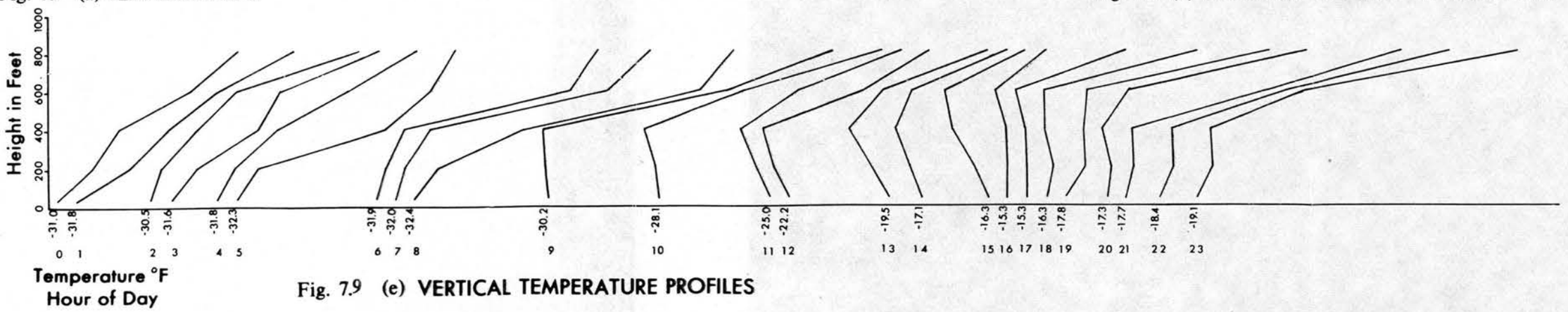


Fig. 7.9 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.10

Fig. 7.10 WEATHER OF FEBRUARY 16, 1971

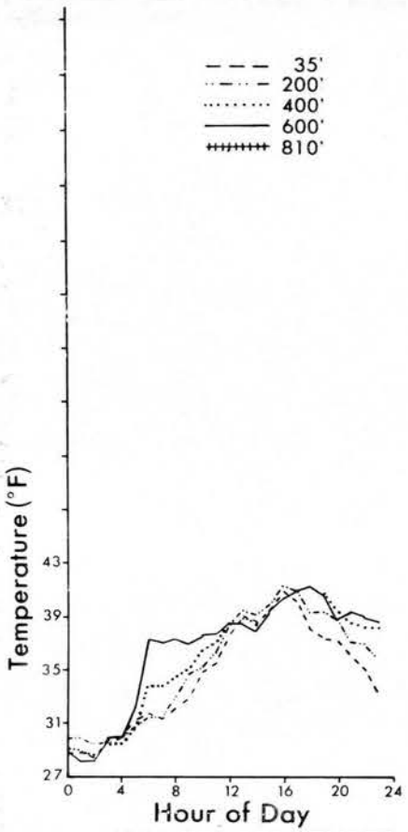


Fig. 7.10 (a) TEMPERATURES

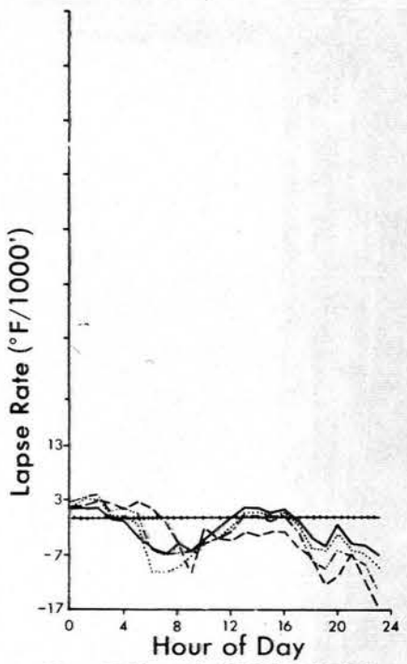


Fig. 7.10 (b) LAPSE RATES

35-200'
35-400'
35-600'
35-810'

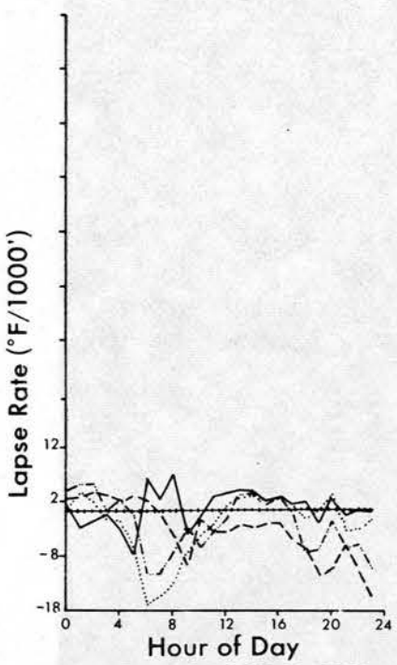


Fig. 7.10 (c) LAPSE RATES

35-200'
200-400'
400-600'
600-810'

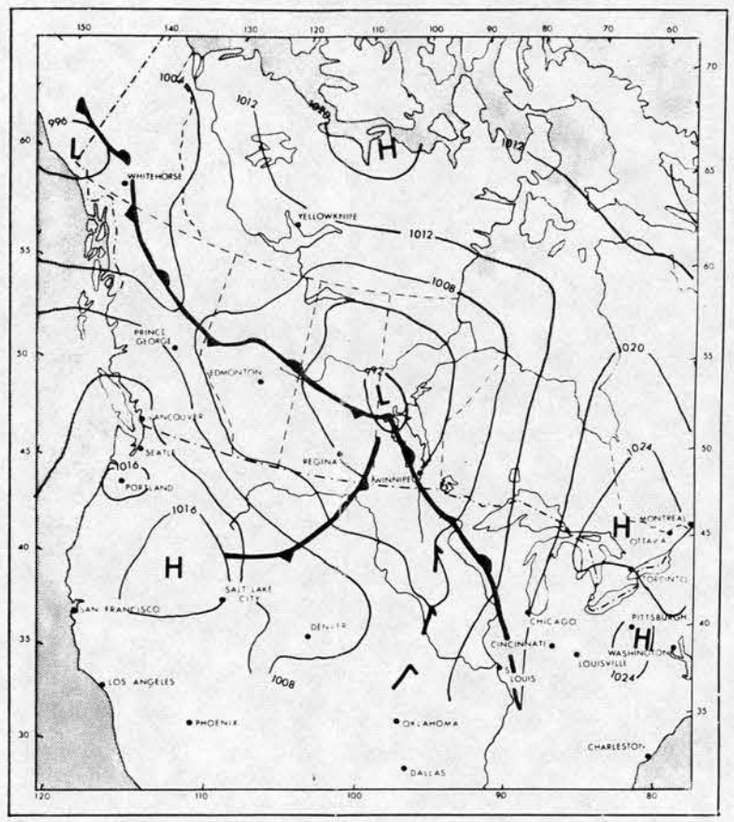


Fig. 7.10 (d) ABSTRACT OF DAILY WEATHER MAP

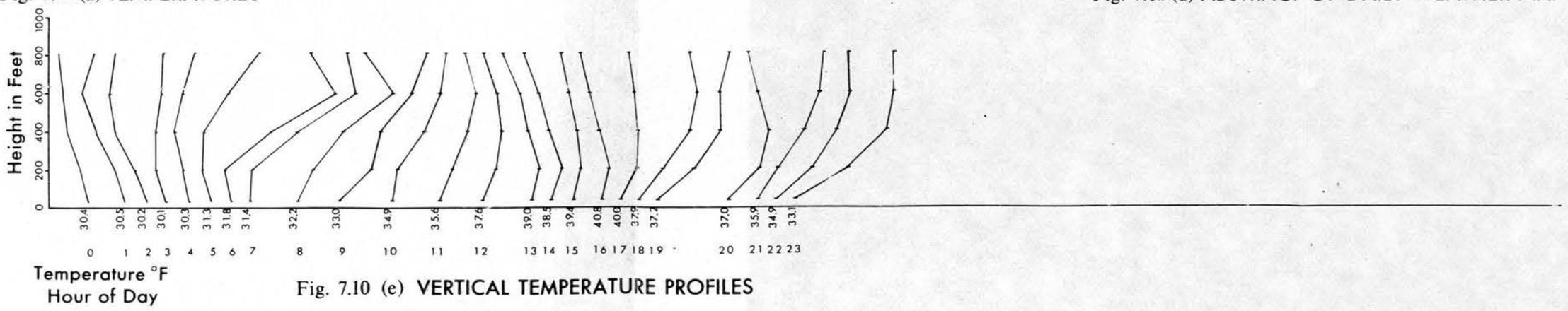


Fig. 7.10 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.11

Fig. 7.11 WEATHER OF FEBRUARY 17, 1971

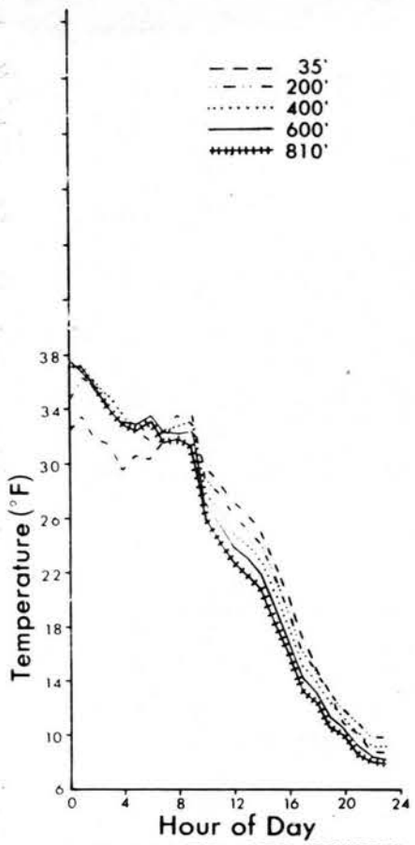


Fig. 7.11 (a) **TEMPERATURES**

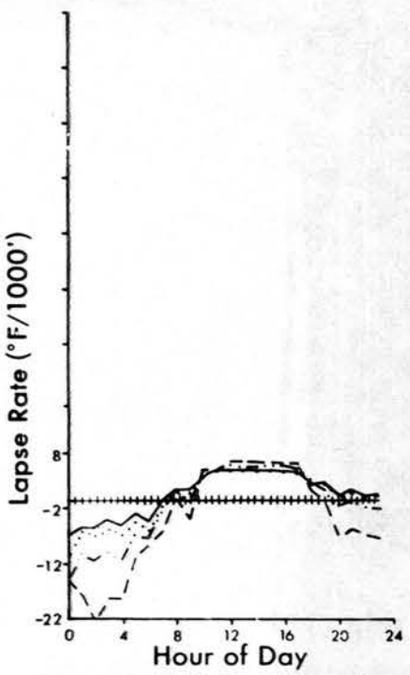


Fig. 7.11 (b) **LAPSE RATES**

35-200'
35-400'
35-600'
35-810'

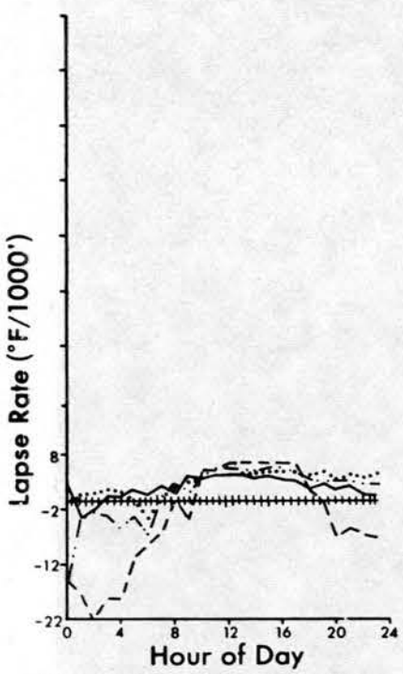


Fig. 7.11 (c) **LAPSE RATES**

35-200'
200-400'
400-600'
600-810'

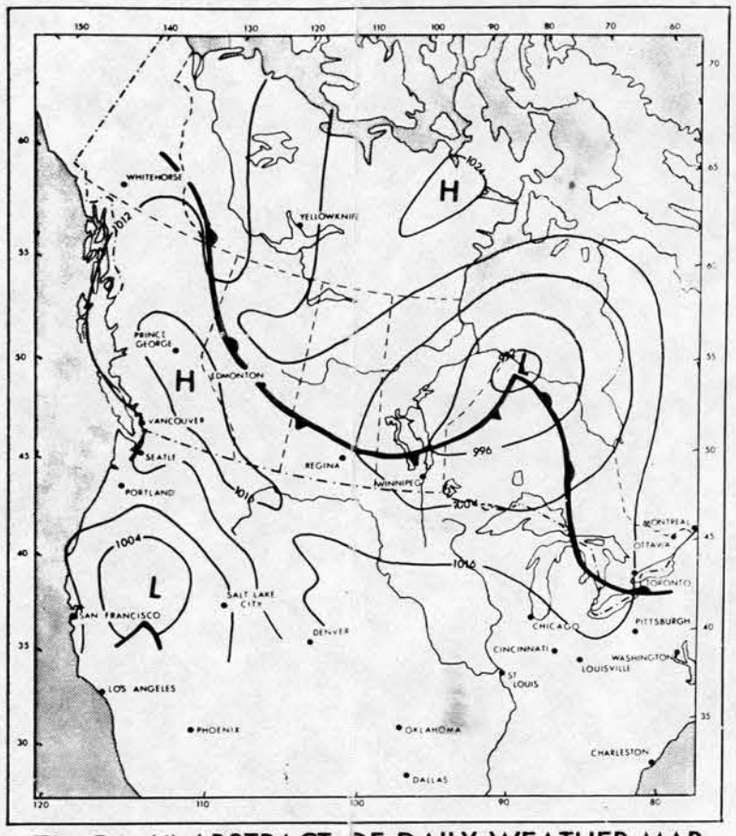


Fig. 7.11 (d) **ABSTRACT OF DAILY WEATHER MAP**

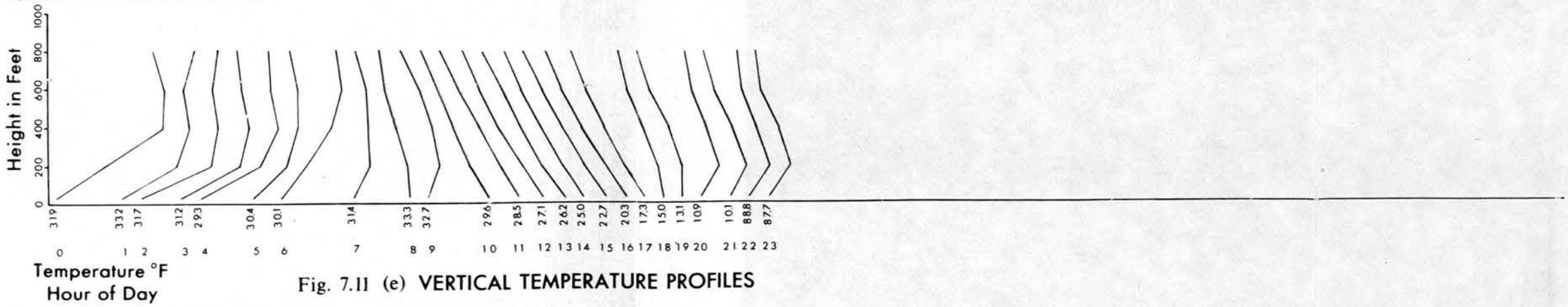


Fig. 7.11 (e) **VERTICAL TEMPERATURE PROFILES**

Figure 7.12

Fig. 7.12 WEATHER OF FEBRUARY 18, 1971

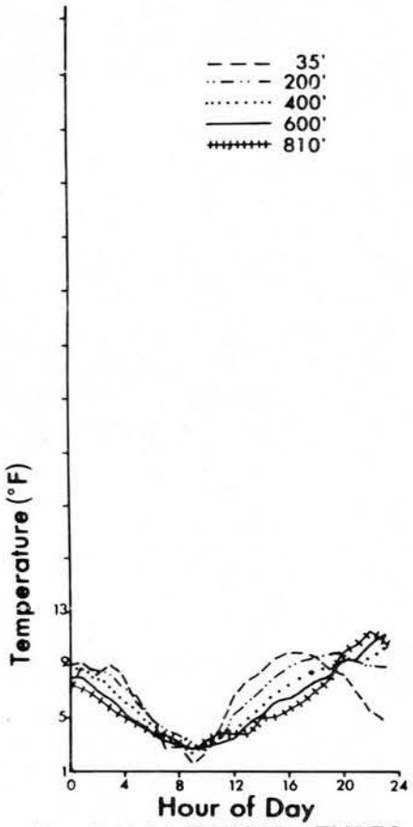


Fig. 7.12 (a) **TEMPERATURES**

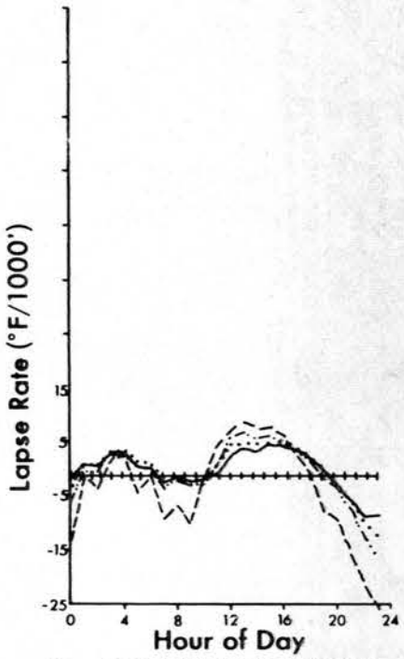


Fig. 7.12 (b) **LAPSE RATES**

35-200'
35-400'
35-600'
35-810'

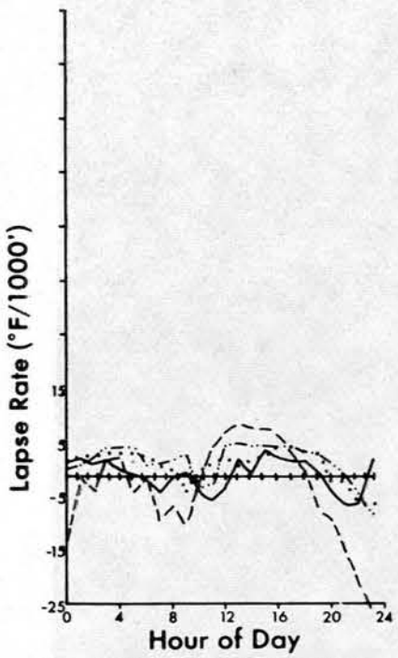


Fig. 7.12 (c) **LAPSE RATES**

35-200'
200-400'
400-600'
600-810'

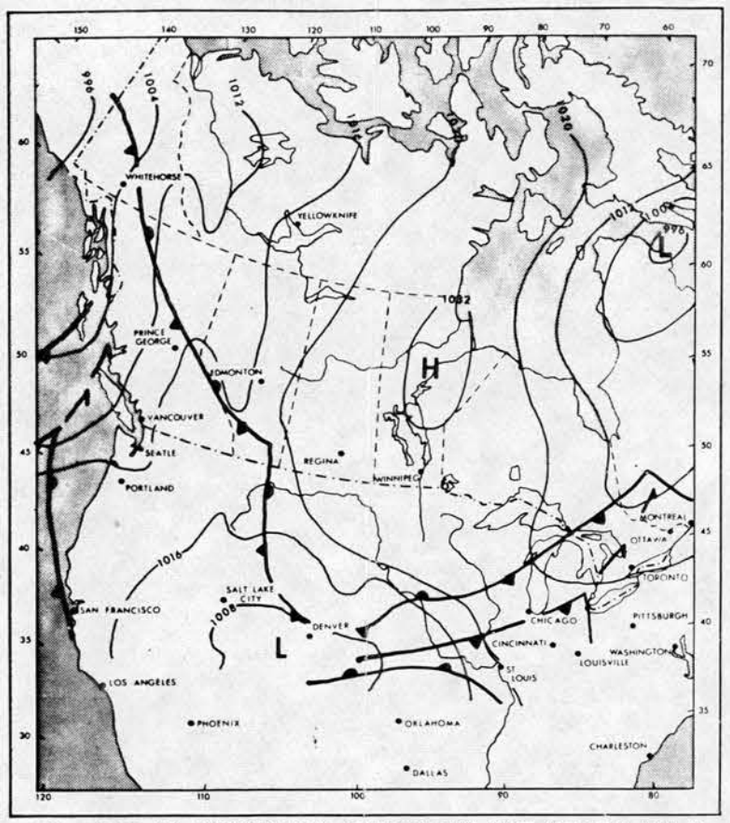


Fig. 7.12 (d) **ABSTRACT OF DAILY WEATHER MAP**

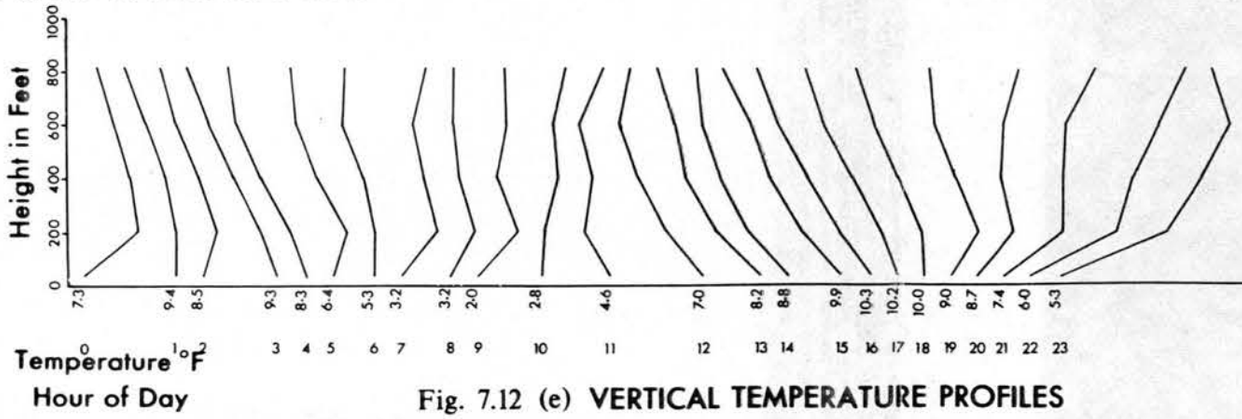


Fig. 7.12 (e) **VERTICAL TEMPERATURE PROFILES**

Figure 7.13

Fig. 7.13 WEATHER OF FEBRUARY 19, 1971

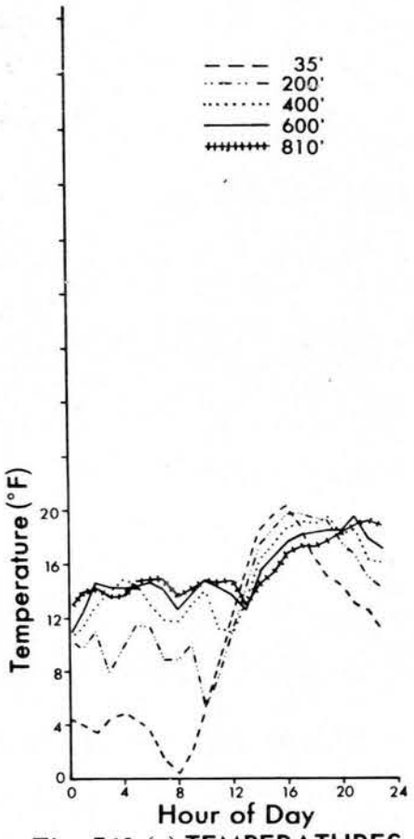


Fig. 7.13 (a) TEMPERATURES

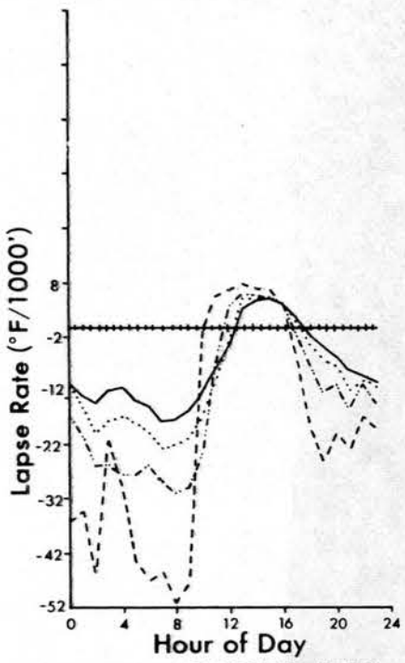


Fig. 7.13 (b) LAPSE RATES

35-200'
35-400'
35-600'
35-810'

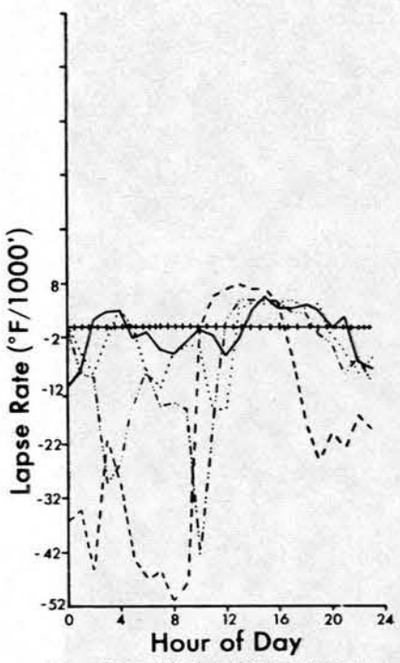


Fig. 7.13 (c) LAPSE RATES

35-200'
200-400'
400-600'
600-810'

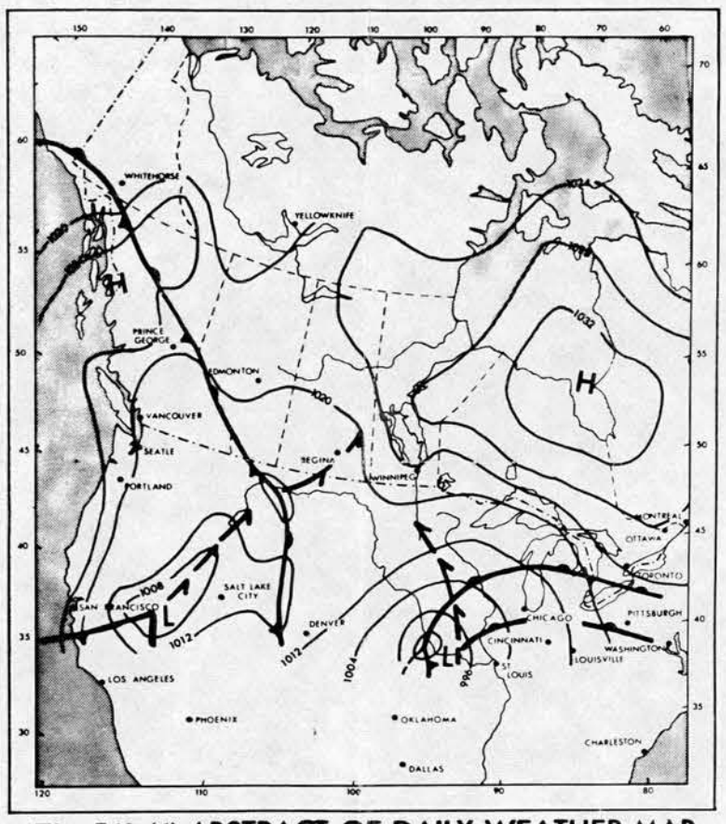


Fig. 7.13 (d) ABSTRACT OF DAILY WEATHER MAP

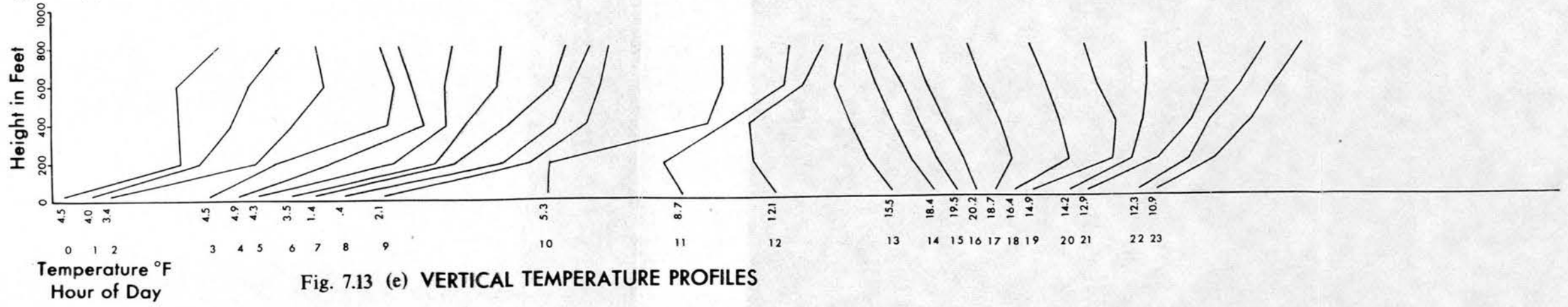


Fig. 7.13 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.14

Fig. 7.14 WEATHER OF JULY 27, 1971

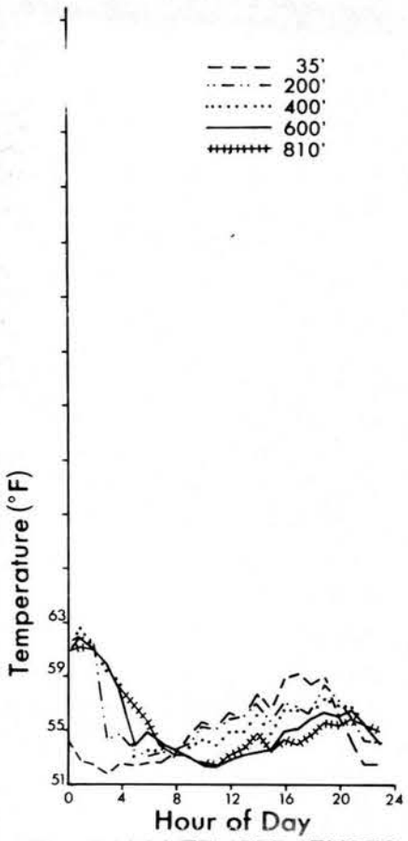


Fig. 7.14 (a) TEMPERATURES

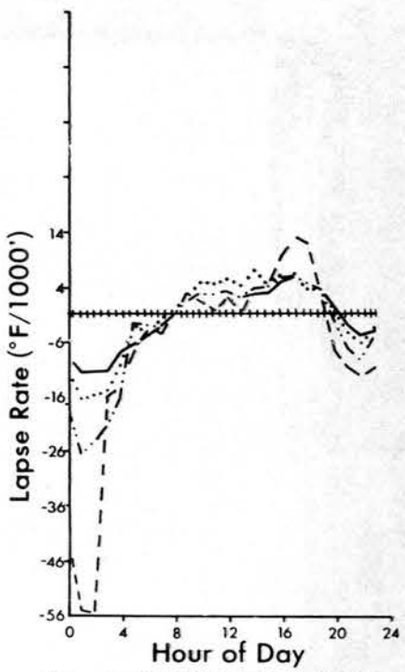


Fig. 7.14 (b) LAPSE RATES

35-200'
35-400'
35-600'
35-810'

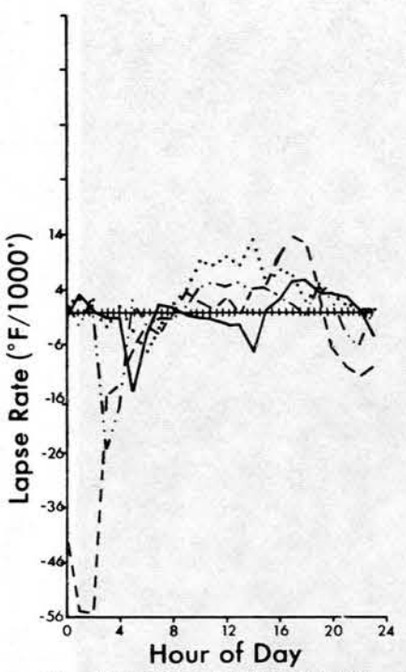


Fig. 7.14 (c) LAPSE RATES

35-200'
200-400'
400-600'
600-810'

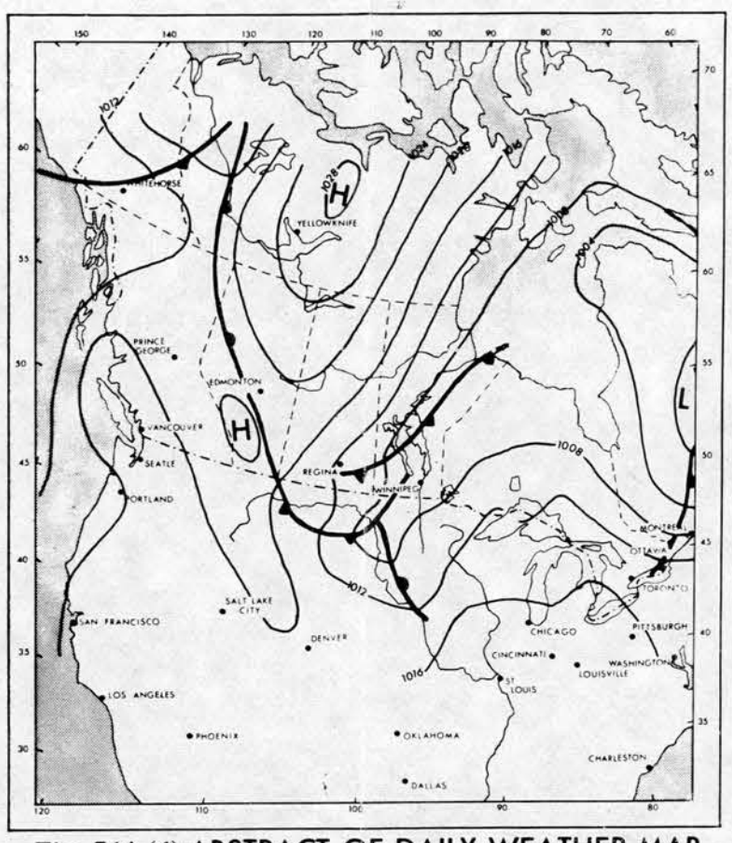


Fig. 7.14 (d) ABSTRACT OF DAILY WEATHER MAP

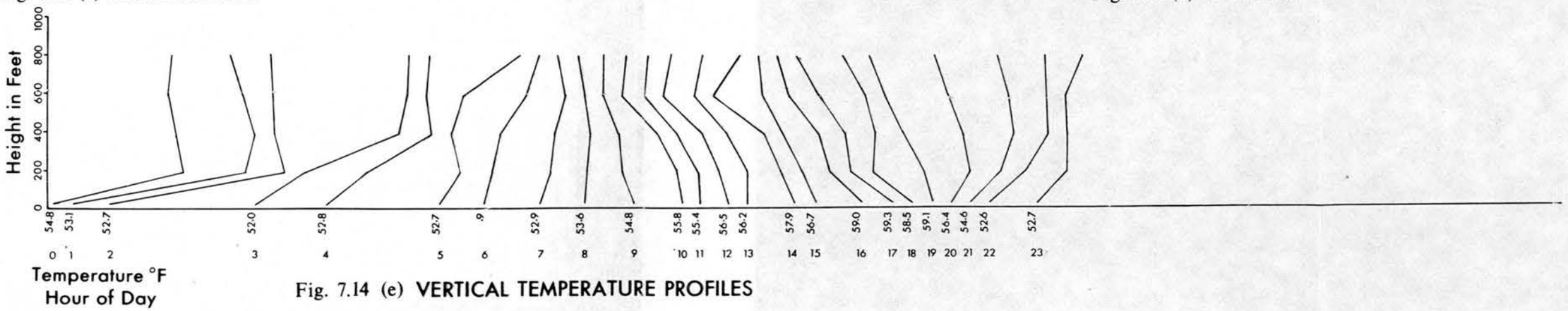


Fig. 7.14 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.15

Fig. 7.15 WEATHER OF JULY 28, 1971

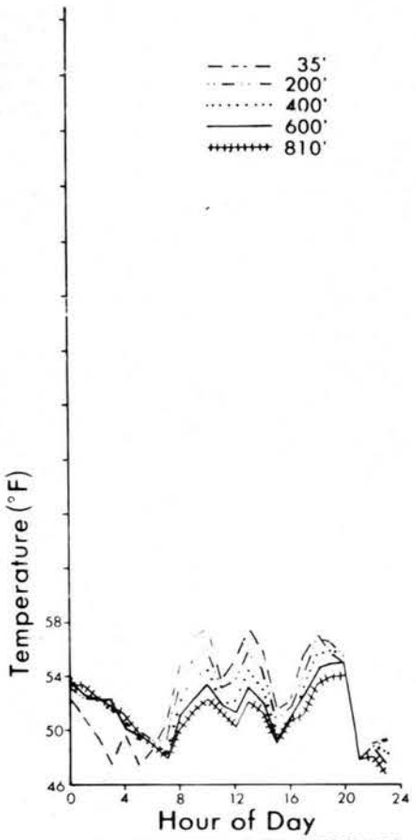


Fig. 7.15 (a) TEMPERATURES

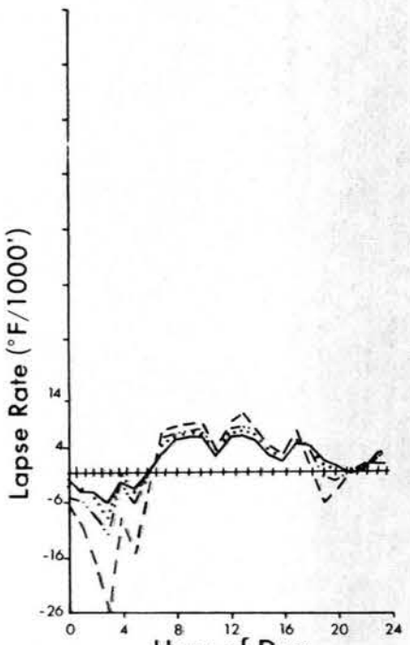


Fig. 7.15 (b) LAPSE RATES

35-200'
35-400'
35-600'
35-810'

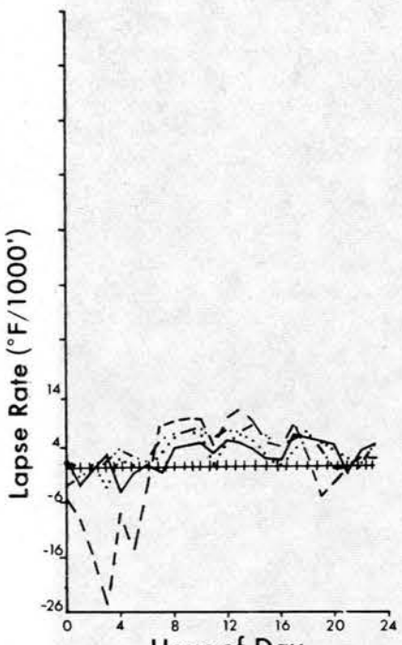


Fig. 7.15 (c) LAPSE RATES

35-200'
200-400'
400-600'
600-810'

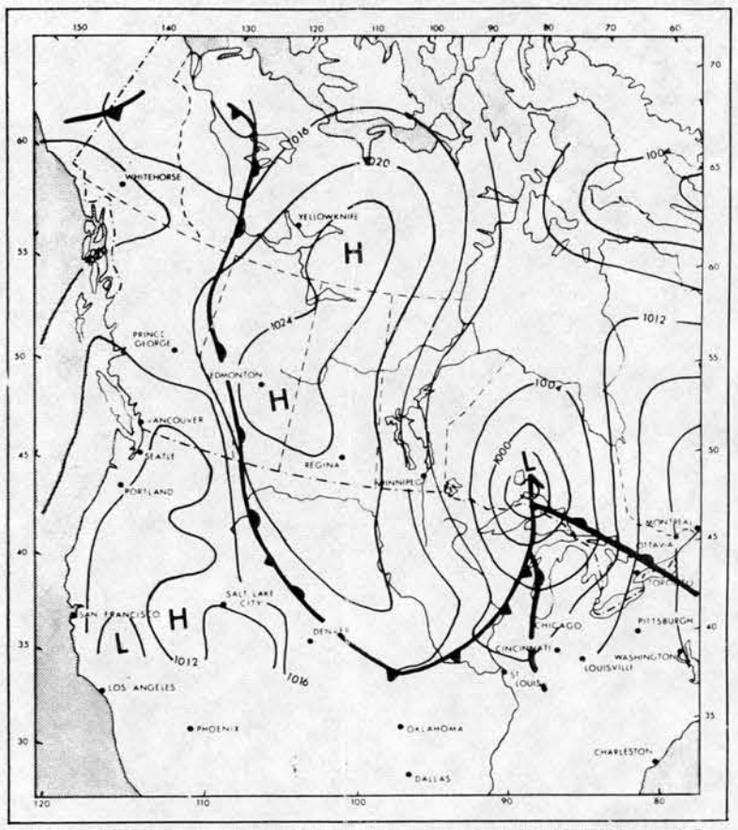


Fig. 7.15 (d) ABSTRACT OF DAILY WEATHER MAP

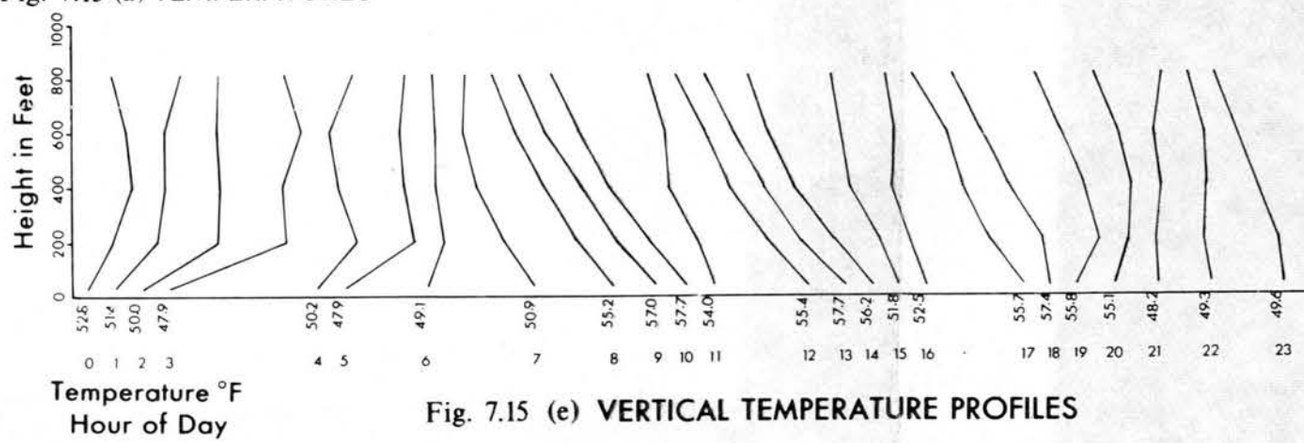


Fig. 7.15 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.16

Fig. 7.16 WEATHER OF JULY 29, 1971

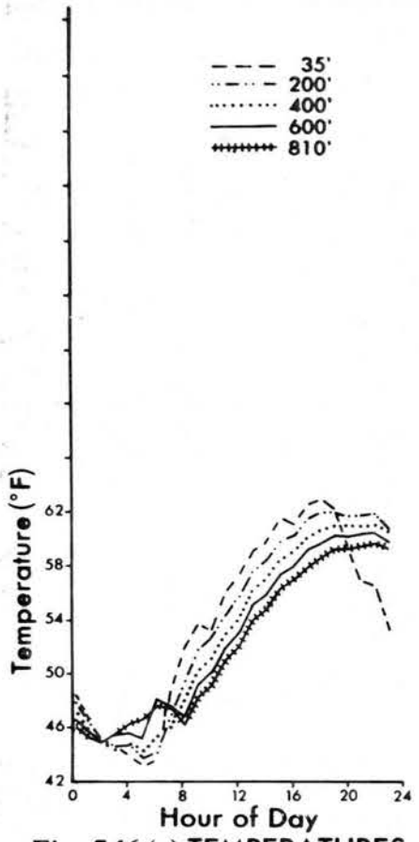


Fig. 7.16 (a) TEMPERATURES

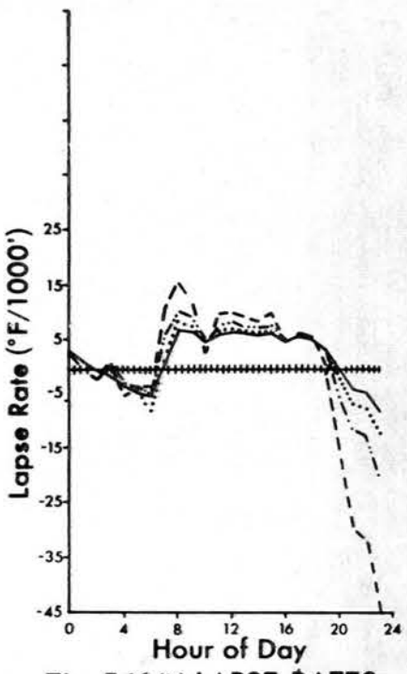
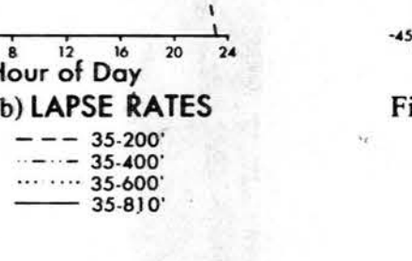


Fig. 7.16 (b) LAPSE RATES



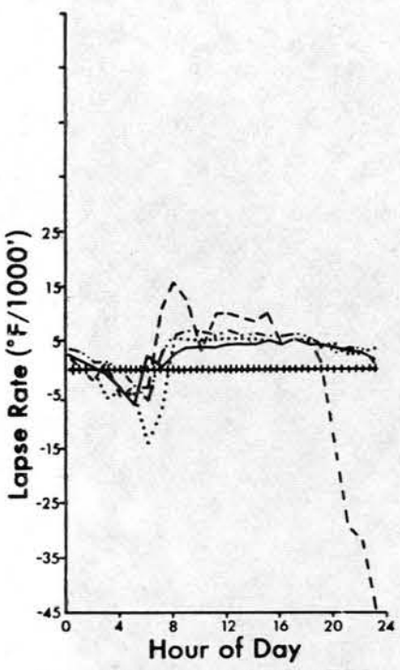
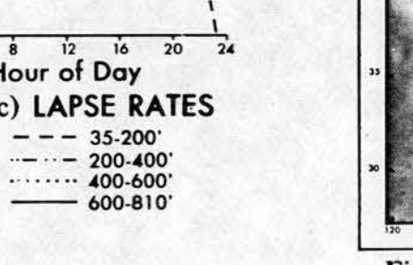


Fig. 7.16 (c) LAPSE RATES



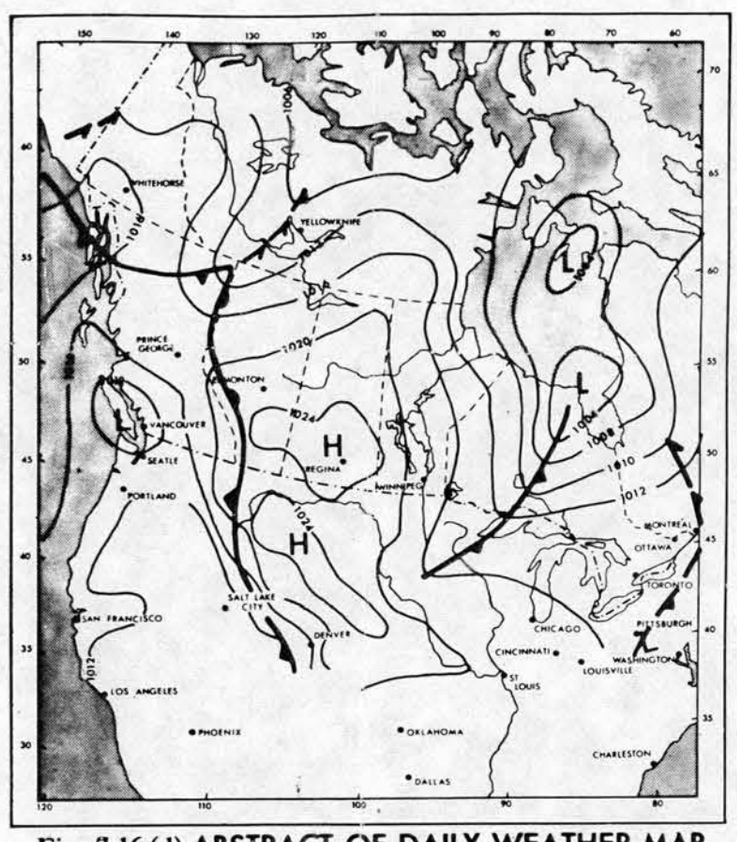


Fig. 7.16 (d) ABSTRACT OF DAILY WEATHER MAP

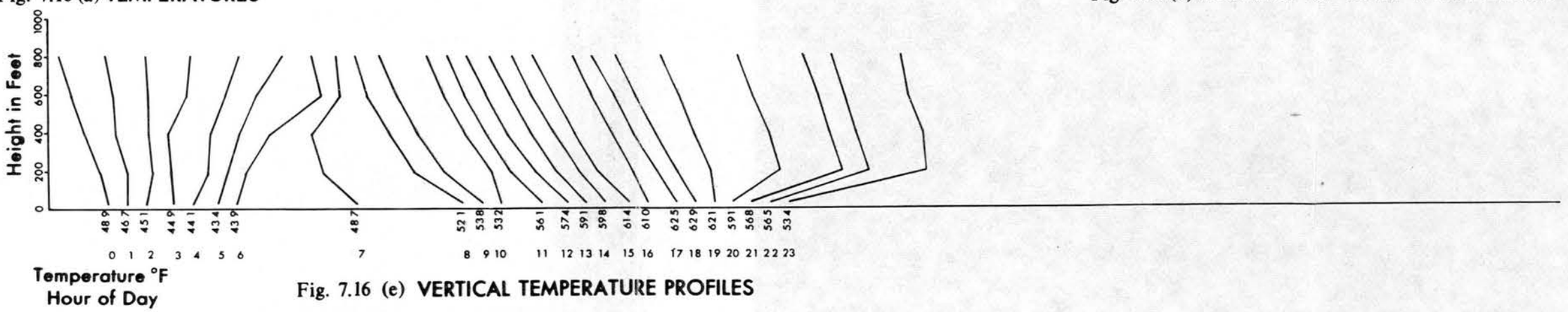


Fig. 7.16 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.17

Fig. 7.17 WEATHER OF JULY 30, 1971

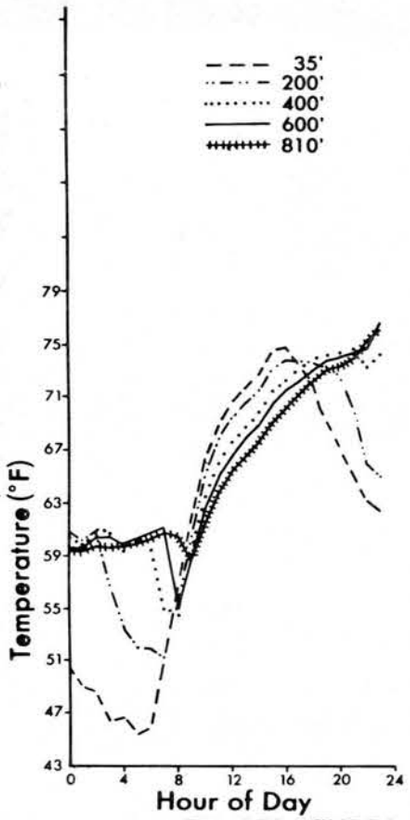


Fig. 7.17 (a) TEMPERATURES

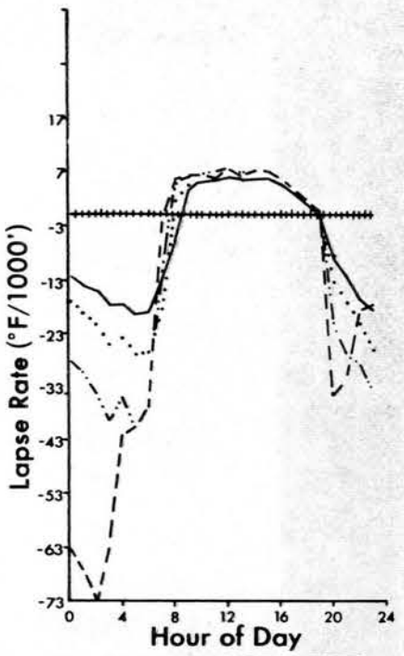


Fig. 7.17 (b) LAPSE RATES

35-200'
35-400'
35-600'
35-810'

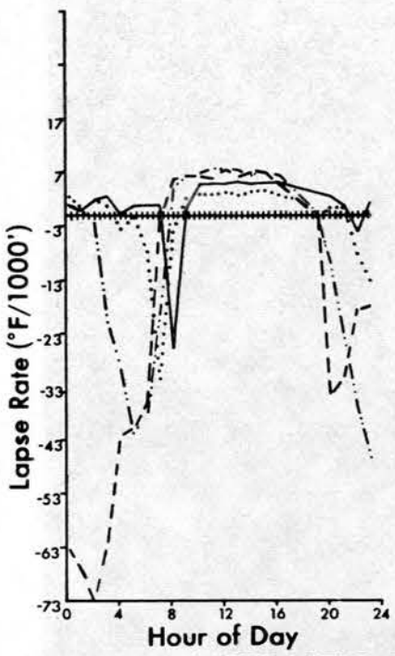


Fig. 7.17 (c) LAPSE RATES

35-200'
200-400'
400-600'
600-810'

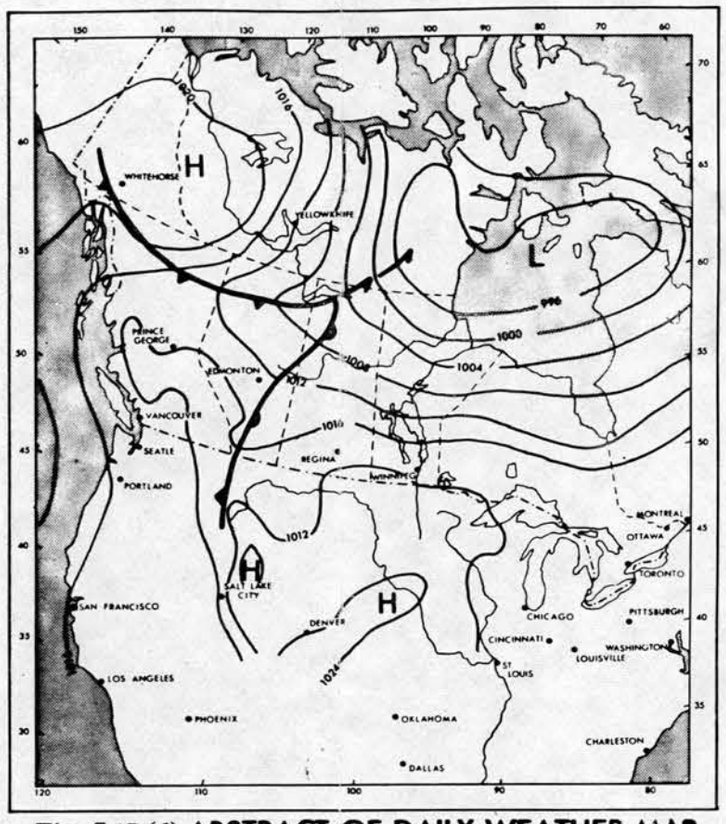


Fig. 7.17 (d) ABSTRACT OF DAILY WEATHER MAP

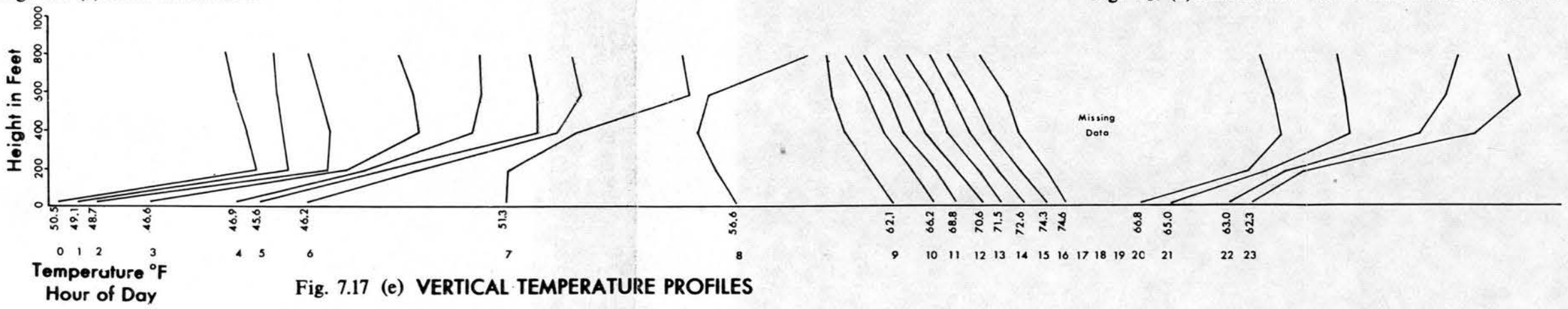


Fig. 7.17 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.18

Fig. 7.18 WEATHER OF AUGUST 10, 1970

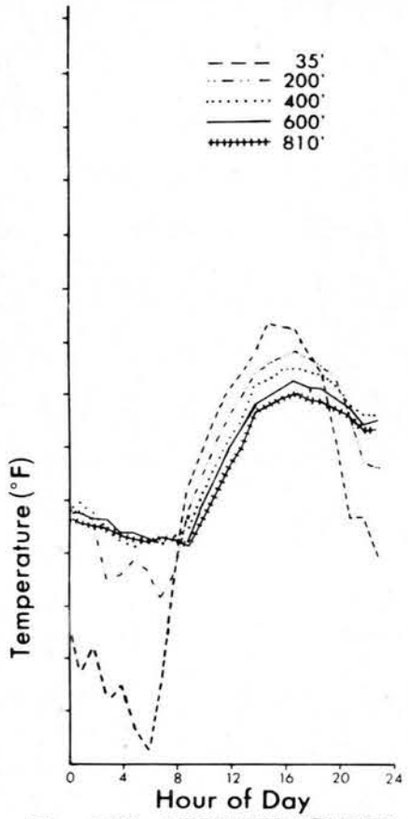


Fig. 7.18 (a) **TEMPERATURES**

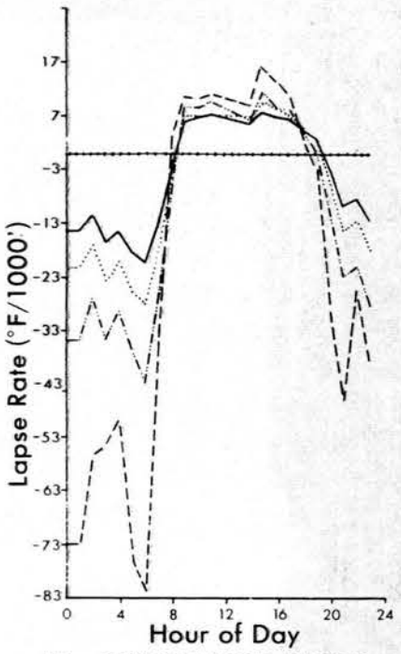


Fig. 7.18 (b) **LAPSE RATES**

35-200'
35-400'
35-600'
35-810'

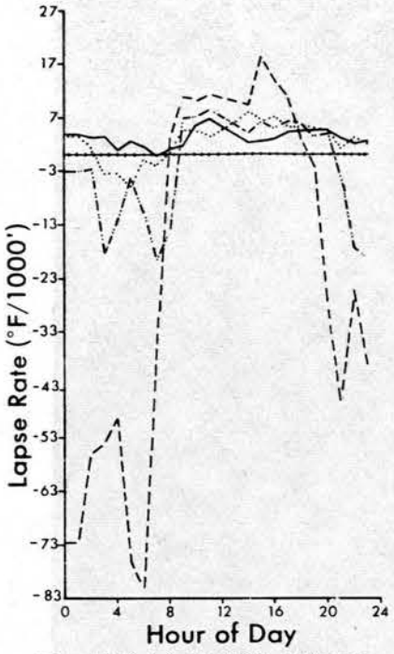


Fig. 7.18 (c) **LAPSE RATES**

35-200'
200-400'
400-600'
600-810'

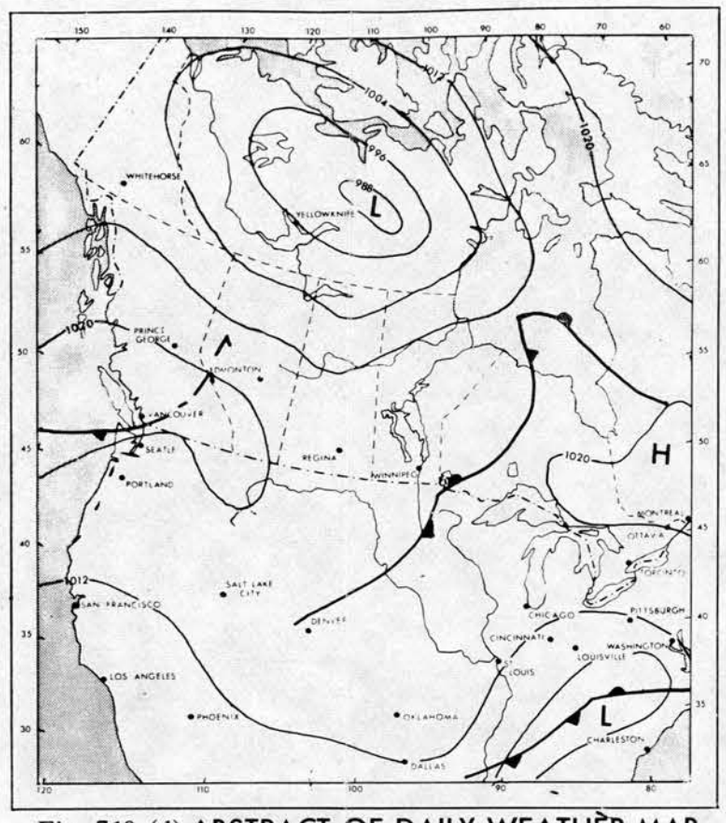


Fig. 7.18 (d) **ABSTRACT OF DAILY WEATHER MAP**

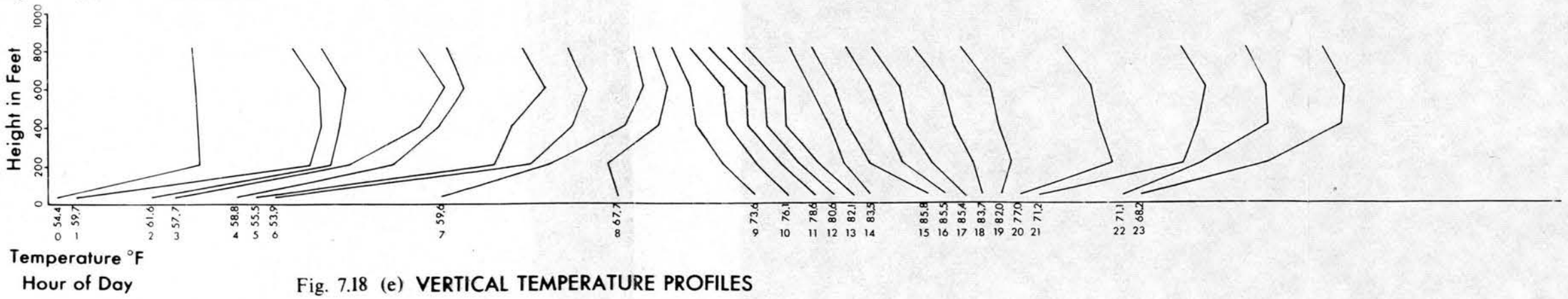


Fig. 7.18 (e) **VERTICAL TEMPERATURE PROFILES**

Figure 7.19

Fig. 7.19 WEATHER OF AUGUST 11, 1970

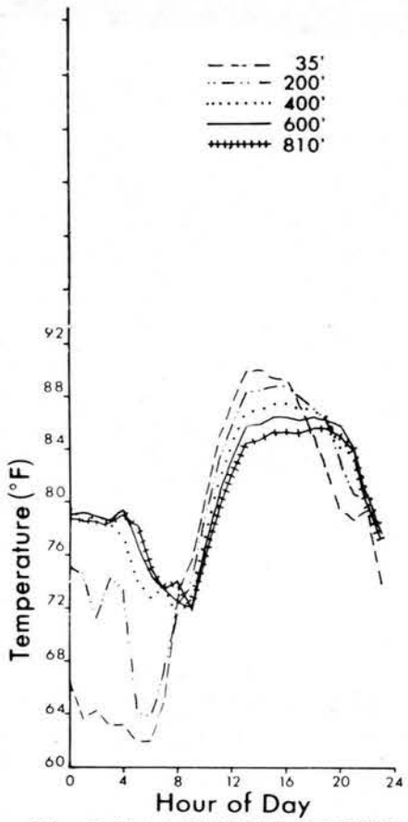


Fig. 7.19 (a) TEMPERATURES

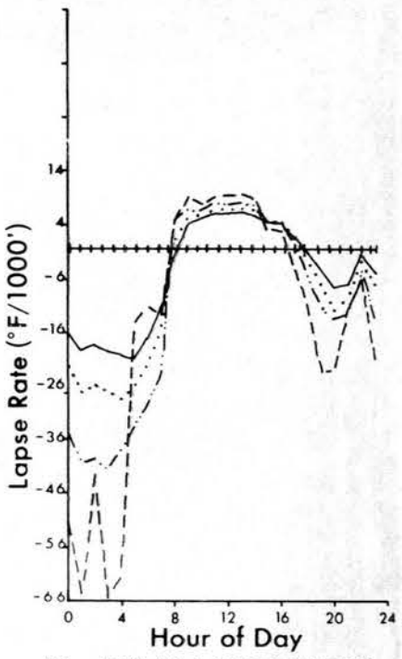
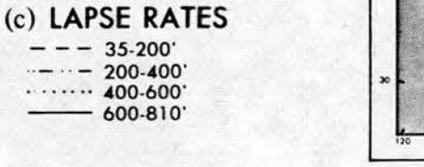


Fig. 7.19 (b) LAPSE RATES



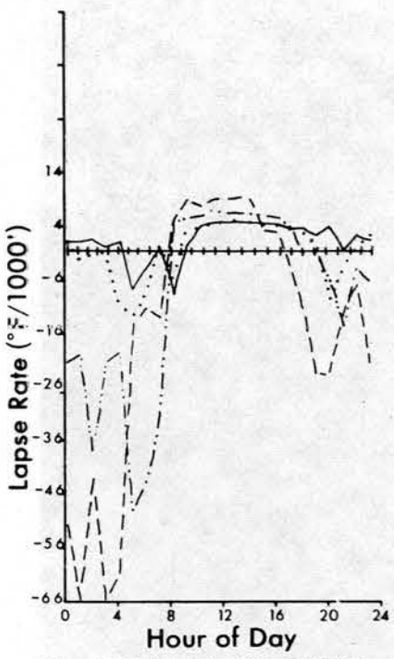


Fig. 7.19 (c) LAPSE RATES

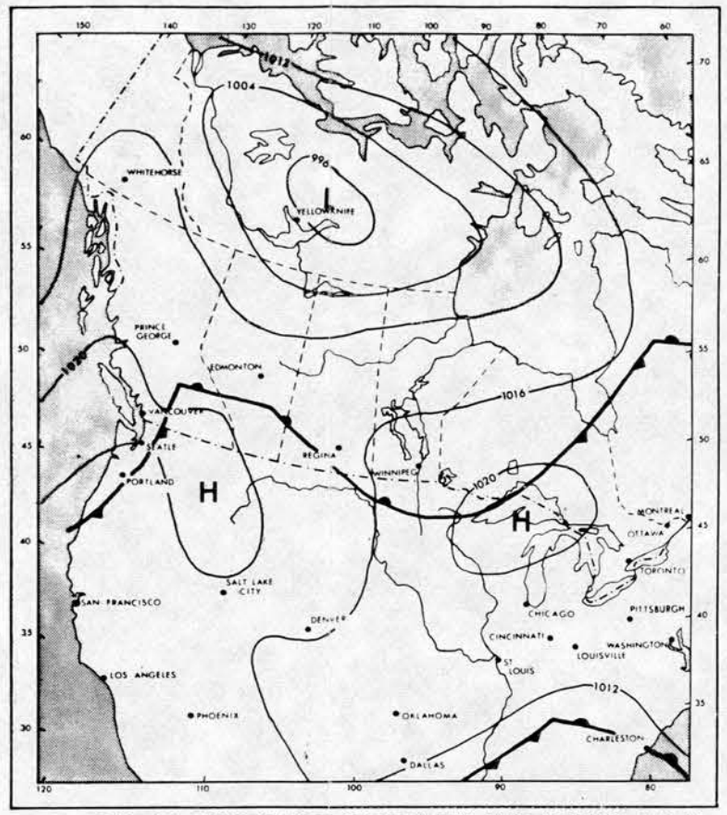


Fig. 7.19 (d) ABSTRACT OF DAILY WEATHER MAP

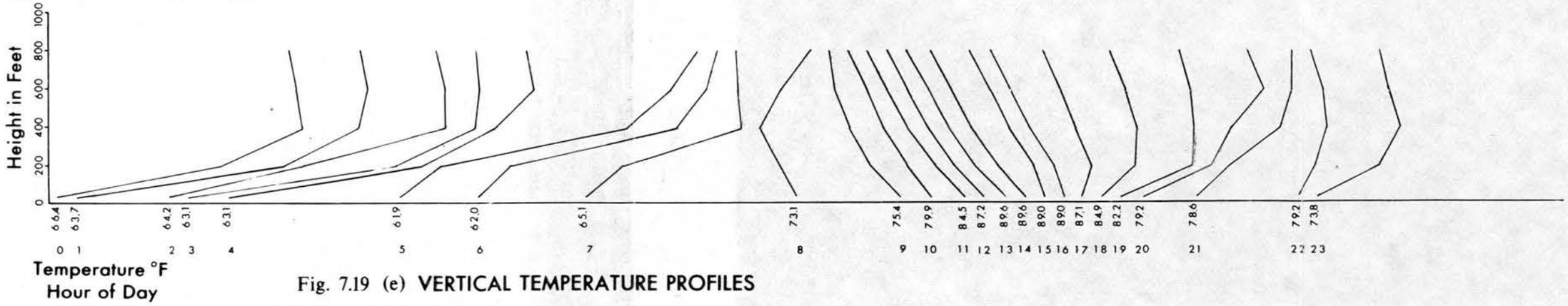


Fig. 7.19 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.20

Fig. 7.20 WEATHER OF AUGUST 12, 1970

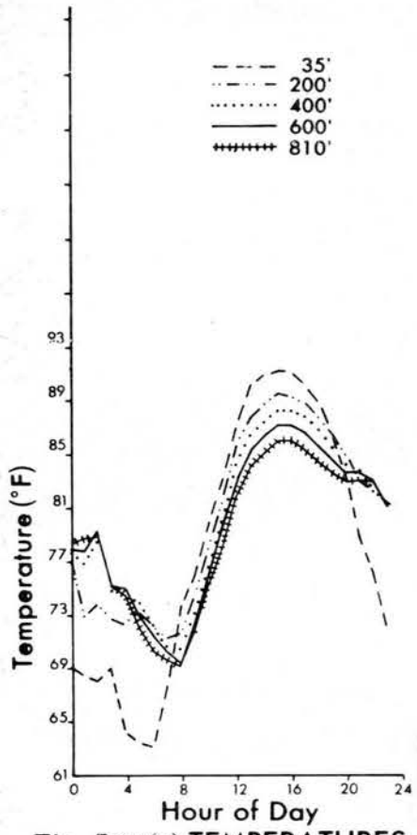


Fig. 7.20 (a) TEMPERATURES

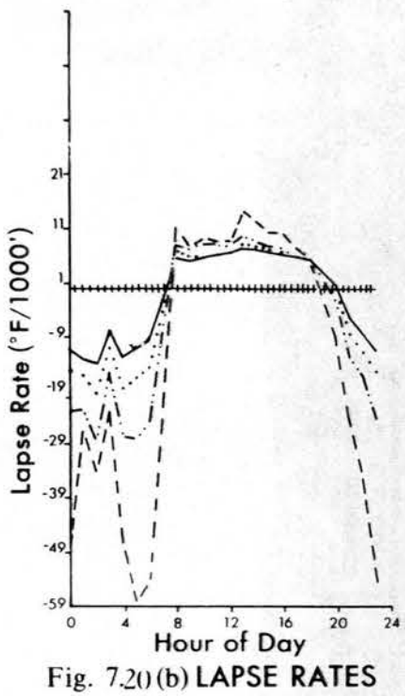
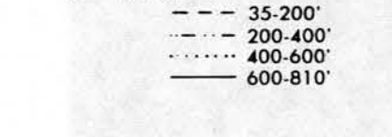


Fig. 7.20 (b) LAPSE RATES



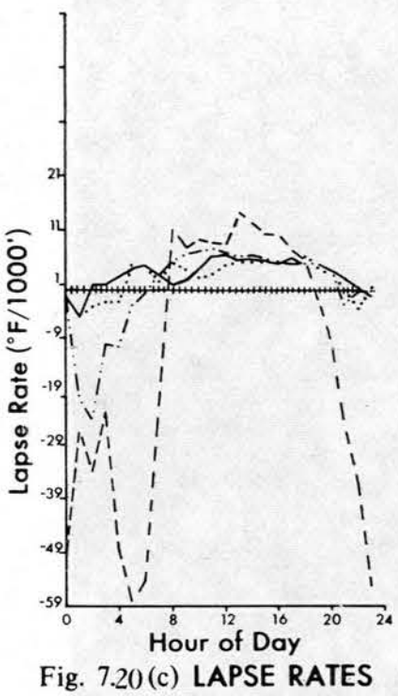


Fig. 7.20 (c) LAPSE RATES

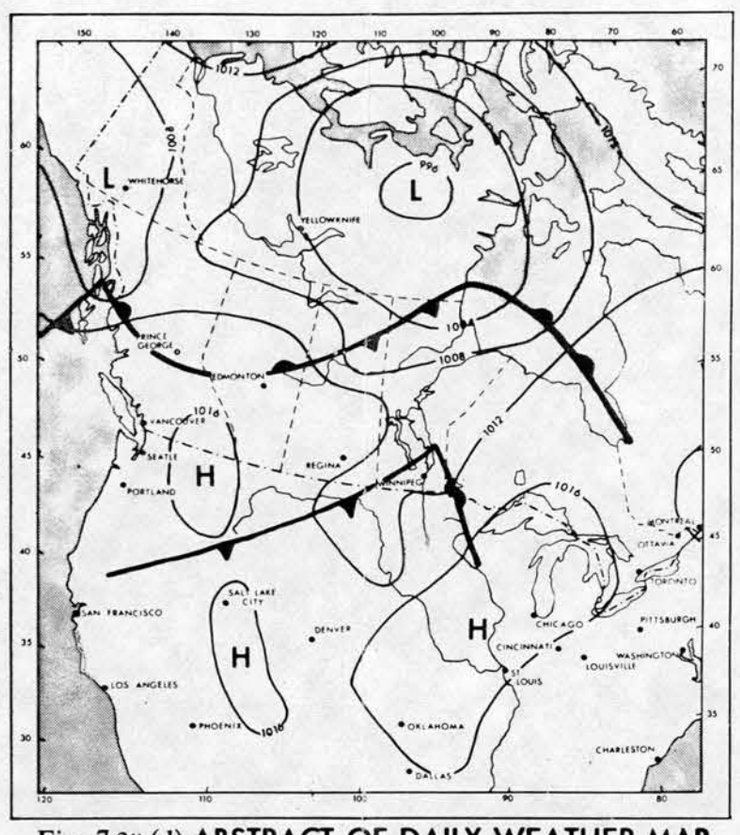


Fig. 7.20 (d) ABSTRACT OF DAILY WEATHER MAP

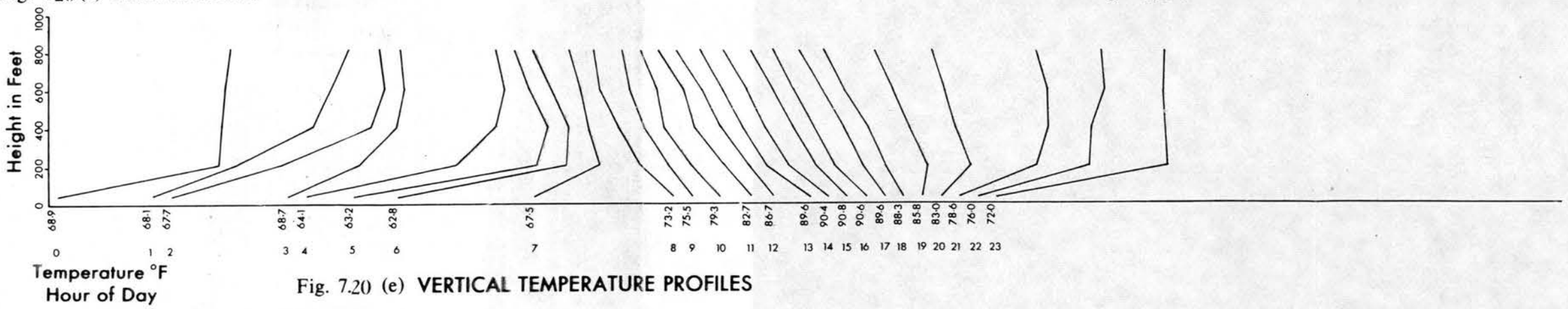


Fig. 7.20 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.21

Fig. 7.21 WEATHER OF AUGUST 13, 1970

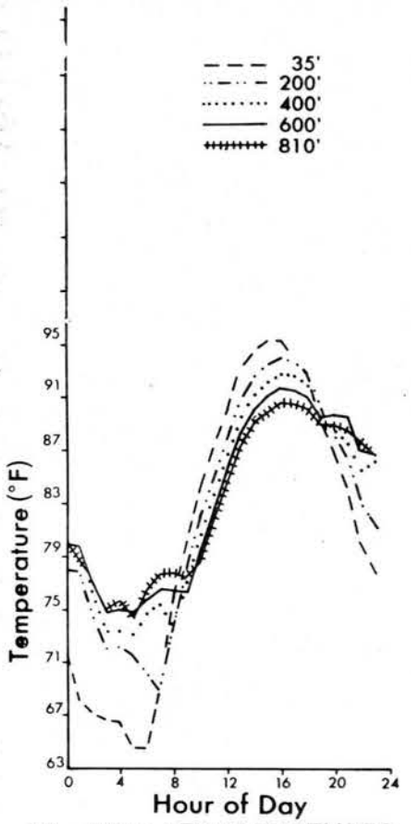


Fig. 7.21 (a) **TEMPERATURES**

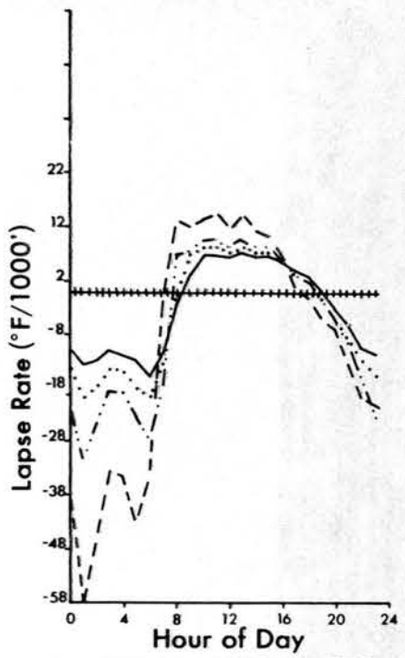
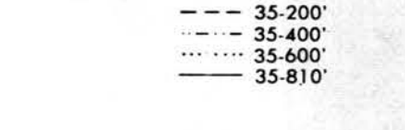


Fig. 7.21 (b) **LAPSE RATES**



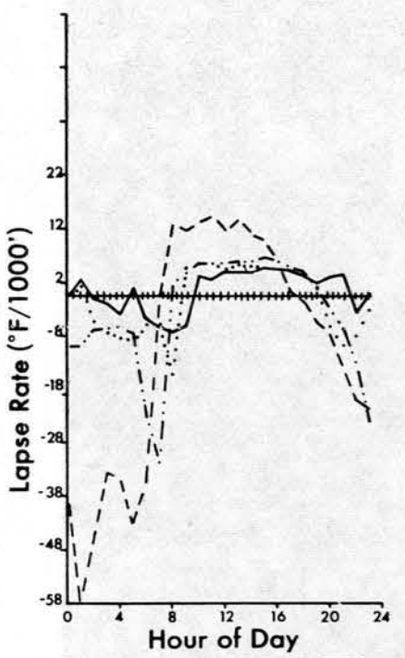
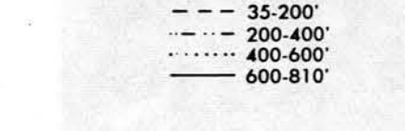


Fig. 7.21 (c) **LAPSE RATES**



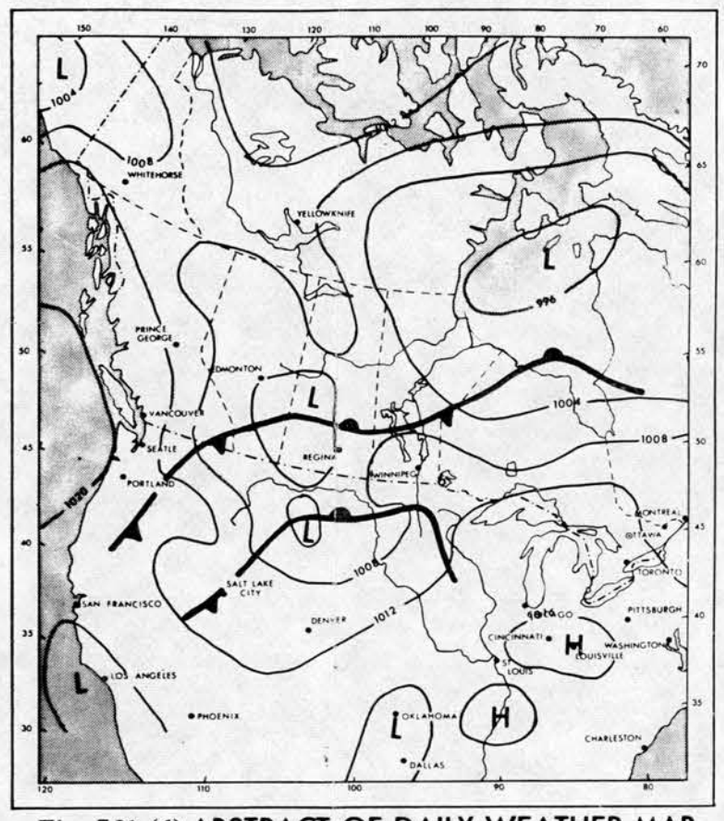


Fig. 7.21 (d) **ABSTRACT OF DAILY WEATHER MAP**

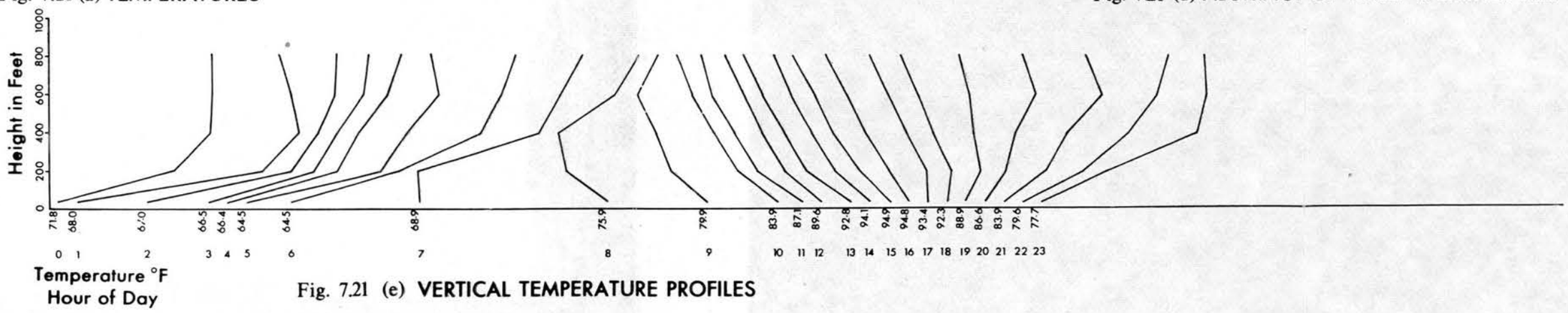


Fig. 7.21 (e) **VERTICAL TEMPERATURE PROFILES**

Figure 7.22

Fig. 7.22 WEATHER OF AUGUST 14, 1970

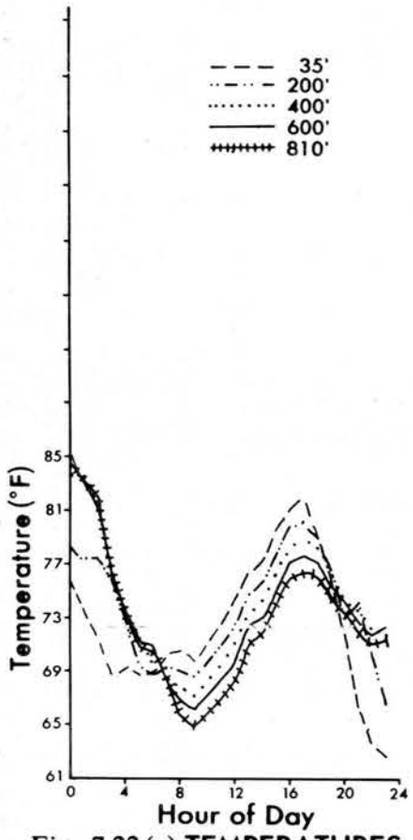


Fig. 7.22 (a) TEMPERATURES

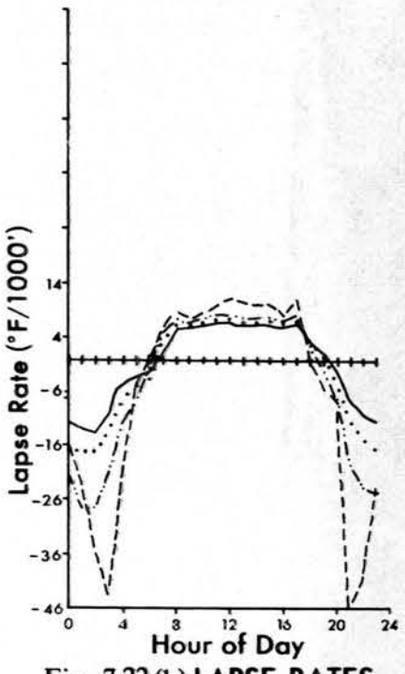


Fig. 7.22 (b) LAPSE RATES

35-200'
35-400'
35-600'
35-810'

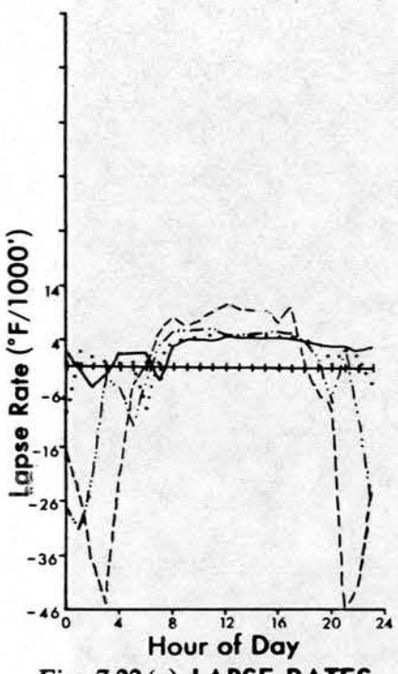


Fig. 7.22 (c) LAPSE RATES

35-200'
200-400'
400-600'
600-810'

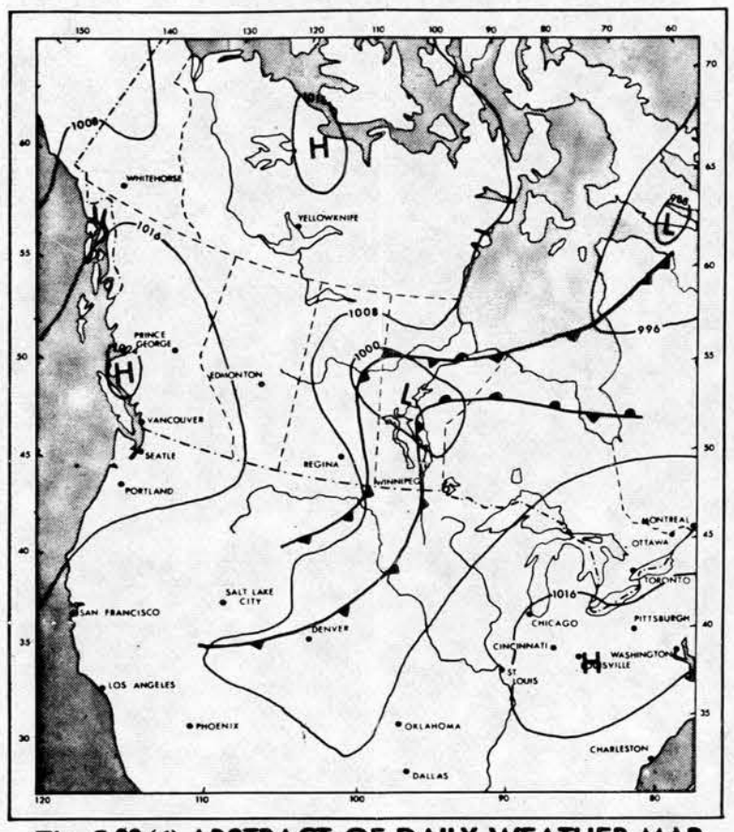


Fig. 7.22 (d) ABSTRACT OF DAILY WEATHER MAP

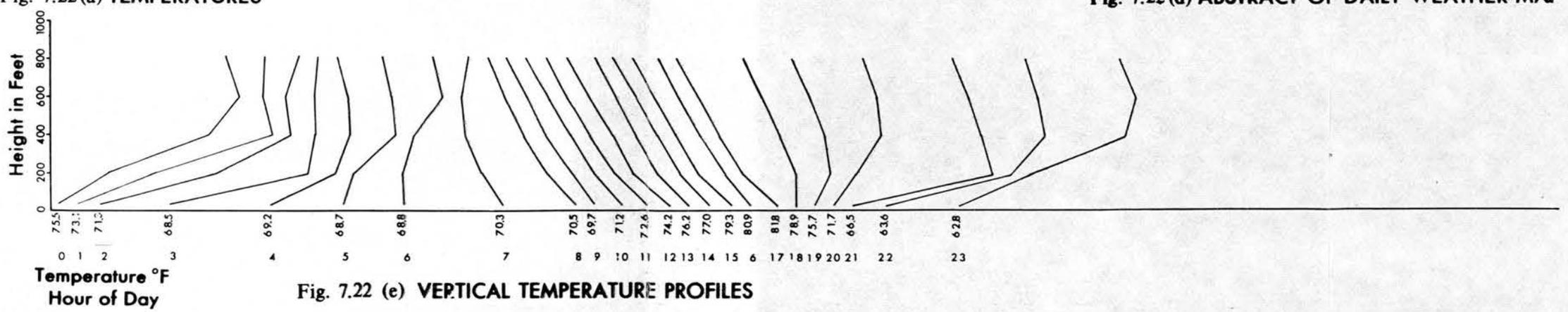


Fig. 7.22 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.23

Fig. 7.23 WEATHER OF AUGUST 15, 1970

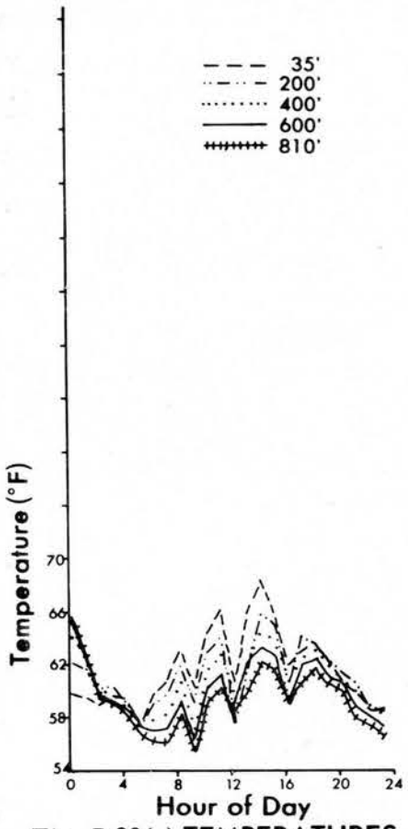


Fig. 7.23(a) TEMPERATURES

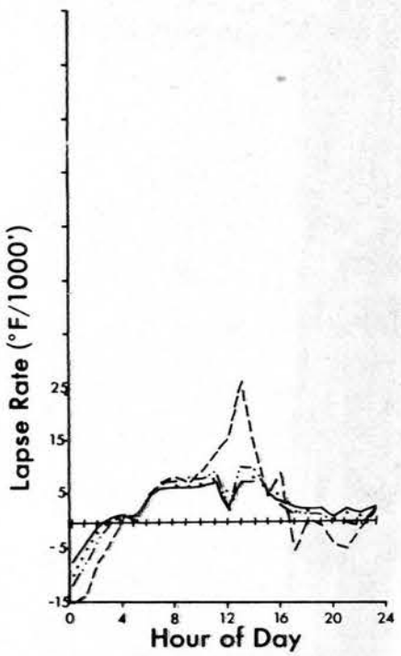


Fig. 7.23(b) LAPSE RATES

35-200'
35-400'
35-600'
35-810'

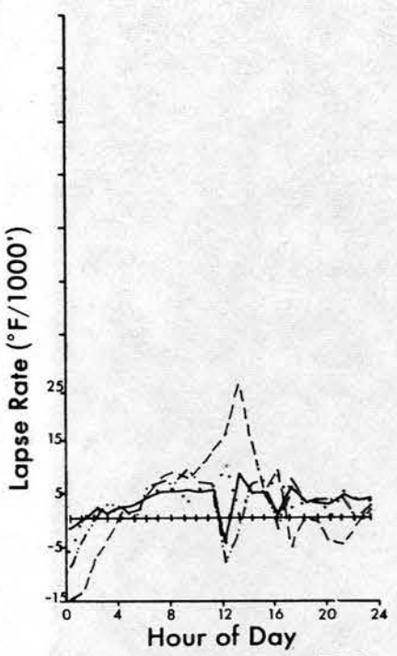


Fig. 7.23(c) LAPSE RATES

35-200'
200-400'
400-600'
600-810'

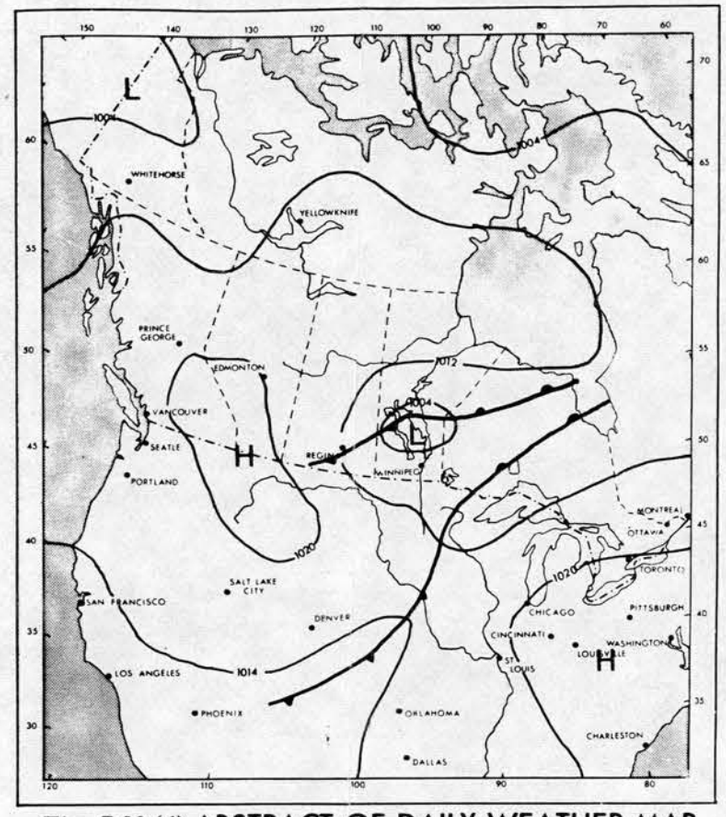


Fig. 7.23 (d) ABSTRACT OF DAILY WEATHER MAP

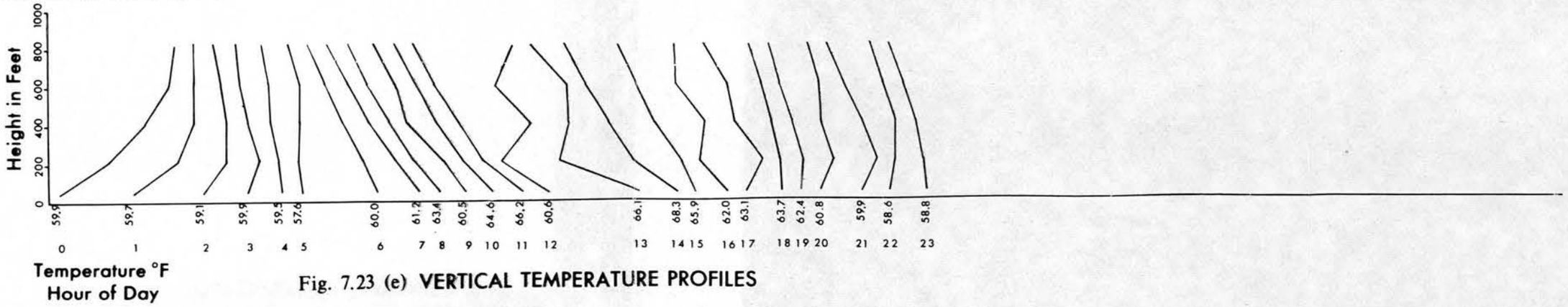


Fig. 7.23 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.24

Fig. 7. 24 WEATHER OF AUGUST 16, 1970

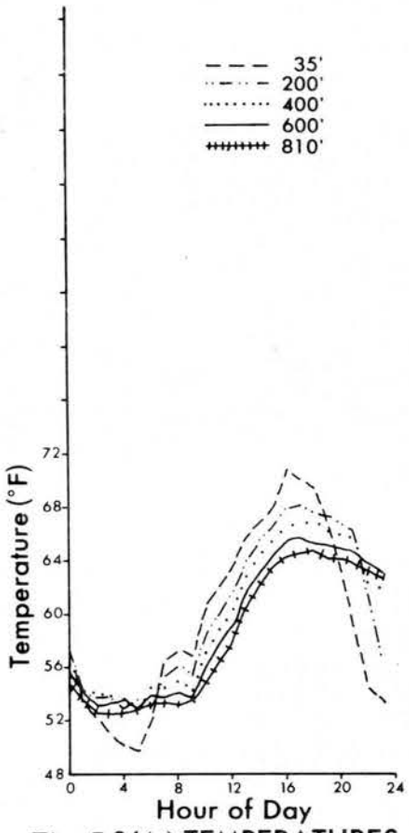


Fig. 7.24(a) TEMPERATURES

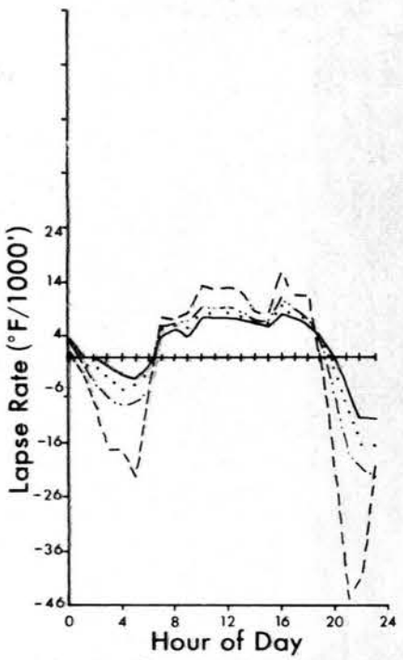


Fig. 7.24(b) LAPSE RATES

35-200'
35-400'
35-600'
35-810'

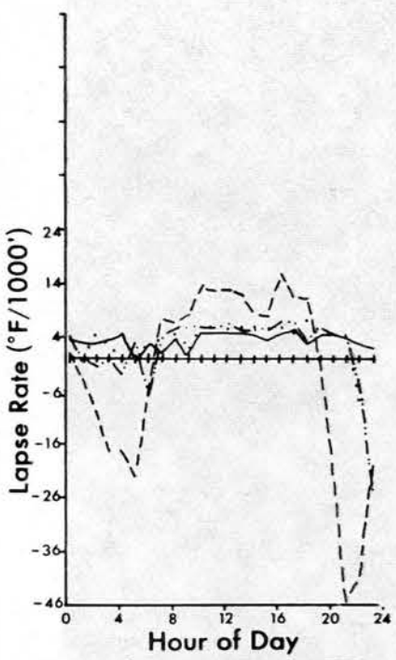


Fig. 7.24(c) LAPSE RATES

35-200'
200-400'
400-600'
600-810'

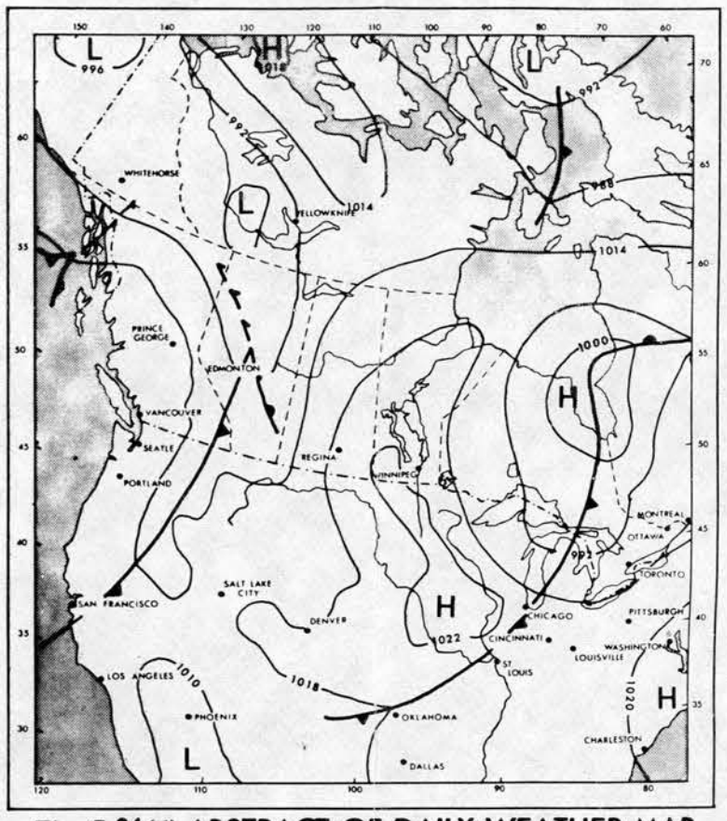


Fig. 7.24(d) ABSTRACT OF DAILY WEATHER MAP

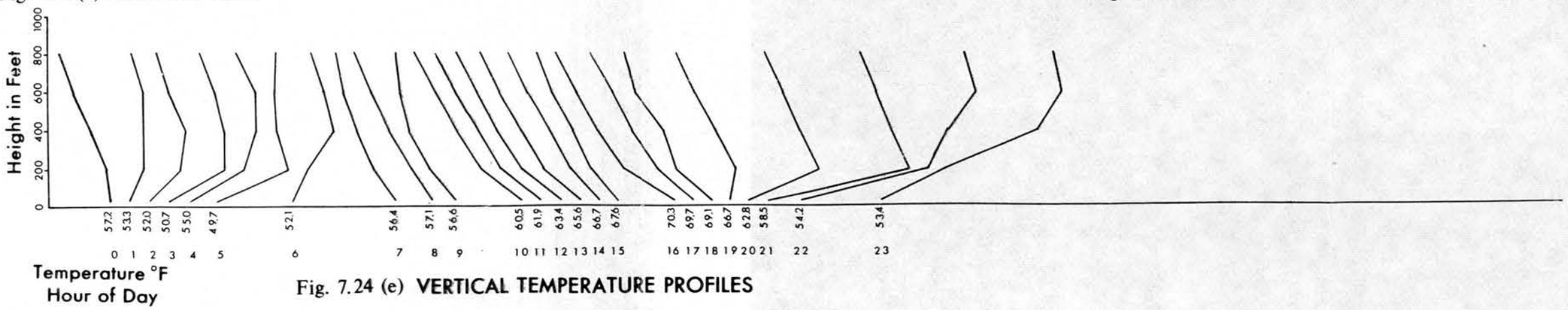


Fig. 7.24 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.25

Fig. 7.25 WEATHER OF AUGUST 17, 1970

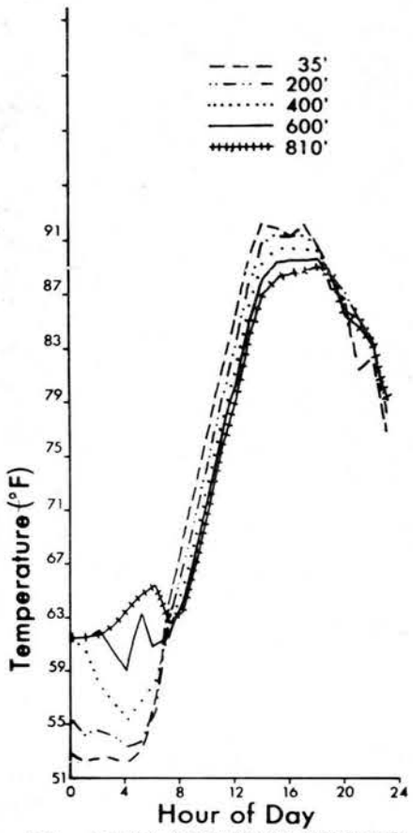


Fig. 7.25(a) TEMPERATURES

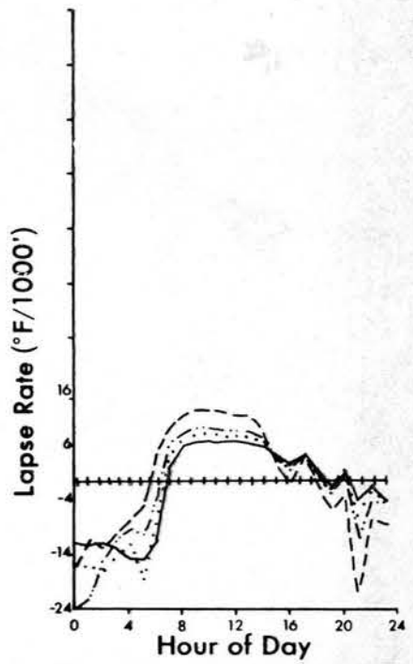


Fig. 7.25(b) LAPSE RATES

35-200'
35-400'
35-600'
35-810'

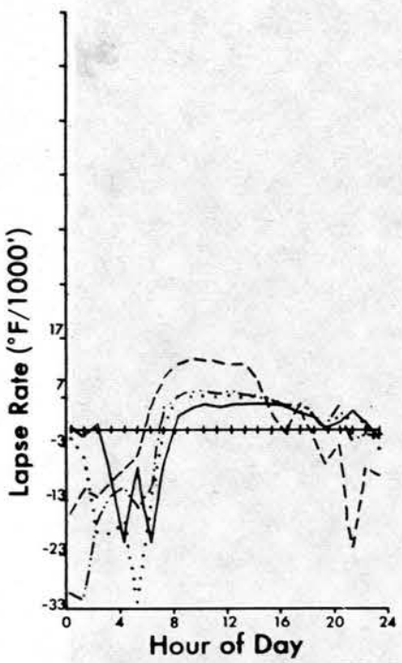


Fig. 7.25(c) LAPSE RATES

35-200'
200-400'
400-600'
600-810'

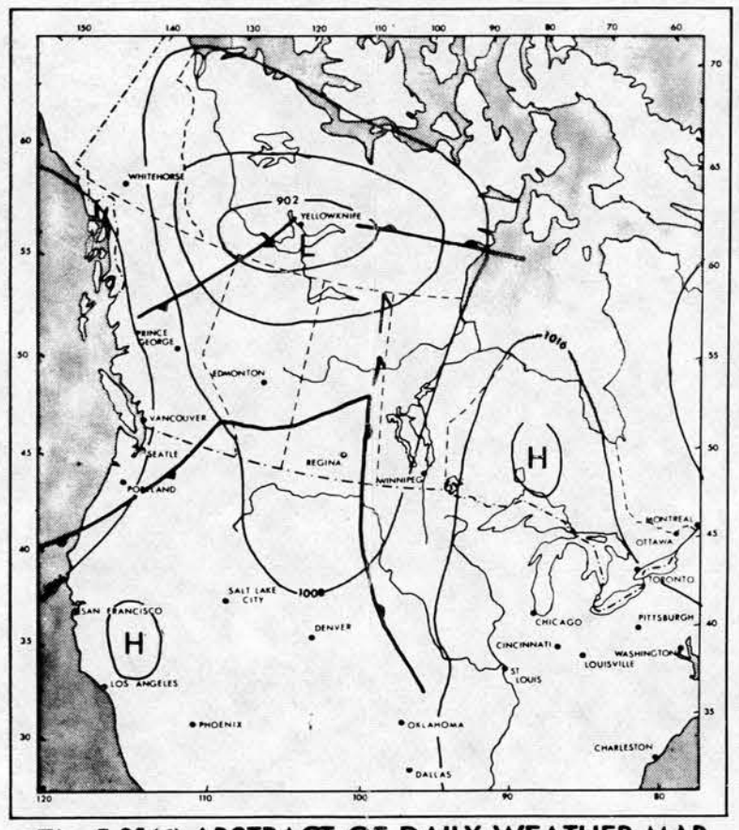


Fig. 7.25(d) ABSTRACT OF DAILY WEATHER MAP

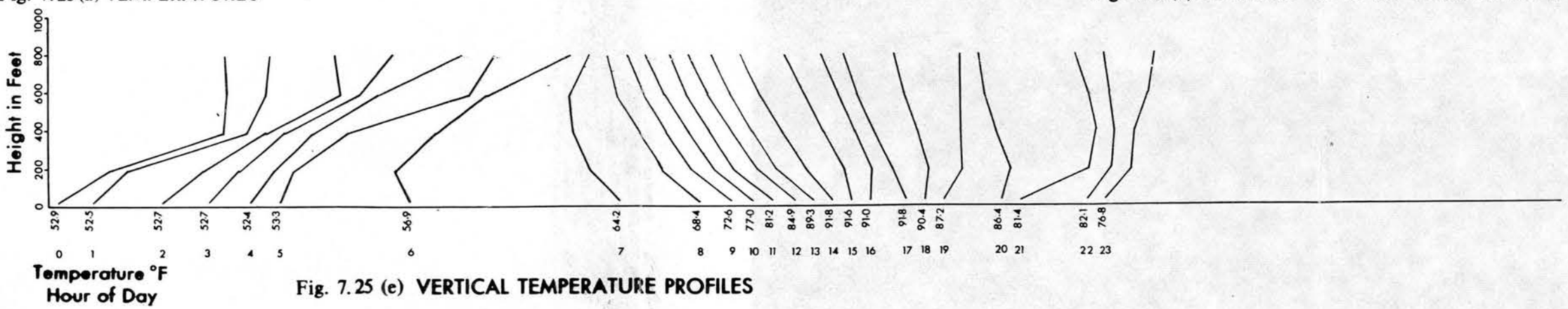


Fig. 7.25 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.26

Fig. 7.26 WEATHER OF AUGUST 18, 1970

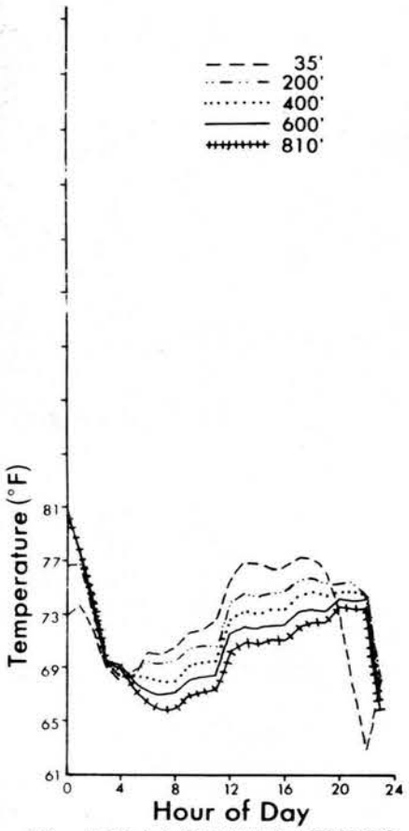


Fig. 7.26 (a) TEMPERATURES

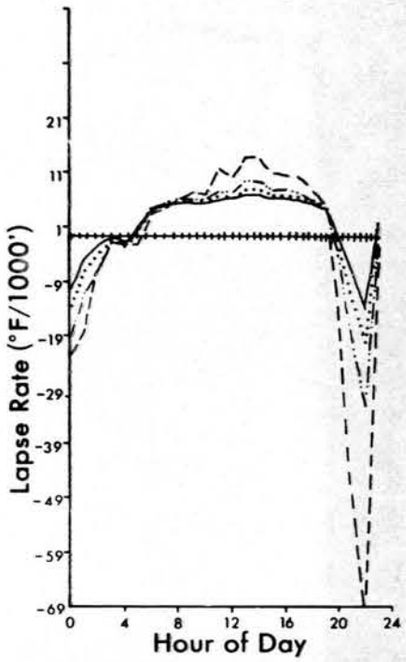
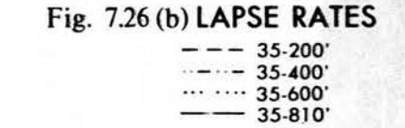


Fig. 7.26 (b) LAPSE RATES



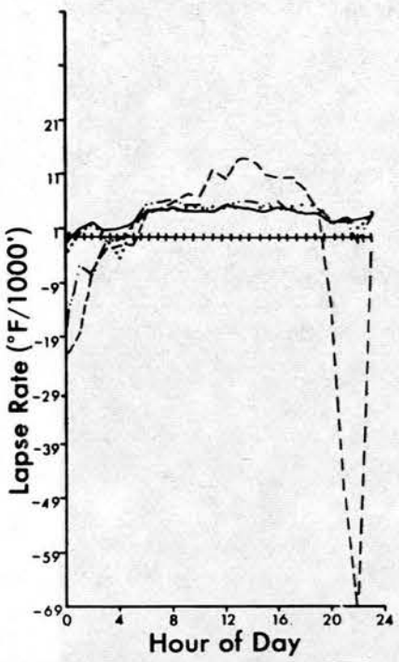


Fig. 7.26 (c) LAPSE RATES

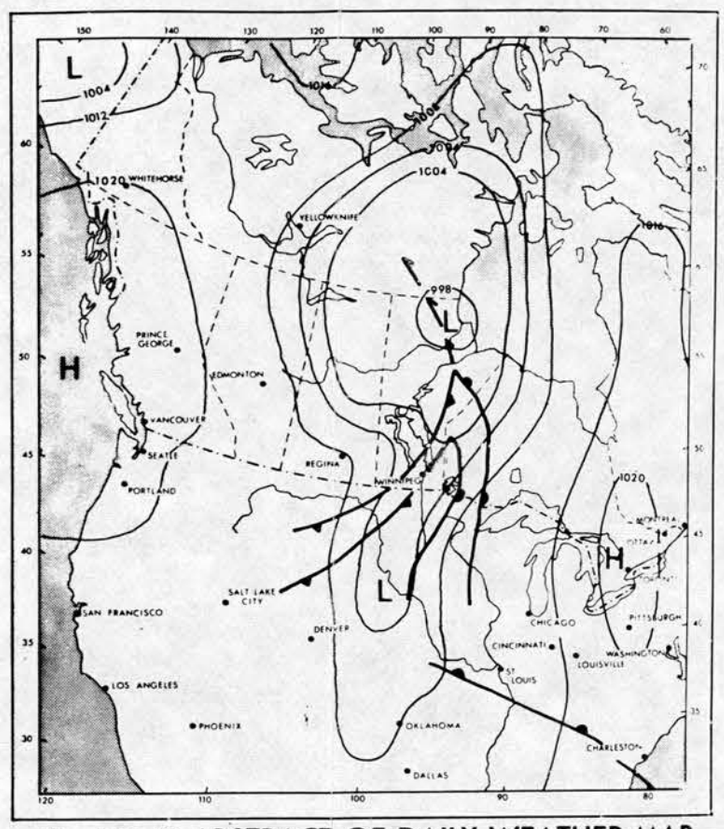


Fig. 7.26 (d) ABSTRACT OF DAILY WEATHER MAP

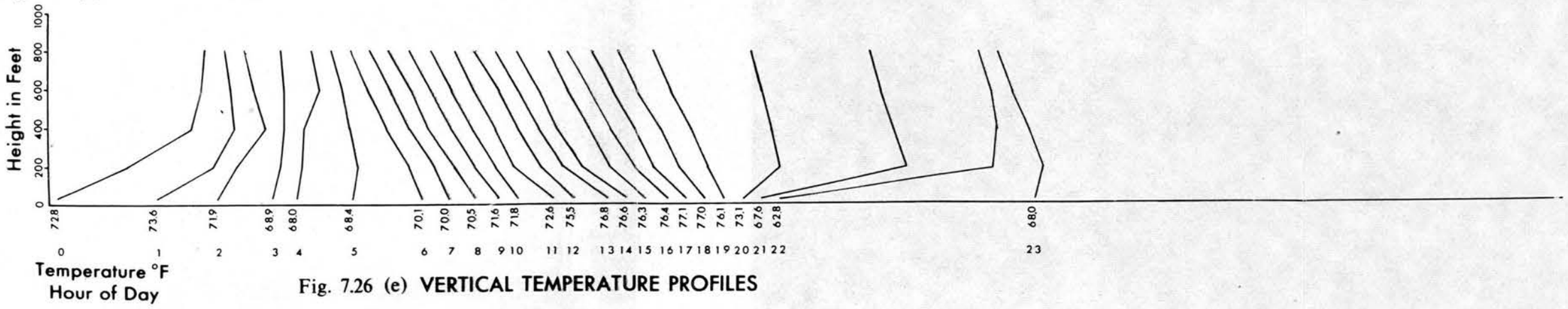


Fig. 7.26 (e) VERTICAL TEMPERATURE PROFILES

Figure 7.27

Fig. 7.27 WEATHER OF AUGUST 19, 1970

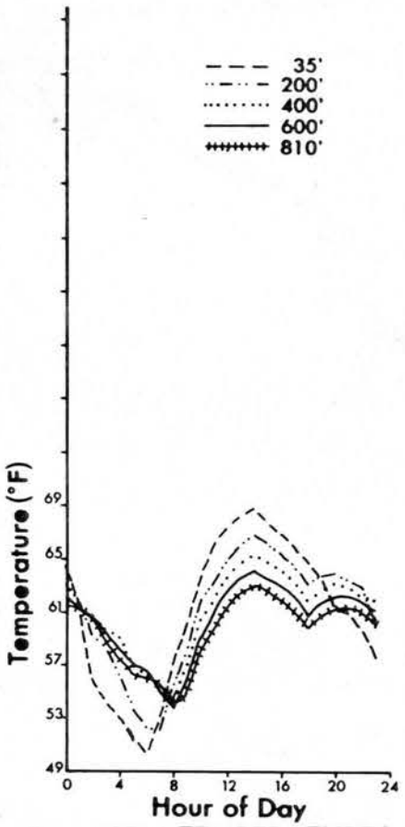


Fig. 7.27(a) TEMPERATURES

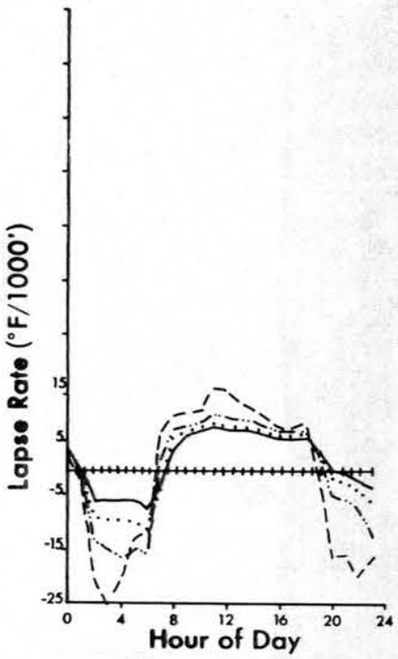


Fig. 7.27(b) LAPSE RATES

35-200'
35-400'
35-600'
35-810'

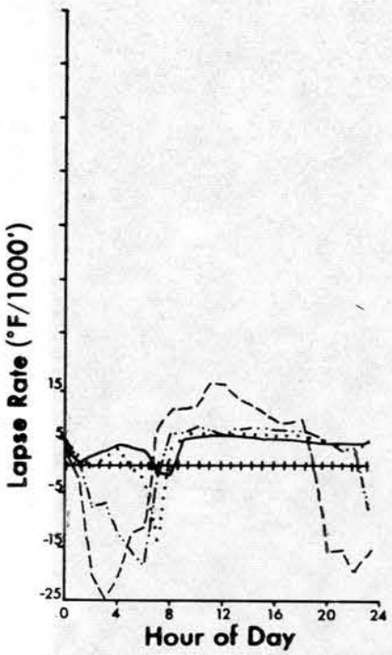


Fig. 7.27(c) LAPSE RATES

35-200'
200-400'
400-600'
600-810'

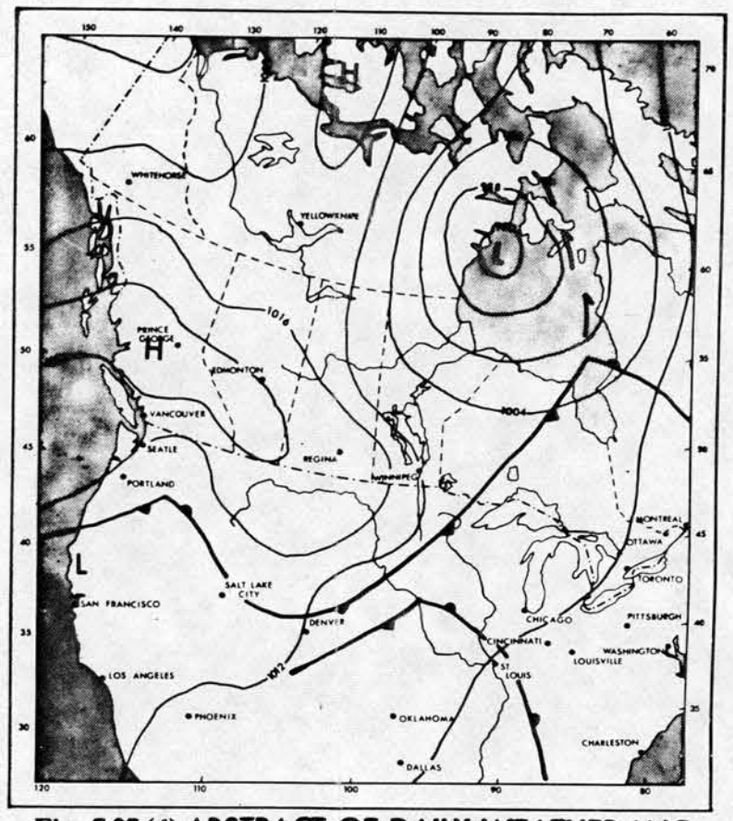


Fig. 7.27 (d) ABSTRACT OF DAILY WEATHER MAP

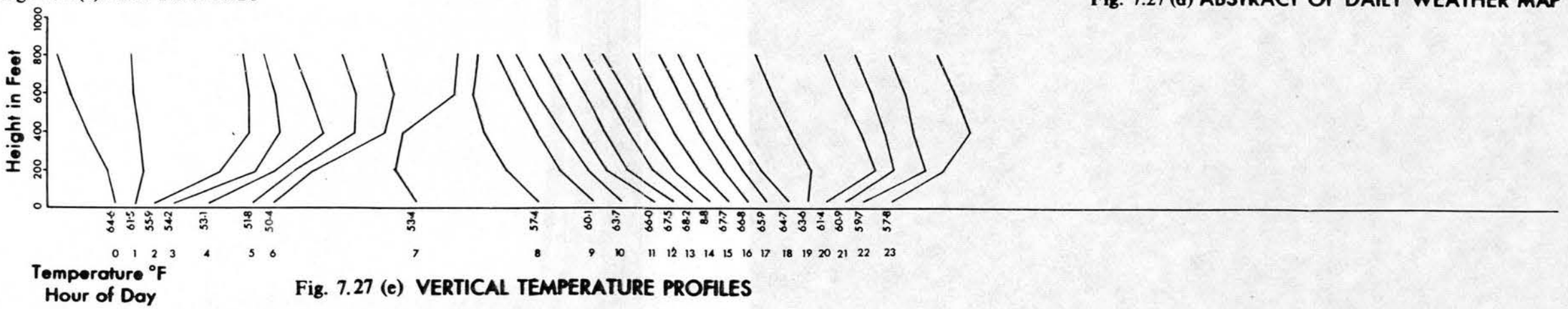


Fig. 7.27 (e) VERTICAL TEMPERATURE PROFILES

Figure 8.1

DIURNAL VARIATION OF WIND SPEED & DIRECTION

ALL YEAR

Winnipeg C.B.C. Tower

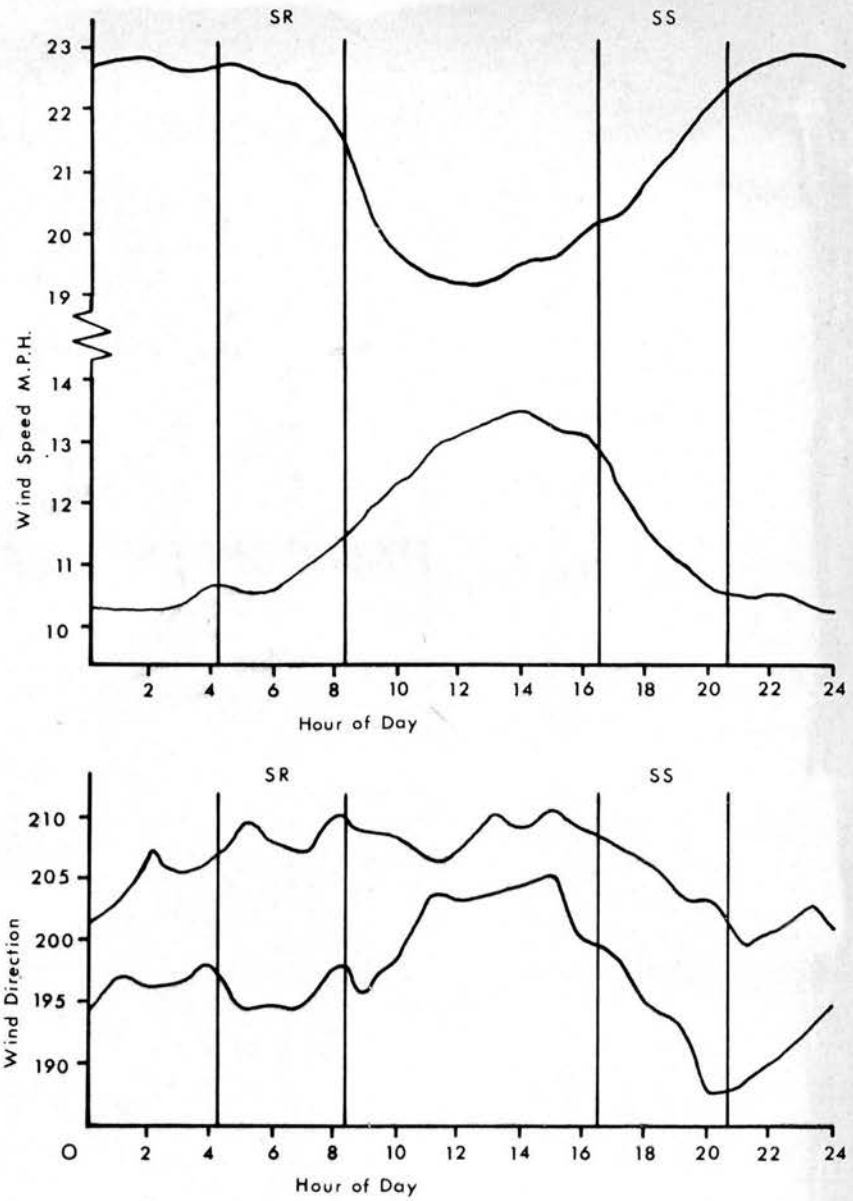


Figure 8.2

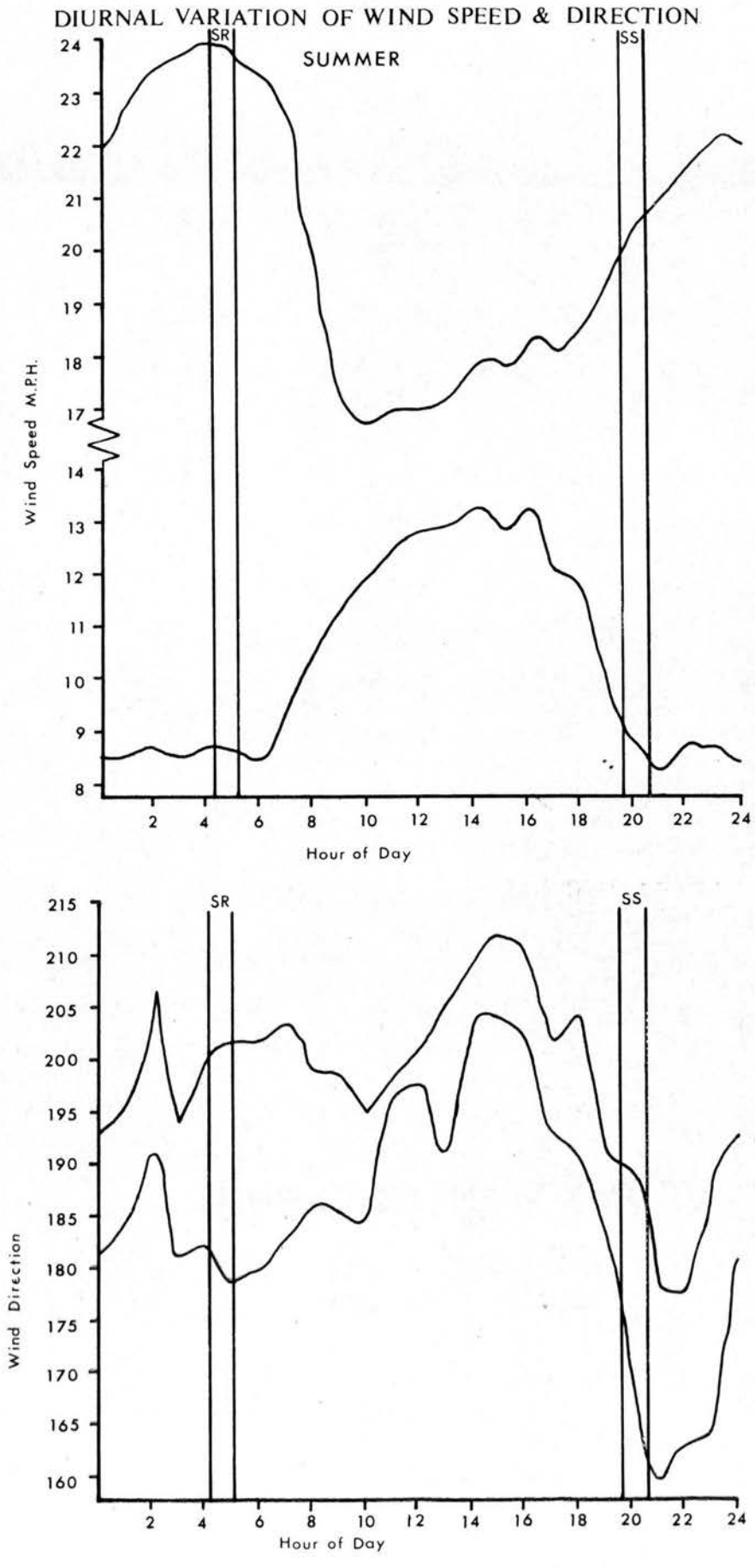

DIURNAL VARIATION OF WIND SPEED & DIRECTION
SUMMER
SR
SS
Wind Speed M.P.H.
24
23
22
21
20
19
18
17
14
13
12
11
10
9
8
2
4
6
8
10
12
14
16
18
20
22
24
Hour of Day
SR
SS
Wind Direction
215
210
205
200
195
190
185
180
175
170
165
160
2
4
6
8
10
12
14
16
18
20
22
24
Hour of Day

Figure 8.3

DIURNAL VARIATION OF WIND SPEED & DIRECTION

WINTER

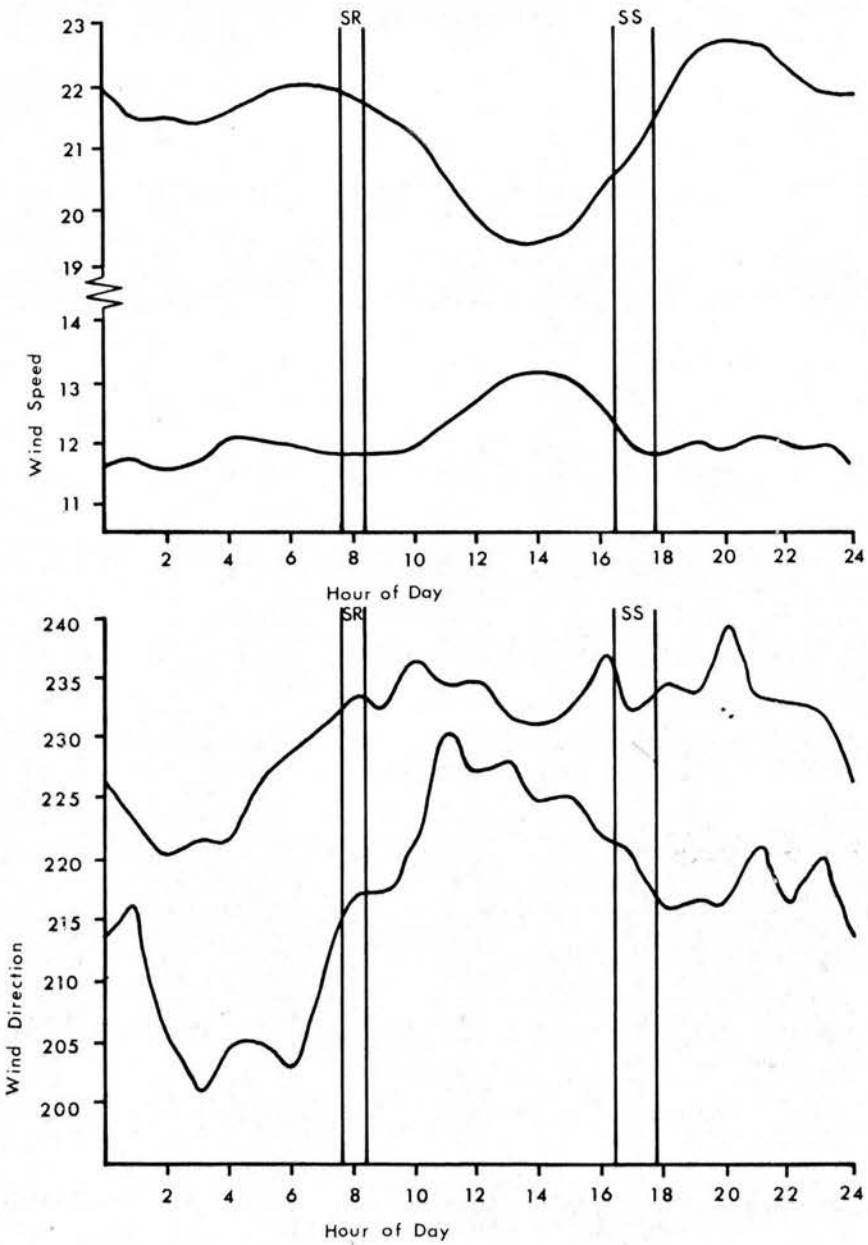


Figure 8.4

DIURNAL VARIATION OF WIND SPEED & DIRECTION

SPRING

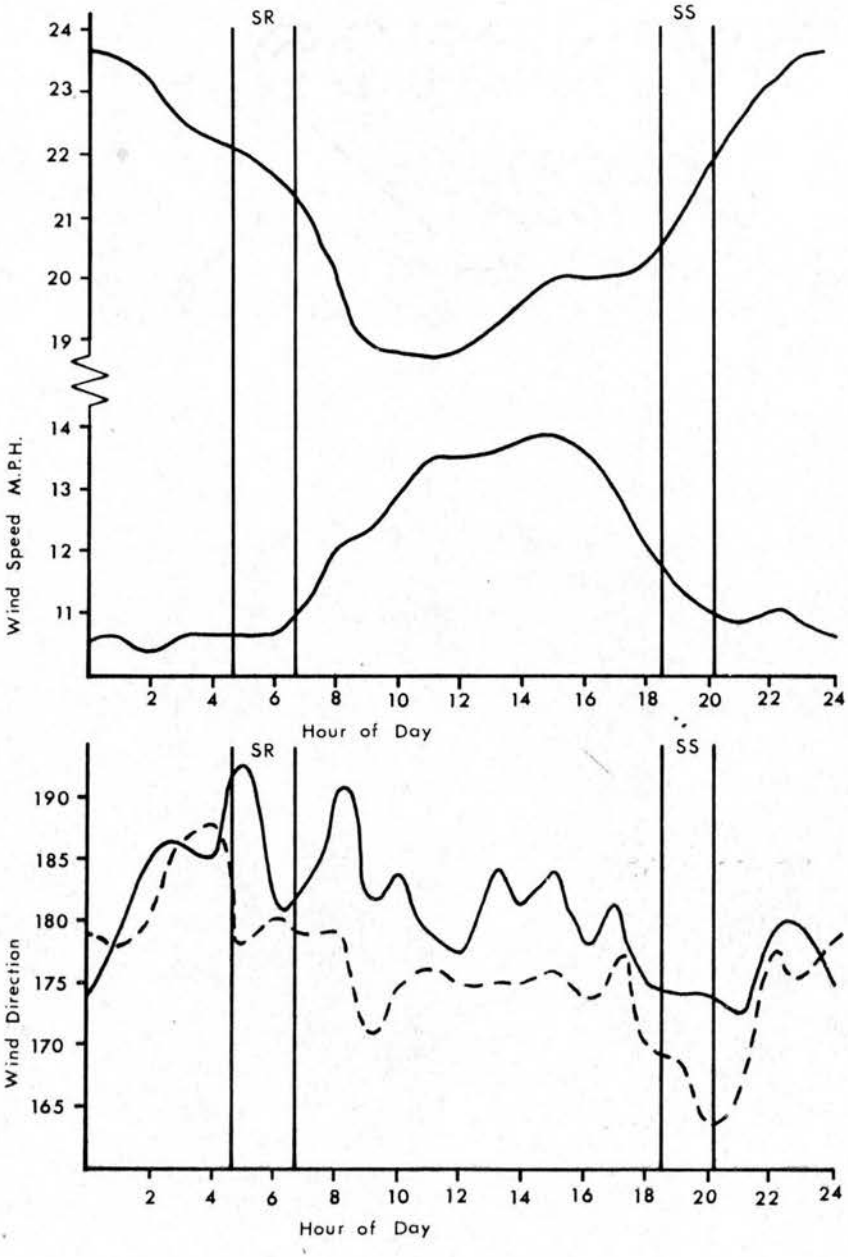


Figure 8.5

DIURNAL VARIATION OF WIND SPEED & DIRECTION

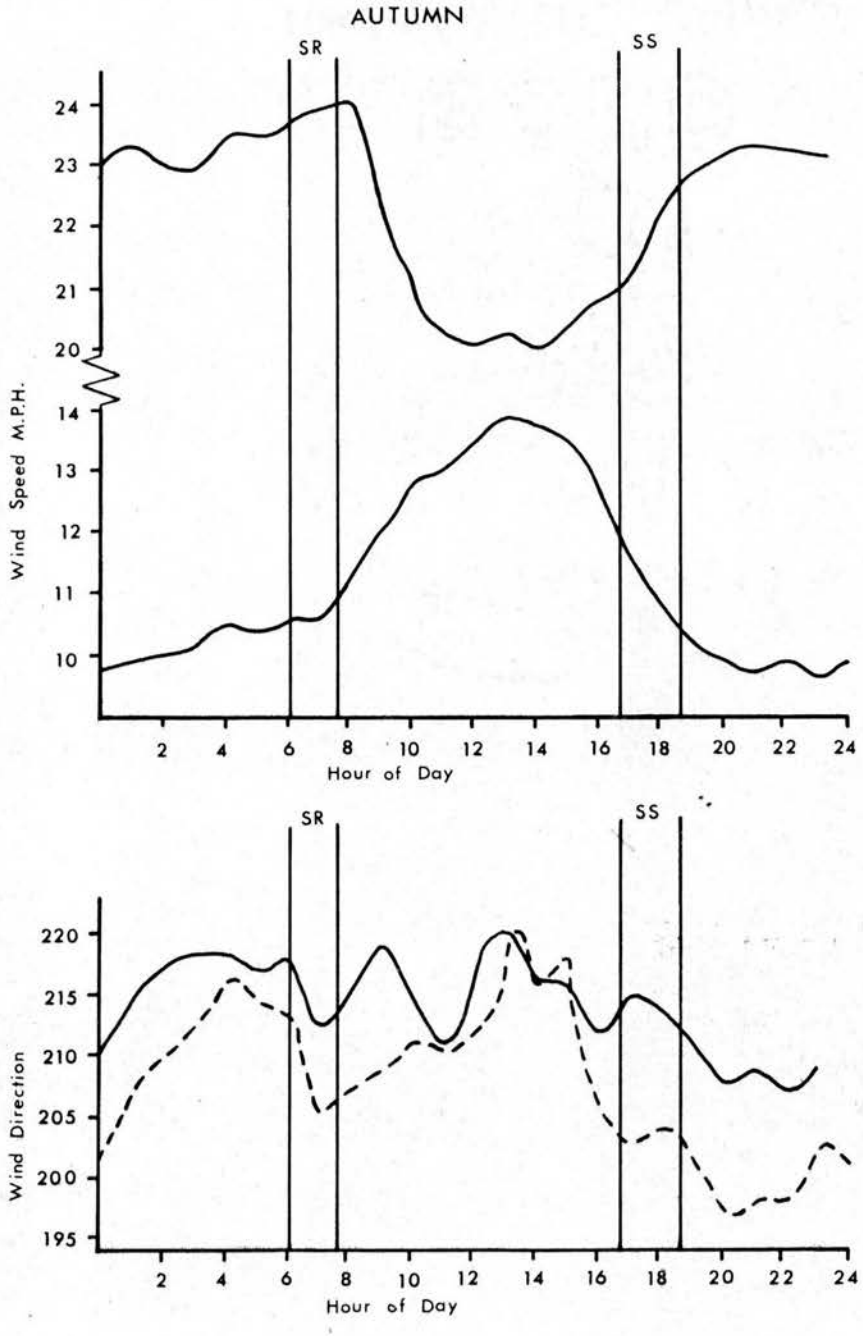
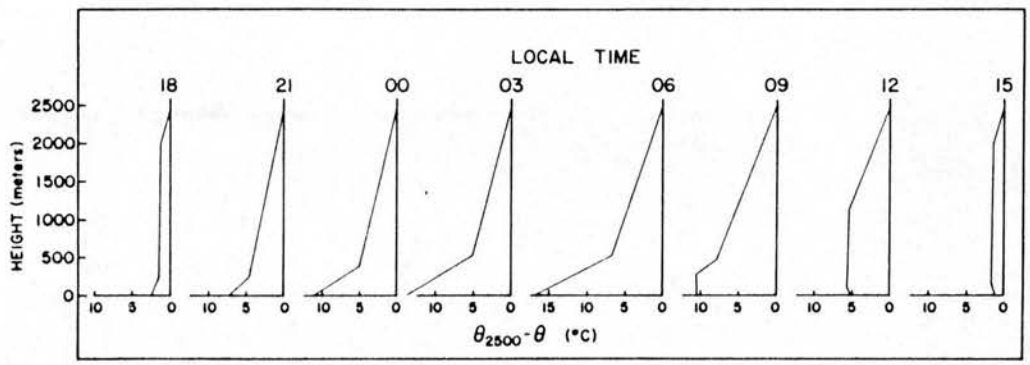
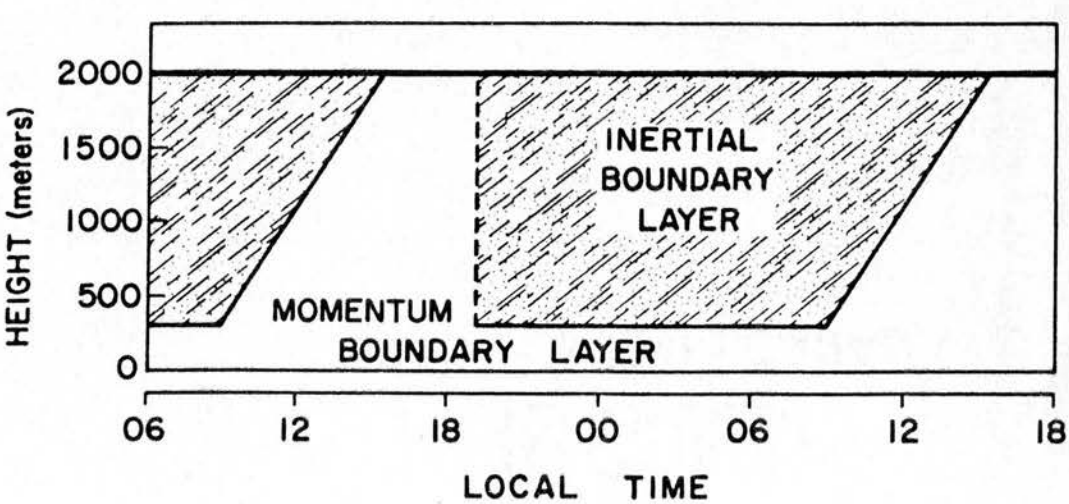


Figure 8.6



Schematic profiles illustrating the typical diurnal variation in the potential temperature profile (θ) for the lowest 8000' under basically clear sky conditions.

Figure 8.7



Schematic diagram of the diurnal variation in the depths of the momentum and inertial boundary layers. Together these layers make up the planetary boundary layer.
Source : Hoxit (1973)

Table 8.1

Wind Speed and Direction Frequencies for Winnipeg

W.M.O. Model B

PERIOD SEPTEMBER 1957-1966 STATION WINNIPEG INT A MAN

MEAN MONTHLY WIND SPEED FREQUENCY (MPH) MOD B

	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	47-54	55-63	64-75	75+	TOTAL	MEAN SPEED
CALM													9.6	
NNE	2.3	11.0	12.1	11.2	4.5	1.5	.2						42.8	11.7
NE	3.1	13.4	11.0	6.4	1.8	.5							36.2	9.3
ENE	1.0	5.0	2.9	2.7	1.3	.4							13.3	10.2
E	1.5	5.0	5.5	2.9	.4	.2							15.5	9.2
ESE	1.1	4.5	6.6	4.6	1.1								17.9	10.3
SE	2.5	12.0	10.9	9.4	1.4	.4							36.6	9.9
SSE	1.6	9.2	14.4	17.7	8.6	1.2	.2						52.9	13.2
S	3.5	14.6	28.9	39.4	16.0	4.8							107.2	13.5
SSW	1.1	9.8	17.5	13.7	5.0	.8							47.9	11.8
SW	1.8	9.8	18.2	7.7	1.5	.1							39.1	10.0
WSW	1.4	8.4	13.9	8.2	2.8	.6							35.3	10.9
W	2.4	14.3	25.9	11.0	4.1	1.5							59.2	10.8
WNW	1.0	8.8	15.0	11.4	5.4	2.3	.2						44.1	12.6
NW	1.7	10.1	19.8	16.0	10.0	4.0	.7	.1					62.4	13.7
NNW	1.1	6.7	16.3	14.5	4.9	1.9	.2						45.6	12.9
N	3.0	10.7	15.1	15.5	7.4	2.0	.7						54.4	12.7
TOTAL	30.1	153.3	234.0	192.3	76.2	22.2	2.2	.1					720.0	11.8

PERIOD NOVEMBER 1957-1966 STATION WINNIPEG INT A MAN

MEAN MONTHLY WIND SPEED FREQUENCY (MPH) MOD B

	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	47-54	55-63	64-75	75+	TOTAL	MEAN SPEED
CALM													11.5	
NNE	1.1	5.8	11.4	13.2	5.3	1.8	.2						38.8	13.5
NE	1.8	7.9	9.8	7.7	1.4	.1							28.7	10.4
ENE	.5	4.5	5.2	4.0	.7	.1							15.0	10.4
E	1.4	3.8	6.4	2.9	.4								14.9	9.2
ESE	.4	3.8	5.7	5.6	.9	.4							16.8	11.4
SE	1.3	7.8	10.4	8.9	1.6	.1							30.1	10.7
SSE	1.7	10.0	14.5	15.3	4.3	2.0	.4						48.2	12.5
S	3.0	15.5	28.5	38.3	19.6	10.5	1.1	.1					116.6	14.8
SSW	1.1	9.5	17.1	12.0	3.8	.6							44.1	11.3
SW	2.4	7.8	10.9	4.2	1.0	.5							26.8	9.4
WSW	2.1	6.1	5.8	3.2	2.6	.5							20.3	10.6
W	2.3	9.7	18.3	8.5	3.5	.8							43.1	10.8
WNW	1.3	6.4	17.6	13.3	6.8	2.2	.2	.3	.1				48.2	13.6
NW	2.1	9.1	26.7	31.5	15.9	10.8	3.1	.3					99.5	15.8
NNW	1.0	4.9	12.5	18.9	13.5	6.6	1.4	.4					59.2	14.1
N	1.9	8.5	16.2	17.0	10.9	2.7	1.0						720.0	13.1
TOTAL	25.4	121.1	217.0	204.5	92.2	39.7	7.4	1.1	.1					

PERIOD OCTOBER 1957-1966 STATION WINNIPEG INT A MAN

MEAN MONTHLY WIND SPEED FREQUENCY (MPH) MOD B

	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	47-54	55-63	64-75	75+	TOTAL	MEAN SPEED
CALM													11.5	
NNE	1.8	7.6	11.4	9.7	5.2	.8							36.5	11.9
NE	2.8	8.1	7.0	6.2	2.6	.3							27.0	10.1
ENE	1.4	3.7	2.8	2.3	.2								10.4	8.7
E	1.7	3.9	3.7	2.9	.2								12.4	8.6
ESE	.9	4.6	5.3	3.8	.7	.3							15.6	10.4
SE	2.7	8.0	11.9	12.1	3.1	.5							38.3	11.2
SSE	1.6	8.5	15.0	18.5	8.4	2.7	.5						55.2	13.7
S	3.3	16.8	33.5	45.7	23.0	5.2	.5						128.0	14.0
SSW	1.4	9.2	15.6	15.0	2.9	.5	.6						45.2	12.0
SW	1.7	6.2	13.6	7.9	1.1	.8	.2						31.5	11.0
WSW	1.5	6.1	9.7	5.3	1.4	.8	.2						25.0	11.0
W	1.8	12.0	21.8	13.3	4.6	1.9	.1	.1					55.6	11.7
WNW	1.2	8.1	17.3	11.0	5.9	1.7	.3						45.5	12.5
NW	2.1	9.3	26.2	22.0	12.5	7.0	1.4		.1				80.6	14.7
NNW	1.1	7.2	13.7	22.8	11.1	6.0	1.1	.1					63.1	15.5
N	3.5	12.1	16.4	19.4	8.1	2.6	.5						62.6	12.7
TOTAL	30.5	131.4	224.9	217.9	91.0	31.1	5.4	.2	.1				744.0	12.6

PERIOD DECEMBER 1957-196[illegible] STATION WINNIPEG INT A MAN

MEAN MONTHLY WIND SPEED FREQUENCY (MPH) MOD B

	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	47-54	55-63	64-75	75+	TOTAL	MEAN SPEED
CALM													12.3	
NNE	3.1	10.0	12.7	12.4	3.3	.6	.2						42.3	11.1
NE	3.0	7.1	11.8	6.2	1.7	.1							29.9	9.8
ENE	1.5	4.6	5.0	1.7	.1								12.9	8.3
E	1.8	3.0	5.6	2.5	.7								13.6	9.2
ESE	.9	2.9	4.0	3.7	1.6	.4							13.5	11.8
SE	1.5	8.0	8.4	7.1	2.7	1.5	.2						29.4	11.8
SSE	2.1	8.7	14.2	15.3	7.3	2.6	.1						50.3	13.2
S	3.3	17.7	39.4	38.4	26.8	10.3	.5						136.4	14.4
SSW	2.0	8.7	13.3	8.5	2.5	.5	.1						35.6	10.7
SW	2.1	10.5	8.4	1.8	.2								23.0	7.3
WSW	1.4	6.9	5.7	2.3	.1								16.4	8.0
W	2.8	16.1	25.4	13.0	2.9	.5	.1						60.8	10.2
WNW	1.9	12.8	23.1	15.8	3.3	1.2	.2						58.3	11.1
NW	3.9	12.0	27.0	27.7	12.5	7.6	3.1	.1					93.9	14.5
NNW	2.1	7.9	13.5	17.7	12.0	4.8	.9						58.9	14.9
N	3.2	8.3	11.7	17.4	9.1	5.9	.9						56.5	14.7
TOTAL	36.6	145.2	229.2	191.5	86.8	36.0	6.3	.1					744.0	12.3

Table 8.2

TYPE19 FREQUENCY OF 35 FOOT WINDS, C.B.C. TOWER , STARBUCK WINT 1969-1972

TIME	0- 1	2- 4 MPH								> 4- 9 MPH								> 9-15 MPH								>15 MPH								HOURLY
		N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	TOTALS
0	12	0	0	2	0	1	2	3	2	10	6	7	5	11	12	15	12	7	6	1	8	12	6	20	25	6	1	0	6	22	0	8	18	246
1	14	0	1	1	3	2	1	2	2	3	6	3	7	12	5	19	13	9	7	1	6	14	3	26	24	5	1	0	8	19	1	6	22	246
2	16	4	0	1	3	0	1	3	2	10	6	1	7	11	8	9	8	7	9	1	7	10	4	33	26	4	1	0	8	20	0	6	20	246
3	18	2	2	1	1	0	3	0	1	8	5	3	8	10	7	16	6	9	11	1	6	9	3	22	29	8	3	0	9	22	0	5	17	245
4	9	3	0	2	2	0	3	1	1	7	7	3	3	9	6	15	13	8	8	1	12	13	2	22	24	6	6	0	7	23	0	6	23	245
5	12	3	2	0	2	1	4	0	0	9	8	2	4	11	5	16	10	12	4	0	13	8	6	22	23	7	4	1	7	21	2	4	22	245
6	11	3	1	1	1	0	3	2	2	11	9	2	9	8	4	9	9	12	3	0	7	11	6	23	20	14	3	0	5	30	1	4	22	246
7	9	1	1	1	2	2	3	4	0	10	7	3	7	11	5	10	13	17	3	0	9	12	7	23	21	12	1	0	5	23	2	4	18	246
8	11	1	0	1	1	3	2	2	2	6	5	2	11	12	6	16	10	14	1	2	10	11	4	24	21	12	2	0	5	22	1	3	20	243
9	9	0	0	2	2	2	0	4	1	10	5	3	8	11	6	15	14	12	0	1	11	12	2	28	24	12	1	1	8	19	1	1	21	246
10	14	0	3	0	3	4	3	6	1	9	2	2	7	8	5	19	7	15	0	0	7	13	4	18	26	12	2	0	12	18	1	7	19	247
11	12	2	3	1	4	2	2	0	3	9	0	2	3	10	9	15	12	8	3	0	5	14	8	14	29	14	0	0	10	22	1	5	25	247
12	18	1	1	1	2	2	2	3	1	5	5	0	3	12	7	15	12	13	2	1	6	14	6	10	22	17	0	0	9	22	3	8	24	247
13	14	2	0	2	0	0	4	2	2	8	1	3	4	14	6	19	10	8	2	1	8	15	1	14	16	16	1	0	13	19	2	9	33	249
14	11	2	0	1	3	5	3	2	0	3	3	2	7	12	9	12	12	6	2	1	5	17	3	15	21	14	1	0	13	18	1	10	35	249
15	9	3	0	1	3	2	3	2	1	4	2	2	7	14	6	5	16	6	6	1	8	17	6	8	29	14	2	0	13	17	0	12	29	248
16	10	0	1	2	3	0	1	1	3	5	5	3	5	12	10	11	14	5	4	0	9	19	4	15	27	7	2	0	11	17	1	6	35	248
17	11	1	1	1	1	1	4	4	0	7	4	4	11	13	6	10	15	5	4	3	6	16	5	13	31	8	3	0	10	17	1	6	27	249
18	12	1	0	0	2	3	2	3	2	5	5	5	7	11	14	11	11	3	6	1	7	15	3	13	33	9	1	0	11	20	1	6	25	248
19	11	3	1	0	0	1	4	2	1	6	6	2	8	13	9	14	9	4	3	3	12	9	7	19	34	11	2	0	10	19	3	4	18	248
20	11	1	2	1	2	1	0	6	0	3	8	2	4	8	9	14	13	8	5	3	6	17	10	17	39	6	0	0	10	19	0	6	16	247
21	13	0	1	1	1	0	1	4	0	3	5	1	8	6	9	22	14	8	6	2	4	16	9	17	35	5	0	0	12	22	1	6	16	248
22	11	1	1	1	2	0	2	1	1	6	3	4	5	9	13	17	14	10	8	1	6	15	4	23	27	7	0	0	9	23	1	7	16	248
23	8	0	0	1	2	2	0	3	2	2	6	4	7	10	13	16	16	8	7	1	5	13	7	22	26	9	0	0	9	23	0	9	16	247

TOTALS BY DIRECTION AND SPEED DURING TYPE 19 LAPSE RATES

286 21 45 53 30 119 155 189 283 110 183 120 632 37 220 24 537 5924

34 25 34 60 159 65 258 340 214 26 322 461 235 2 497 148

LAPSE RATE PERCENT TOTALS BY DIRECTION AND SPEED DURING TYPE 19 LAPSE RATES

4.8 0.4 0.8 0.9 0.5 2.0 2.6 3.2 4.8 1.9 3.1 2.0 10.7 0.6 3. 7 0.4 9.1

0.6 0.4 0.6 1.0 2.7 1.1 4.4 5.7 3.6 0.4 5.4 7.8 4.0 0.0 8.4 2. 5

PERCENT TOTALS BY SPEED DURING TYPE 19 LAPSE-RATES

4.8 5.1 26.5 34.9 28. 7

PERCENT TOTALS BY DIRECTION DURING TYPE 19 LAPSE RATES

4.8% CALM · 10.8% NORTH 4.8%N-EAST 2.0% EAST 10.2% S-EAST 18.8% SOUTH 6.5% S-WEST 17. 0% WEST 25.0% N-WEST

Table 8.3

TYPE19 FREQUENCY OF 35 FOOT WINDS, C.B.C. TOWER , STARBUCK SPR 1970-1972

TIME	0- 1	2- 4 MPH								> 4- 9 MPH								> 9-15 MPH								>15 MPH								HOURLY
		N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	TOTALS
0	10	2	2	4	0	0	2	1	2	12	10	10	11	13	7	12	8	14	16	1	9	17	9	8	15	9	2	0	6	13	0	0	14	239
1	11	2	1	5	5	1	0	4	2	10	13	6	6	11	8	10	7	13	10	2	7	24	10	9	21	10	2	0	8	9	0	0	12	239
2	10	4	1	5	3	3	2	0	0	9	11	9	7	14	14	15	9	12	7	1	11	19	5	14	11	12	3	0	7	10	0	2	9	239
3	10	0	5	6	5	2	5	1	2	12	5	5	7	11	8	11	9	14	10	3	8	16	7	10	19	11	3	1	2	14	1	2	12	237
4	12	1	3	3	3	1	2	1	2	14	4	12	8	16	9	11	8	13	9	1	7	17	7	9	16	13	4	1	5	10	1	3	13	239
5	18	0	0	3	2	5	4	0	3	6	12	6	6	9	14	5	10	11	7	1	10	19	5	8	20	11	6	0	7	10	3	1	14	238
6	13	3	6	3	3	3	3	4	1	9	5	9	4	16	6	8	5	12	12	1	8	16	7	8	20	10	7	0	6	15	0	3	12	238
7	12	5	0	3	1	4	2	1	3	7	11	5	8	9	6	12	4	9	8	6	8	20	2	11	18	13	8	2	7	15	2	3	13	238
8	10	2	2	1	1	3	2	1	3	4	4	10	4	10	6	7	10	14	8	4	7	19	4	8	17	14	5	2	7	23	2	4	16	234
9	17	3	0	2	2	2	1	4	3	5	3	8	3	11	7	10	7	12	12	1	10	15	5	2	14	17	5	1	6	21	1	6	20	236
10	9	1	0	1	2	4	2	5	3	5	5	5	5	16	7	7	5	11	9	2	7	12	4	3	15	20	7	1	12	24	2	7	18	236
11	10	1	3	2	1	3	1	3	4	2	5	7	4	12	3	9	5	13	7	1	10	13	5	9	9	19	9	0	11	23	3	6	22	235
12	8	0	1	3	1	3	2	5	4	2	9	4	6	12	2	8	7	14	7	3	4	19	6	7	9	16	11	0	10	26	1	6	23	239
13	17	1	0	0	2	0	2	2	4	3	5	6	3	7	3	9	6	9	8	4	7	17	5	3	17	20	8	0	13	23	3	6	26	239
14	14	1	2	6	4	1	1	1	1	2	5	3	8	4	6	9	5	19	5	1	8	11	5	2	13	15	13	1	13	26	3	6	25	239
15	10	2	1	5	3	3	0	2	1	2	6	4	6	10	7	5	7	10	7	5	7	10	5	4	10	20	12	1	11	25	3	5	25	234
16	11	1	0	5	2	3	4	2	1	6	5	5	4	5	5	3	4	12	8	3	9	14	6	2	19	16	14	1	6	27	2	5	21	231
17	12	2	0	6	2	1	1	1	5	6	8	3	5	14	4	4	2	12	9	2	9	10	6	1	18	16	14	0	8	23	3	4	21	232
18	13	1	3	6	2	2	0	2	1	6	6	8	3	13	4	5	3	12	10	2	12	13	6	6	19	14	11	0	8	17	2	3	20	233
19	12	3	2	6	1	3	1	1	1	4	9	7	7	17	5	5	7	14	18	2	6	17	4	8	16	12	6	0	8	14	1	2	13	232
20	14	1	2	4	0	1	0	1	0	12	8	8	3	13	11	9	11	9	26	4	13	17	4	6	17	7	2	0	6	14	1	0	12	236
21	11	2	0	2	1	0	2	0	0	13	15	13	5	9	10	11	13	11	16	1	9	17	6	10	11	9	4	1	7	16	0	1	12	238
22	7	0	2	2	2	0	1	0	3	12	16	5	8	9	11	8	14	13	17	8	5	25	3	7	15	7	2	0	6	14	1	2	15	240
23	12	0	1	3	3	0	0	1	1	14	13	8	8	12	6	14	11	11	18	0	11	20	8	5	16	8	3	0	4	15	0	2	12	240

TOTALS BY DIRECTION AND SPEED DURING TYPE 19 LAPSE RATES

283 37 51 40 50 193 139 169 177 264 202 134 375 161 184 35 400 5681

38 86 48 43 179 166 273 207 294 59 397 160 319 12 427 79

LAPSE RATE PERCENT TOTALS BY DIRECTION AND SPEED DURING TYPE 19 LAPSE RATES

5.0 0.7 0.9 0.7 0.9 3.4 2.4 3.0 3.1 4.6 3.6 2.4 6.6 2.8 3. 2 0.6 7.0

0.7 1.5 0.8 0.8 3.2 2.9 4.8 3.6 5.2 1.0 7.0 2.8 5.6 0.2 7.5 1. 4

PERCENT TOTALS BY SPEED DURING TYPE 19 LAPSE-RATES

5.0 6.9 26.5 33.2 28. 5

PERCENT TOTALS BY DIRECTION DURING TYPE 19 LAPSE RATES

5.0% CALM 14.6% NORTH 11.5%N-EAST 5.7% EAST 10.1% S-EAST 20.2% SOUTH 6.7% S-WEST 8. 6% WEST 17.6% N-WEST

Table 8.4

TYPE19 FREQUENCY OF 35 FOOT WINDS, C.B.C. TOWER , STARBUCK SUM 1970-1972

TIME	0- 1	2- 4 MPH								> 4- 9 MPH								> 9-15 MPH								>15 MPH								HOURLY
		N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	TOTALS
0	18	0	0	4	1	0	2	4	3	10	10	7	10	16	16	12	14	5	4	3	8	18	8	7	8	2	1	1	4	6	2	0	2	206
1	16	1	1	1	1	1	0	3	0	11	7	8	14	15	22	21	13	7	2	2	9	10	10	5	6	2	2	0	3	7	3	1	2	206
2	10	1	1	4	1	2	0	4	0	15	7	12	9	14	17	19	10	6	3	1	9	15	9	10	8	1	0	0	6	3	2	4	3	206
3	22	0	1	1	2	2	1	0	1	12	7	8	8	23	14	19	10	5	5	2	9	9	6	11	9	0	0	0	3	7	2	3	4	206
4	22	0	0	3	1	2	2	2	0	11	6	5	7	21	18	19	9	2	3	0	12	11	7	9	12	2	0	1	5	7	1	4	2	206
5	20	0	0	4	0	0	1	1	0	11	6	5	12	24	18	23	10	5	4	1	11	5	6	8	9	2	0	1	6	5	0	3	4	205
6	24	2	2	4	1	3	1	3	0	7	3	4	11	16	14	12	15	6	6	1	9	14	7	11	7	3	0	1	5	4	3	1	4	204
7	21	0	0	6	1	0	7	0	1	10	4	7	6	14	6	13	7	8	6	0	9	16	7	12	10	4	1	0	6	7	2	5	5	201
8	15	2	1	2	1	4	0	1	0	8	7	8	3	16	6	10	6	7	5	4	6	17	5	11	11	6	1	0	3	15	2	11	10	204
9	11	0	2	2	2	1	2	2	0	6	6	5	8	11	7	9	2	16	3	4	7	14	4	10	11	5	3	1	9	17	5	9	14	208
10	15	0	2	3	0	1	1	2	0	6	4	7	5	4	7	8	4	13	3	2	7	18	9	6	15	6	2	0	9	17	6	9	15	206
11	13	0	1	1	0	1	2	0	0	1	2	3	6	8	4	8	7	13	8	6	8	15	8	10	13	11	3	2	8	18	4	8	14	206
12	10	0	0	0	1	1	3	0	0	5	4	5	5	5	8	7	4	18	6	3	7	8	11	10	15	9	4	2	9	20	4	9	13	206
13	16	1	0	0	2	0	1	1	0	2	4	5	4	9	9	4	2	16	4	2	7	9	7	12	12	7	3	1	9	23	5	10	19	206
14	12	0	0	0	0	0	0	0	0	4	4	6	3	9	3	13	4	16	6	2	7	9	5	9	15	4	2	1	9	18	5	10	20	196
15	14	0	0	1	1	1	1	0	0	4	1	3	2	5	6	4	9	14	11	1	7	10	3	9	17	6	1	0	9	12	3	11	16	182
16	13	0	1	1	1	1	0	1	0	10	2	3	2	4	3	7	3	17	5	1	6	7	3	5	15	9	2	0	9	10	7	10	15	173
17	15	2	1	2	0	0	1	0	0	3	5	1	3	2	2	6	3	16	8	1	2	6	4	10	15	9	2	0	9	12	3	4	13	160
18	10	1	2	1	0	1	1	0	0	8	5	3	2	6	2	12	3	9	8	2	3	6	5	4	19	9	3	0	7	10	6	4	7	159
19	10	1	1	1	2	2	1	0	0	5	8	8	3	6	6	7	12	14	9	3	0	5	5	9	12	4	2	0	8	7	3	3	5	162
20	16	1	0	3	3	0	0	2	0	16	14	5	6	9	8	10	10	5	5	2	6	6	3	6	6	4	2	0	4	7	6	1	3	169
21	21	3	2	3	1	0	1	1	4	12	13	9	7	9	12	15	6	6	7	1	10	7	5	4	5	3	1	1	4	6	4	1	2	186
22	20	1	3	3	0	0	2	0	0	14	6	14	9	12	11	14	11	5	5	1	10	10	13	3	5	4	2	1	8	6	2	2	3	200
23	24	1	0	1	1	0	1	1	2	11	6	14	12	14	14	13	8	7	4	1	8	15	11	2	7	3	1	0	6	6	2	4	3	203

TOTALS BY DIRECTION AND SPEED DURING TYPE 19 LAPSE RATES

388 21 23 31 11 141 157 233 182 130 177 161 262 38 158 82 198 4666

17 51 23 28 202 155 272 285 236 46 260 193 115 13 250 127

LAPSE RATE PERCENT TOTALS BY DIRECTION AND SPEED DURING TYPE 19 LAPSE RATES

8.3 0.5 0.5 0.7 0.2 3.0 3.4 5.0 3.9 2.8 3.8 3.5 5.6 0.8 3. 4 1.8 4.2

0.4 1.1 0.5 0.6 4.3 3.3 5.8 6.1 5.1 1.0 5.6 4.1 2.5 0.3 5.4 2. 7

PERCENT TOTALS BY SPEED DURING TYPE 19 LAPSE-RATES

8.3 4.4 34.9 31.4 21. 0

PERCENT TOTALS BY DIRECTION DURING TYPE 19 LAPSE RATES

6.3% CALM 12.2% NORTH 7.1%N-EAST 5.7% EAST 11.0% S-EAST 17.3% SOUTH 10.9% S-WEST 13. 6% WEST 14.0% N-WEST

Table 8.5

TYPE19 FREQUENCY OF 35 FOOT WINDS, C.B.C. TOWER , STARBUCK

FALL 1969-1971

TIME	0- 1	2- 4 MPH								> 4- 9 MPH								> 9-15 MPH								>15 MPH								HOURLY
		N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	TOTALS
0	14	2	2	5	2	1	3	2	2	8	3	2	11	18	13	15	20	10	4	1	9	19	2	10	10	3	3	0	5	8	1	4	11	223
1	9	2	1	5	3	2	3	1	6	12	5	5	7	16	13	18	16	13	2	1	11	18	3	10	10	3	2	0	3	10	0	3	10	223
2	12	3	0	4	4	1	2	8	1	12	6	2	7	16	8	19	19	8	1	1	14	18	0	12	13	1	5	0	4	9	1	3	8	222
3	7	1	2	2	2	4	2	4	3	14	9	7	4	17	9	17	18	9	3	0	16	13	4	11	9	3	3	0	3	9	1	3	12	221
4	3	0	2	3	2	1	2	2	2	16	6	8	8	15	13	17	19	7	5	1	12	12	4	14	15	3	3	0	4	9	1	3	10	222
5	9	2	1	3	0	2	1	2	2	14	5	5	12	14	14	17	17	8	7	0	10	11	0	12	15	4	2	0	5	12	2	6	9	223
6	7	5	0	4	1	2	2	4	3	15	6	5	7	11	7	16	11	10	5	2	12	12	4	14	13	4	2	0	5	12	2	5	12	220
7	14	2	1	4	1	3	2	1	2	12	6	7	8	8	9	17	13	11	6	1	9	15	4	11	11	5	3	0	6	11	1	7	10	221
8	18	1	1	3	1	4	2	4	1	11	8	1	2	6	3	13	10	15	6	2	10	16	6	14	12	7	1	0	6	16	1	9	14	224
9	14	1	1	6	1	0	2	2	3	5	4	6	4	9	5	11	11	20	5	1	3	19	2	9	19	7	1	0	9	19	1	9	16	225
10	7	0	1	6	5	2	2	0	4	10	3	5	6	5	5	10	6	16	6	0	5	20	2	11	13	12	1	0	11	19	1	8	23	225
11	5	1	1	7	5	4	2	2	4	9	5	5	6	6	6	7	7	14	3	1	8	7	7	9	18	13	1	0	12	18	3	7	23	226
12	9	1	0	7	1	2	0	2	2	9	4	2	7	7	7	8	5	18	2	2	4	9	5	11	16	13	2	2	9	26	1	10	25	228
13	6	2	0	3	4	2	4	0	3	9	1	5	4	8	2	3	9	13	3	0	6	15	5	9	26	11	3	0	14	20	3	9	26	228
14	8	3	0	1	1	3	1	2	1	5	3	2	8	6	3	2	7	14	3	3	8	15	2	17	29	9	4	0	9	22	3	9	23	226
15	5	0	1	2	2	2	2	1	5	5	4	5	9	4	4	9	9	14	3	4	5	14	3	10	24	9	3	0	8	21	4	10	24	225
16	10	2	0	2	4	1	3	5	0	5	4	3	6	7	2	10	12	19	2	2	5	12	3	14	17	6	3	0	11	20	3	5	25	223
17	10	1	3	2	2	3	2	1	1	11	5	3	8	5	10	11	13	17	6	3	8	12	3	6	21	9	2	1	6	17	3	4	15	224
18	12	3	1	2	2	2	0	3	2	14	4	3	8	14	8	13	15	15	7	6	8	16	1	9	18	10	1	0	6	10	0	3	8	224
19	15	2	4	3	1	2	1	5	0	15	9	4	8	11	7	15	17	10	6	1	7	14	2	6	15	8	1	2	7	12	0	3	10	223
20	16	5	0	3	4	4	3	2	2	18	6	5	8	8	10	14	15	14	3	0	8	16	4	8	13	5	1	0	5	12	1	2	10	225
21	8	3	2	6	5	5	4	2	2	20	5	4	9	13	10	12	17	10	3	3	10	15	3	10	8	5	1	0	7	10	1	4	8	225
22	16	1	2	2	3	3	0	1	1	12	6	5	9	18	8	18	17	18	1	1	11	16	5	8	7	4	1	0	8	8	0	5	11	226
23	13	3	3	7	1	6	4	1	1	9	2	4	4	20	8	14	24	15	2	1	0	22	3	7	9	2	1	0	5	10	0	3	12	225

TOTALS BY DIRECTION AND SPEED DURING TYPE 19 LAPSE RATES

247 29 57 49 53 119 170 184 327 94 208 77 361 50 168 34 355 5377

46 92 61 57 270 103 262 306 318 37 356 252 156 5 340 134

LAPSE RATE PERCENT TOTALS BY DIRECTION AND SPEED DURING TYPE 19 LAPSE RATES

4.6 0.5 1.1 0.9 1.0 2.2 3.2 3.4 6.1 1.7 3.9 1.4 6.7 0.9 3. 1 0.6 6.6

0.9 1.7 1.1 1.1 5.0 1.9 4.9 5.7 5.9 0.7 6.6 4.7 2.9 0.1 6.3 2. 5

PERCENT TOTALS BY SPEED DURING TYPE 19 LAPSE-RATES

4.6 8.3 32.4 31.7 23. 1

PERCENT TOTALS BY DIRECTION DURING TYPE 19 LAPSE RATES

4.6% CALM 14.7% NORTH 5.4%N-EAST 4.4% EAST 11.2% S-EAST 19.0% SOUTH 6.4% S-WEST 13. 9% WEST 20.4% N-WEST

Table 8.6

TYPE19 FREQUENCY OF 35 FOOT WINDS, C.B.C. TOWER , STARBUCK — A YR 1969-1972

TIME	0- 1	2- 4 MPH								> 4- 9 MPH								> 9-15 MPH								>15 MPH								HOURLY
		N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	TOTALS
0	54	4	4	15	3	2	9	10	9	40	29	26	37	58	48	54	54	36	30	6	34	66	25	45	58	20	7	1	21	49	3	12	45	914
1	50	5	4	12	12	6	4	10	10	36	31	22	34	54	48	68	49	42	21	6	33	66	26	50	61	20	7	0	22	45	4	10	46	914
2	48	12	2	14	11	6	5	15	3	46	30	24	30	55	47	62	46	33	20	4	41	62	18	69	58	18	9	0	25	42	3	15	40	913
3	57	3	10	10	10	8	11	5	7	46	26	23	27	61	38	63	43	37	29	6	39	47	20	54	66	22	9	1	17	52	4	13	45	909
4	46	4	5	11	8	4	9	6	5	48	23	28	26	61	46	62	49	30	25	3	43	53	20	54	67	24	13	2	21	49	3	16	48	912
5	59	5	3	10	4	8	10	3	5	42	31	18	34	58	51	61	47	36	22	2	44	43	17	50	67	24	12	2	25	48	7	14	49	911
6	55	13	9	12	6	8	9	13	6	42	23	20	31	51	31	45	40	40	26	4	36	53	24	56	60	31	12	1	21	61	6	13	50	908
7	56	8	2	14	5	9	14	6	6	39	28	22	29	42	26	52	37	45	23	7	35	63	20	57	60	34	13	2	24	56	7	19	46	906
8	54	6	4	7	4	14	6	8	6	29	24	21	20	44	21	46	36	50	20	12	33	63	19	57	61	39	9	2	21	76	6	27	60	905
9	51	4	3	12	7	5	5	12	7	26	18	22	23	42	25	45	34	60	20	7	31	60	13	49	68	41	10	3	32	76	8	25	71	915
10	45	1	6	10	10	11	8	13	8	30	14	19	23	33	24	44	22	55	18	4	26	63	19	38	69	50	12	1	44	78	10	31	75	914
11	40	4	8	11	10	10	7	5	11	21	12	17	19	36	22	39	31	48	21	8	31	49	28	42	69	57	13	2	41	81	11	26	84	914
12	45	2	2	11	5	8	7	10	7	21	22	11	21	36	24	38	28	63	17	9	21	50	28	38	62	55	17	4	37	94	9	33	85	920
13	53	6	0	5	8	2	11	5	9	22	11	19	15	38	20	35	27	46	17	7	28	56	18	38	71	54	15	1	49	85	13	34	104	922
14	45	6	2	8	8	9	5	5	2	14	15	13	26	31	21	36	28	55	16	7	28	52	15	43	78	42	20	2	44	84	12	35	103	910
15	38	5	2	9	9	8	6	5	7	15	13	14	24	33	23	23	41	44	27	11	27	51	17	31	80	49	18	1	41	75	10	38	94	889
16	44	3	2	10	10	5	8	9	4	26	16	14	17	28	20	31	33	53	19	6	29	52	16	36	78	38	21	1	37	74	13	26	96	875
17	48	6	5	11	5	5	8	6	6	27	22	11	27	34	22	31	33	50	27	9	25	44	18	30	85	42	21	1	33	69	10	18	76	865
18	47	6	6	9	6	8	3	8	5	33	20	19	20	44	28	41	32	39	31	11	30	50	15	32	89	42	16	0	32	57	9	16	60	864
19	48	9	8	10	4	8	7	8	2	30	32	21	26	47	27	41	45	42	36	9	25	45	18	42	77	35	11	2	33	52	7	12	46	865
20	57	8	4	11	9	6	3	11	2	49	36	20	21	38	38	47	49	36	39	9	33	56	21	37	75	22	5	0	25	52	8	9	41	877
21	53	8	5	12	8	5	8	7	6	48	38	27	29	37	41	60	50	35	32	7	33	55	23	41	59	22	6	2	30	54	6	12	38	897
22	54	3	8	8	7	3	5	2	5	44	31	28	31	48	43	57	56	46	31	11	32	66	25	41	54	22	5	1	31	51	4	16	45	914
23	57	4	4	12	7	8	5	6	6	36	27	30	31	56	41	57	59	41	31	3	33	70	29	36	58	22	5	0	24	54	2	18	43	915

TOTALS BY DIRECTION AND SPEED DURING TYPE 19 LAPSE RATES

1204 108 176 173 144 572 621 775 969 598 770 492 1630 286 730 175 1 490 21648
135 254 166 188 810 489 1065 1138 1062 168 1335 1066 825 32 1 514 488

LAPSE RATE PERCENT TOTALS BY DIRECTION AND SPEED DURING TYPE 19 LAPSE RATES

5.6 0.5 0.8 0.8 0.7 2.6 2.9 3.6 4.5 2.8 3.6 2.3 7.5 1.3 3. 4 0.8 6.9
0.6 1.2 0.8 0.9 3.7 2.3 4.9 5.3 4.9 0.8 6.2 4.9 3.8 0.1 7.0 2. 3

PERCENT TOTALS BY SPEED DURING TYPE 19 LAPSE-RATES

5.6 6.2 29.7 32.9 25. 6

PERCENT TOTALS BY DIRECTION DURING TYPE 19 LAPSE RATES

5.6% CALM 13.1% NORTH 7.2%N-EAST 4.4% EAST 10.6% S-EAST 18.8% SOUTH 7.5% S-WEST 13. 3% WEST 19.6% N-WEST

Table 8.7

TYPE20 FREQUENCY OF 810 FOOT WINDS, C.B.C. TOWER , STARBUCK — A YR 1969-1972

TIME	0- 1	2- 4 MPH								> 4- 9 MPH								> 9-15 MPH								>15 MPH								HOURLY
		N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	TOTALS
0	20	1	2	1	3	7	2	3	1	19	10	9	8	12	10	14	13	27	12	16	18	16	15	25	24	113	36	44	64	123	52	71	123	914
1	24	3	0	3	2	2	4	3	2	17	5	9	8	12	9	14	15	33	12	15	19	15	11	27	16	112	38	42	66	117	47	84	128	914
2	17	3	0	2	0	8	5	2	8	19	10	10	5	12	14	13	10	26	11	13	9	22	14	22	19	106	37	41	66	124	42	80	143	913
3	23	6	1	3	2	3	4	5	3	14	6	7	6	18	5	7	12	29	16	18	12	16	17	22	23	111	38	39	51	134	40	75	143	909
4	19	5	0	2	0	0	4	5	3	20	9	8	1	19	8	10	8	30	18	19	17	21	17	18	24	111	38	33	56	129	47	66	147	912
5	23	4	2	2	0	0	2	2	2	15	11	8	7	13	17	13	10	25	16	15	15	19	15	19	25	120	34	31	56	123	55	64	148	911
6	27	7	2	0	1	0	2	4	3	14	7	9	10	15	8	9	13	21	17	16	18	21	15	14	27	125	33	28	52	121	58	64	147	908
7	28	5	0	4	1	4	2	1	3	16	7	7	10	13	11	7	14	29	21	13	16	26	8	19	25	119	30	26	57	120	47	75	142	906
8	24	5	1	0	4	2	2	4	2	17	11	11	10	21	11	10	16	33	19	20	14	14	8	12	30	109	21	27	60	121	47	73	146	905
9	26	7	3	2	1	3	5	3	3	17	12	7	7	23	10	10	20	27	17	24	20	38	10	22	29	109	19	22	53	113	33	75	145	915
10	31	8	6	2	2	3	4	3	1	11	13	7	11	15	19	15	17	36	13	22	21	40	12	22	34	98	26	14	53	115	36	77	127	914
11	35	7	1	1	3	4	4	5	4	20	10	8	15	12	13	12	14	30	15	17	20	40	20	30	32	101	22	19	65	102	26	74	133	914
12	27	5	2	0	6	4	3	4	6	16	14	12	16	18	12	20	11	37	11	12	27	31	21	28	44	87	23	17	63	106	32	71	134	920
13	30	2	3	4	3	4	3	5	3	9	9	9	15	13	16	15	20	38	11	14	24	34	15	37	40	84	23	17	64	111	28	74	145	922
14	31	3	1	3	3	2	5	1	2	16	9	8	16	13	15	18	15	29	13	9	21	31	16	36	51	73	26	23	55	117	27	77	145	910
15	31	3	4	2	2	1	6	4	1	18	5	13	12	14	11	18	14	20	18	12	16	25	16	34	41	78	20	23	60	108	28	73	158	889
16	34	5	2	1	2	3	2	5	1	17	7	16	10	8	14	16	13	24	11	11	16	21	15	25	42	77	23	27	62	99	37	71	158	875
17	30	4	5	3	2	3	1	2	4	12	8	10	12	12	8	19	11	33	12	16	19	14	15	23	33	84	23	25	62	94	38	72	156	865
18	17	5	2	1	3	3	1	3	5	15	10	17	10	13	4	21	9	30	14	12	21	21	11	30	31	88	20	29	60	88	39	80	151	864
19	20	4	2	0	4	2	1	6	3	9	8	15	8	16	1	19	9	32	15	16	15	21	14	29	29	91	33	35	65	91	31	76	145	865
20	21	4	1	2	2	3	1	4	4	6	6	12	10	10	6	12	14	27	19	21	11	24	15	28	25	109	33	39	68	94	31	82	133	877
21	25	2	3	1	0	7	4	1	4	18	4	8	10	9	7	14	12	26	22	20	13	24	10	28	16	114	32	48	65	111	33	76	130	897
22	20	4	2	5	2	1	2	3	3	16	6	12	10	11	9	14	12	26	11	23	21	18	17	22	24	124	35	41	59	122	38	77	124	914
23	22	3	3	4	3	2	1	4	2	18	4	8	8	12	10	14	8	30	10	20	17	15	23	20	23	116	42	45	60	125	47	68	128	915

TOTALS BY DIRECTION AND SPEED DURING TYPE 20 LAPSE RATES

605 48 51 70 73 201 235 248 310 354 420 350 707 705 1442 939 3 379 21648

105 48 71 82 369 240 334 334 698 394 567 592 2459 735 2 708 1775

LAPSE RATE PERCENT TOTALS BY DIRECTION AND SPEED DURING TYPE 20 LAPSE RATES

2.8 0.2 0.2 0.3 0.3 0.9 1.1 1.1 1.4 1.6 1.9 1.6 3.3 3.3 6. 7 4.3 15.6

0.5 0.2 0.3 0.4 1.7 1.1 1.5 1.5 3.2 1.8 2.6 2.7 11.4 3.4 12.5 8. 2

PERCENT TOTALS BY SPEED DURING TYPE 20 LAPSE-RATES

2.8 2.5 10.5 18.9 65. 3

PERCENT TOTALS BY DIRECTION DURING TYPE 20 LAPSE RATES

2.8% CALM 16.8% NORTH 6.0%N-EAST 6.5% EAST 9.9% S-EAST 17.0% SOUTH 7.4% S-WEST 12. 9% WEST 20.6% N-WEST

Table 8.8

TYPE20 FREQUENCY OF 810 FOOT WINDS, C.B.C. TOWER , STARBUCK WINT 1969-1972

TIME	0- 1	2- 4 MPH								> 4- 9 MPH								> 9-15 MPH								>15 MPH								HOURLY
		N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	TOTALS
0	4	0	2	0	0	4	0	0	0	6	4	3	3	2	5	6	3	10	2	7	2	4	3	4	9	27	3	8	10	27	11	26	51	246
1	6	0	0	0	0	0	2	1	1	6	2	4	4	4	4	4	7	11	5	2	4	3	2	8	5	29	2	7	13	25	10	25	50	246
2	5	1	0	0	0	3	2	0	1	6	5	5	1	3	4	6	5	9	4	2	0	5	5	4	4	29	4	7	15	27	9	17	58	246
3	9	1	0	2	1	2	2	1	1	4	3	2	1	2	2	2	4	11	6	4	2	5	5	6	6	32	6	7	12	27	10	16	51	245
4	8	1	0	1	0	0	1	1	0	6	5	2	0	4	4	4	2	16	4	5	5	3	3	6	6	29	6	4	12	26	15	14	52	245
5	7	0	1	1	0	0	0	0	2	3	2	3	2	4	6	5	2	14	4	4	5	1	5	5	7	30	4	4	13	27	15	17	52	245
6	5	1	0	0	0	0	1	1	2	2	0	4	3	5	1	1	4	13	6	4	6	4	3	7	11	35	7	2	12	24	20	14	48	246
7	4	2	0	2	0	1	0	0	1	6	0	2	3	3	3	3	5	11	7	4	6	4	3	6	8	37	5	1	12	22	14	22	49	246
8	7	2	1	0	0	0	1	3	1	3	2	3	2	5	1	2	2	8	5	6	3	1	3	4	12	35	3	2	12	27	13	22	52	243
9	4	2	2	2	0	0	1	1	0	7	3	1	1	2	1	3	3	7	3	6	5	8	3	6	10	35	4	0	8	28	9	29	52	246
10	9	3	2	1	0	0	2	0	0	5	3	1	0	0	3	2	8	6	2	4	4	6	4	6	12	33	4	2	10	30	11	27	47	247
11	9	4	0	0	0	1	0	0	2	10	2	2	2	2	3	1	6	5	3	2	3	8	4	8	11	30	3	2	13	25	10	24	52	247
12	9	3	1	0	0	0	0	1	3	5	3	6	2	5	1	6	6	10	1	1	5	5	6	6	10	27	3	1	9	30	10	24	48	247
13	10	0	0	1	0	1	1	0	2	4	4	3	2	3	5	5	8	13	0	2	4	8	5	10	11	19	3	1	11	29	8	25	51	249
14	9	2	0	1	0	0	3	0	0	7	3	2	2	5	3	6	8	7	1	2	4	10	9	11	14	19	0	0	13	26	11	21	50	249
15	11	1	1	0	0	1	0	2	0	8	1	4	2	4	4	6	2	2	4	4	3	9	7	12	14	17	1	1	13	24	10	25	55	248
16	10	3	1	0	1	2	0	0	1	4	1	3	2	3	4	8	5	4	1	5	4	7	3	8	10	17	1	2	15	26	11	27	59	248
17	13	2	1	1	1	0	0	1	0	3	1	2	0	2	2	5	5	3	2	4	6	6	6	10	11	19	2	3	17	22	11	33	55	249
18	10	2	1	0	1	0	0	1	2	2	2	4	1	2	0	1	2	4	3	5	6	8	5	14	8	19	1	2	16	22	9	40	55	248
19	10	1	1	0	1	0	0	0	2	1	2	3	2	3	0	4	1	4	4	3	3	6	3	15	9	26	1	3	19	26	6	35	54	248
20	4	2	0	1	2	1	0	3	0	1	2	1	3	0	3	5	1	4	4	5	4	3	6	11	11	28	1	5	18	26	5	34	53	247
21	5	0	1	0	0	2	4	1	0	3	0	3	4	1	2	4	2	9	3	4	3	5	4	14	6	30	2	7	16	23	10	28	52	248
22	5	0	0	2	2	1	0	0	1	3	3	5	2	3	4	4	2	7	1	6	5	4	3	10	7	32	0	6	13	25	11	27	54	248
23	5	2	0	3	1	1	0	2	0	5	1	2	1	6	3	5	1	9	2	7	5	2	6	7	8	29	4	5	13	24	13	22	53	247

TOTALS BY DIRECTION AND SPEED DURING TYPE 20 LAPSE RATES

178 15 10 20 22 54 45 68 94 77 97 106 220 70 315 262 1 253 5924

35 18 20 19 110 70 73 98 197 98 125 198 663 82 618 594

LAPSE RATE PERCENT TOTALS BY DIRECTION AND SPEED DURING TYPE 20 LAPSE RATES

3.0 0.3 0.2 0.3 0.4 0.9 0.8 1.1 1.6 1.3 1.6 1.8 3.7 1.2 5. 3 4.4 21.2

0.6 0.3 0.3 0.3 1.9 1.2 1.2 1.7 3.3 1.7 2.1 3.3 11.2 1.4 10.4 10. 0

PERCENT TOTALS BY SPEED DURING TYPE 20 LAPSE-RATES

3.0 2.7 10.3 18.9 65. 1

PERCENT TOTALS BY DIRECTION DURING TYPE 20 LAPSE RATES

3.0% CALM 17.0% NORTH 3.6%N-EAST 4.5% EAST 7.9% S-EAST 14.1% SOUTH 7.7% S-WEST 15. 3% WEST 26.8% N-WEST

Table 8.9

TYPE20 FREQUENCY OF 810 FOOT WINDS, C.B.C. TOWER , STARBUCK SPR 1970-1972

TIME	0- 1	2- 4 MPH								> 4- 9 MPH								> 9-15 MPH								>15 MPH				HOURLY
		N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	TOTALS
0	3	0	0	1	2	1	0	0	0	3	2	1	3	2	1	3	6	10	3	2	3	5	1	7	4	38	16	20	18	39	10	9	26	239
1	5	0	0	1	0	1	0	1	0	6	2	2	0	3	0	5	2	8	2	5	4	4	2	6	5	38	18	18	18	36	8	15	24	239
2	5	2	0	2	0	1	0	0	1	3	0	1	2	3	3	5	1	7	3	3	4	5	3	7	8	39	16	16	19	33	12	13	22	239
3	3	2	0	1	0	0	1	2	1	7	0	1	3	5	1	3	3	8	1	4	3	2	4	4	5	37	17	15	17	36	10	14	27	237
4	6	3	0	0	0	0	1	1	2	3	4	2	0	4	1	4	5	6	3	4	6	8	4	4	2	36	16	14	12	33	11	13	31	239
5	9	2	1	0	0	0	1	1	0	3	5	0	3	5	3	4	3	4	4	2	5	4	2	6	6	37	16	14	11	34	11	12	30	238
6	10	4	1	0	1	0	0	2	1	6	3	3	2	3	1	4	4	3	5	3	6	6	3	1	5	35	13	14	8	34	12	11	34	238
7	10	1	0	1	0	2	2	1	1	4	4	1	3	4	2	1	6	8	4	3	7	12	1	1	6	36	14	11	12	30	7	15	28	238
8	10	0	0	0	2	1	0	1	0	6	6	1	5	4	4	2	5	11	5	5	6	6	2	1	7	30	10	12	14	34	7	8	29	234
9	12	3	1	0	0	2	1	1	2	4	3	3	1	8	3	1	6	7	6	6	4	13	3	3	6	30	9	7	17	28	6	8	32	236
10	13	4	2	0	1	2	1	1	0	4	4	0	3	8	6	5	2	10	3	5	7	11	1	2	6	32	11	5	13	31	8	11	24	236
11	15	2	1	0	1	2	1	0	0	4	3	2	4	4	3	6	4	10	4	6	8	8	3	3	5	33	10	7	13	32	5	10	26	235
12	10	1	0	0	1	4	1	2	1	4	4	3	4	5	3	4	2	14	1	5	9	10	6	4	9	26	11	9	12	30	5	10	29	239
13	9	1	1	1	0	2	1	5	0	2	3	2	4	5	1	3	5	12	3	4	9	8	3	7	5	32	10	9	11	34	6	8	33	239
14	10	1	1	1	1	0	1	0	1	3	3	4	5	3	5	3	2	10	4	1	5	4	1	6	17	25	13	12	12	40	6	8	31	239
15	12	0	2	1	0	0	2	0	1	0	2	5	4	5	2	5	6	6	5	2	4	4	1	5	6	32	11	11	13	37	6	8	36	234
16	13	0	1	0	0	0	0	2	0	5	1	6	3	2	4	3	5	8	5	2	6	5	7	1	10	30	11	10	14	31	7	6	33	231
17	6	1	1	2	0	1	1	0	4	5	0	4	4	6	4	6	2	12	6	4	9	3	3	0	6	30	11	9	11	33	7	5	36	232
18	5	0	1	1	1	2	0	2	2	6	3	5	4	3	2	6	3	11	5	3	8	5	4	2	6	33	10	12	12	29	10	6	31	233
19	3	1	0	0	2	2	0	3	1	4	3	5	2	6	1	6	4	12	5	4	6	7	3	3	3	31	13	14	16	28	6	9	29	232
20	7	0	0	0	0	1	0	1	2	5	2	4	3	6	1	1	6	9	6	3	2	8	6	2	5	38	17	15	19	26	5	10	26	236
21	6	1	0	1	0	3	0	0	1	7	1	1	4	5	2	4	3	7	8	3	3	9	3	1	4	40	12	21	18	31	4	10	25	238
22	5	1	1	1	0	0	0	1	1	4	1	0	6	2	2	2	1	12	1	4	6	7	6	2	10	42	16	20	16	31	7	9	23	240
23	7	0	1	0	1	1	0	1	0	5	1	0	3	1	2	3	4	13	3	4	2	4	2	4	5	40	19	21	14	40	9	7	23	240

TOTALS BY DIRECTION AND SPEED DURING TYPE 20 LAPSE RATES

194 15 13 14 22 60 75 57 90 95 132 74 151 320 340 185 688 5681

30 14 28 28 103 56 102 89 218 87 158 82 820 316 790 235

LAPSE RATE PERCENT TOTALS BY DIRECTION AND SPEED DURING TYPE 20 LAPSE RATES

3.4 0.3 0.2 0.2 0.4 1.1 1.3 1.0 1.6 1.7 2.3 1.3 2.7 5.6 6. 0 3.3 12.1

0.5 0.2 0.5 0.5 1.8 1.0 1.8 1.6 3.8 1.5 2.8 1.4 14.4 5.6 13.9 4. 1

PERCENT TOTALS BY SPEED DURING TYPE 20 LAPSE-RATES

3.4 2.9 11.1 17.5 65. 0

PERCENT TOTALS BY DIRECTION DURING TYPE 20 LAPSE RATES

3.4% CALM 20.6% NORTH 8.6%N-EAST 8.3% EAST 9.9% S-EAST 19.0% SOUTH 5.8% S-WEST 7. 6% WEST 16.7% N-WEST

Table 8.10

TYPE20 FREQUENCY OF 810 FOOT WINDS, C.B.C. TOWER , STARBUCK

SUM 1970-1972

TIME	0- 1	2- 4 MPH								> 4- 9 MPH								> 9-15 MPH								>15 MPH								HOURLY
		N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	TOTALS
0	10	1	0	0	1	1	1	1	1	3	4	3	1	2	2	2	3	5	3	5	5	5	5	4	2	21	6	11	20	27	17	14	20	206
1	9	0	0	1	1	0	1	1	1	1	1	3	2	2	4	1	1	5	3	4	6	6	2	6	3	23	8	10	20	24	17	21	19	206
2	3	0	0	0	0	3	1	1	3	3	3	2	2	3	4	1	2	4	3	4	3	7	3	4	2	18	8	9	19	28	11	26	26	206
3	6	2	1	0	0	1	0	1	0	0	1	0	2	6	0	0	2	4	6	5	3	5	7	4	2	24	7	10	13	36	10	24	24	206
4	3	1	0	1	0	0	0	2	0	5	0	2	1	6	1	1	1	2	5	7	2	6	5	2	5	23	9	7	16	35	14	19	25	206
5	4	1	0	1	0	0	0	1	0	5	3	1	1	2	4	0	4	3	1	5	4	6	5	5	2	27	6	6	18	31	17	15	27	205
6	7	1	0	0	0	0	0	1	0	4	3	0	2	3	3	1	2	0	2	6	4	5	6	3	3	27	5	9	16	30	17	18	26	204
7	9	1	0	0	1	1	0	0	0	5	1	1	1	4	2	2	1	5	2	5	2	5	1	5	5	16	7	7	16	32	19	16	29	201
8	5	0	0	0	0	1	0	0	1	6	0	5	2	7	4	1	8	9	4	4	3	3	2	2	5	16	4	7	15	29	16	20	25	204
9	7	1	0	0	0	0	0	1	1	5	3	2	3	6	5	3	5	6	2	6	9	13	4	8	7	15	3	6	14	26	7	17	23	208
10	6	1	1	0	0	0	1	2	1	1	3	2	6	3	8	2	3	8	3	7	7	13	4	10	10	14	6	3	11	27	8	14	21	206
11	8	0	0	0	0	1	2	0	2	2	2	3	5	3	3	2	3	8	5	4	5	15	7	13	9	18	4	4	16	24	5	14	19	206
12	6	0	0	0	2	0	0	0	1	3	3	2	4	3	5	7	2	7	5	4	7	11	4	12	12	15	3	3	19	21	9	13	23	206
13	6	1	0	1	1	0	0	0	0	3	1	2	4	2	7	5	3	6	5	5	7	7	5	12	13	12	4	3	18	24	7	16	26	206
14	6	0	0	0	1	1	0	1	0	2	2	2	4	2	3	4	3	6	4	3	7	10	5	10	10	13	6	6	13	22	4	19	27	196
15	6	0	0	0	1	0	1	0	0	6	1	1	3	3	4	4	2	7	3	4	5	5	2	10	10	15	4	6	14	19	6	14	26	182
16	5	1	0	1	0	1	1	1	0	4	2	3	3	1	3	2	1	7	3	2	2	4	1	8	12	13	5	7	13	18	8	11	30	173
17	10	0	1	0	0	1	0	0	0	1	4	0	4	2	1	3	2	13	0	2	1	1	4	4	6	16	5	7	12	17	7	12	24	160
18	1	2	0	0	1	1	0	0	0	4	2	5	2	3	1	6	0	12	3	0	2	2	1	7	9	12	5	7	11	17	8	10	25	159
19	2	0	1	0	1	0	0	0	0	4	2	4	2	4	0	2	2	7	3	5	1	3	4	7	8	13	11	7	11	17	7	11	23	162
20	3	2	0	0	0	0	0	0	0	0	2	4	2	2	1	2	3	9	5	5	3	6	2	7	6	14	8	10	14	17	10	12	20	169
21	7	1	1	0	0	0	0	0	1	5	3	2	1	1	2	1	4	5	7	5	3	3	1	7	3	20	9	12	16	27	9	13	17	186
22	6	1	1	1	0	0	0	2	0	6	2	4	1	1	1	3	5	3	4	8	4	3	4	3	3	21	10	10	18	31	8	19	17	200
23	5	1	1	1	1	0	0	1	1	5	0	3	1	1	3	2	2	3	3	6	4	5	9	4	5	21	8	14	20	29	9	15	20	203

TOTALS BY DIRECTION AND SPEED DURING TYPE 20 LAPSE RATES

140	7	11	8	13	48	59	71	64	84	99	93	152	151	373	250	562	4666
18	7	12	16	83	56	72	57	144	111	149	157	427	181	608	383		

LAPSE RATE PERCENT TOTALS BY DIRECTION AND SPEED DURING TYPE 20 LAPSE RATES

3.0	0.2	0.2	0.2	0.3	1.0	1.3	1.5	1.4	1.8	2.1	2.0	3.3	3.2	8. 0	5.4	12.0
0.4	0.2	0.3	0.3	1.8	1.2	1.5	1.2	3.1	2.4	3.2	3.4	9.2	3.9	13.0	8. 2	

PERCENT TOTALS BY SPEED DURING TYPE 20 LAPSE-RATES

3.0	2.0	10.9	21.2	62. 9

PERCENT TOTALS BY DIRECTION DURING TYPE 20 LAPSE RATES

3.0% CALM	14.4% NORTH	6.2%N-EAST	7.6% EAST	11.6% S-EAST	18.0% SOUTH	9.0% S-WEST	13. 1% WEST	17.0% N-WEST

Table 8.11

TYPE20 FREQUENCY OF 810 FOOT WINDS, C.B.C. TOWER , STARBUCK

FALL 1969-1971

TIME	0- 1	2- 4 MPH								> 4- 9 MPH								> 9-15 MPH								>15 MPH								HOURLY
		N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	TOTALS
0	3	0	0	0	0	1	1	2	0	7	0	2	1	6	2	3	1	2	4	2	8	2	6	10	9	27	11	5	16	30	14	22	26	223
1	4	3	0	1	1	1	1	0	0	4	0	0	2	3	1	4	5	9	2	4	5	2	5	7	3	22	10	7	15	32	12	23	35	223
2	4	0	0	0	0	1	2	1	3	7	2	2	0	3	3	1	2	6	1	4	2	5	3	7	5	20	9	9	13	36	10	24	37	222
3	5	1	0	0	1	0	1	1	1	3	2	4	0	5	2	2	3	6	3	5	4	4	1	8	10	18	8	7	9	35	10	21	41	221
4	2	0	0	0	0	0	2	1	1	6	0	2	0	5	2	1	0	6	6	3	4	4	5	6	11	23	7	8	16	35	7	20	39	222
5	3	1	0	0	0	0	1	0	0	4	1	4	1	2	4	4	1	4	7	4	1	8	3	3	10	26	8	7	14	31	12	20	39	223
6	5	1	1	0	0	0	1	0	0	2	1	2	3	4	3	3	3	5	4	3	2	6	3	3	8	28	8	3	16	33	9	21	39	220
7	5	1	0	1	0	0	0	0	1	1	2	3	3	2	4	1	2	5	8	1	1	5	3	7	6	30	4	7	17	36	7	22	36	221
8	2	3	0	0	2	0	1	0	0	2	3	2	1	5	2	5	1	5	5	5	2	4	1	5	6	28	4	6	19	31	11	23	40	224
9	3	1	0	0	1	1	3	0	0	1	3	1	2	7	1	3	6	7	6	6	2	4	0	5	6	29	3	9	14	31	11	21	38	225
10	3	0	1	1	1	1	0	0	0	1	3	4	2	4	2	6	4	12	5	6	3	10	3	4	6	19	5	4	19	27	9	25	35	225
11	3	1	0	1	2	0	1	5	0	4	3	1	4	3	4	3	1	7	3	5	4	9	6	6	7	20	5	6	23	21	6	26	36	226
12	2	1	1	0	3	0	2	1	1	4	4	1	6	5	3	3	1	6	4	2	6	5	5	6	13	19	6	4	23	25	8	24	34	228
13	5	0	2	1	2	1	1	0	1	0	1	2	5	3	3	2	4	7	3	3	4	11	2	8	11	21	6	4	24	24	7	25	35	228
14	6	0	0	1	1	1	1	0	1	4	1	0	5	3	4	5	2	6	4	3	5	7	1	9	10	16	7	5	17	29	6	29	37	226
15	2	2	1	1	1	0	3	2	0	4	1	3	3	2	1	3	4	5	6	2	4	7	6	7	11	14	4	5	20	28	6	26	41	225
16	6	1	0	0	1	0	1	2	0	4	3	4	2	2	3	3	2	5	2	2	4	5	4	8	10	17	6	8	20	24	11	27	36	223
17	1	1	2	0	1	1	0	1	0	3	3	4	4	2	1	5	2	5	4	6	3	4	2	9	10	19	5	6	22	22	13	22	41	224
18	1	1	0	0	0	0	1	0	1	3	3	3	3	5	1	8	4	3	3	4	5	6	1	7	8	24	4	8	21	20	12	24	40	224
19	5	2	0	0	0	0	1	3	0	0	1	3	2	3	0	7	2	9	3	4	5	5	4	4	9	21	8	11	19	20	12	21	39	223
20	7	0	1	1	0	1	1	0	2	0	0	3	2	2	1	4	4	5	4	8	2	7	1	8	3	29	7	9	17	25	11	26	34	225
21	7	0	1	0	0	2	0	0	2	3	0	2	1	2	1	5	3	5	4	8	4	7	2	6	3	24	9	8	15	30	10	25	36	225
22	4	2	0	1	0	0	2	0	1	3	0	3	1	5	2	5	4	4	5	5	6	4	4	7	4	29	9	5	12	35	12	22	30	226
23	5	0	1	0	0	0	1	0	1	3	2	3	3	4	2	4	1	5	2	3	6	4	6	5	5	26	11	5	13	32	16	24	32	225

TOTALS BY DIRECTION AND SPEED DURING TYPE 20 LAPSE RATES

93	11	17	28	16	39	56	52	62	98	92	77	184	164	414	242	876	5377			
22	9	11	19	73	58	87	90	139	98	135	155	549	156	692	563					

LAPSE RATE PERCENT TOTALS BY DIRECTION AND SPEED DURING TYPE 20 LAPSE RATES

1.7	0.2	0.3	0.5	0.3	0.7	1.0	1.0	1.2	1.8	1.7	1.4	3.4	3.1	7. 7	4.5	16.3				
0.4	0.2	0.2	0.4	1.4	1.1	1.6	1.7	2.6	1.8	2.5	2.9	10.2	2.9	12.9	10. 5					

PERCENT TOTALS BY SPEED DURING TYPE 20 LAPSE-RATES

1.7	2.5	9.6	18.2	68. 0																

PERCENT TOTALS BY DIRECTION DURING TYPE 20 LAPSE RATES

1.7% CALM	14.6% NORTH	5.8%N-EAST	6.0% EAST	10.8% S-EAST	17.2% SOUTH	7.4% S-WEST	15. 4% WEST	21.2% N-WEST												

TABLE 8.12

Duration of Light Winds at 35' Level, C.B.C. Tower

	Maximum Value (Hours)			99th Percentile (Hours)		
	≤3	≤6	≤9	≤3	≤6	≤9
Spring	18	26	40	11	20	38
Summer	11	28	37	9	18	32
Autumn	13	51	66	11	25	43
Winter	18	30	61	12	21	49
All Year	18	51	66	11	22	39

TABLE 8.13

Duration of Light Winds Winnipeg Airport 1961-70

	Maximum Value (Hours)			99th Percentile (Hours)		
	≤3	≤6	≤9	≤3	≤6	≤9
Spring	9	18	30	6	16	21
Summer	7	22	30	7	12	24
Autumn	6	17	37	6	12	24
Winter	19	25	36	9	18	22
All Year	19	25	37	7	14	24

TABLE 8.14

Duration of Light Winds for Calgary and Edmonton

	Calgary 1963 - 1967			Edmonton 1963 - 1967		
	≤3	≤6	≤9	≤3	≤6	≤9
Summer	16	33	55	14	46	91
Winter	30	70	119	20	90	147

Figure 8.8

DURATION OF LIGHT WINDS at WINNIPEG C.B.C. TOWER

WINTER 1969-72

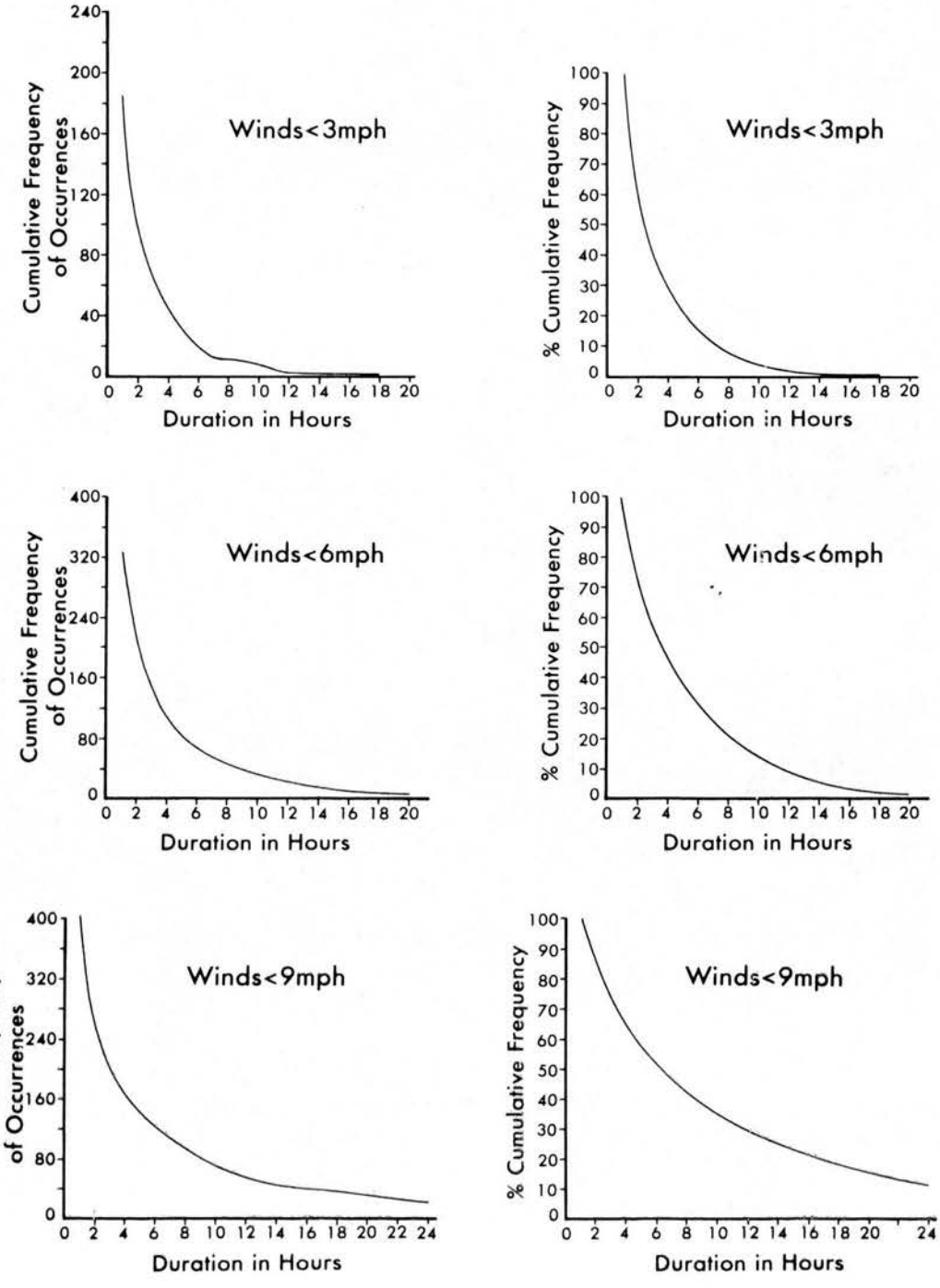


Figure 8.9

DURATION OF LIGHT WINDS at WINNIPEG C.B.C. TOWER

SPRING 1970-72

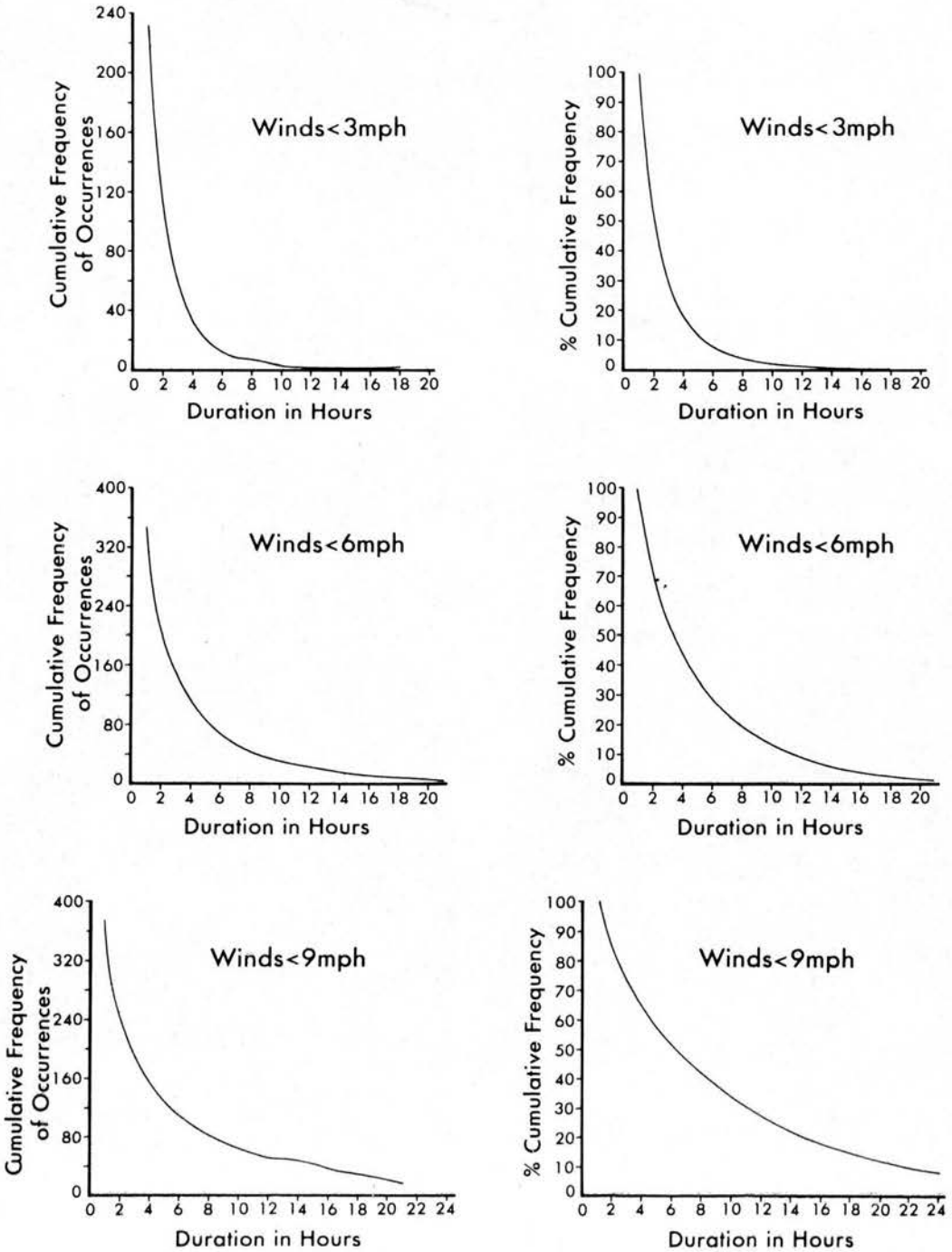


Figure 8.10

DURATION OF LIGHT WINDS at WINNIPEG C.B.C. TOWER

SUMMER 1970-72

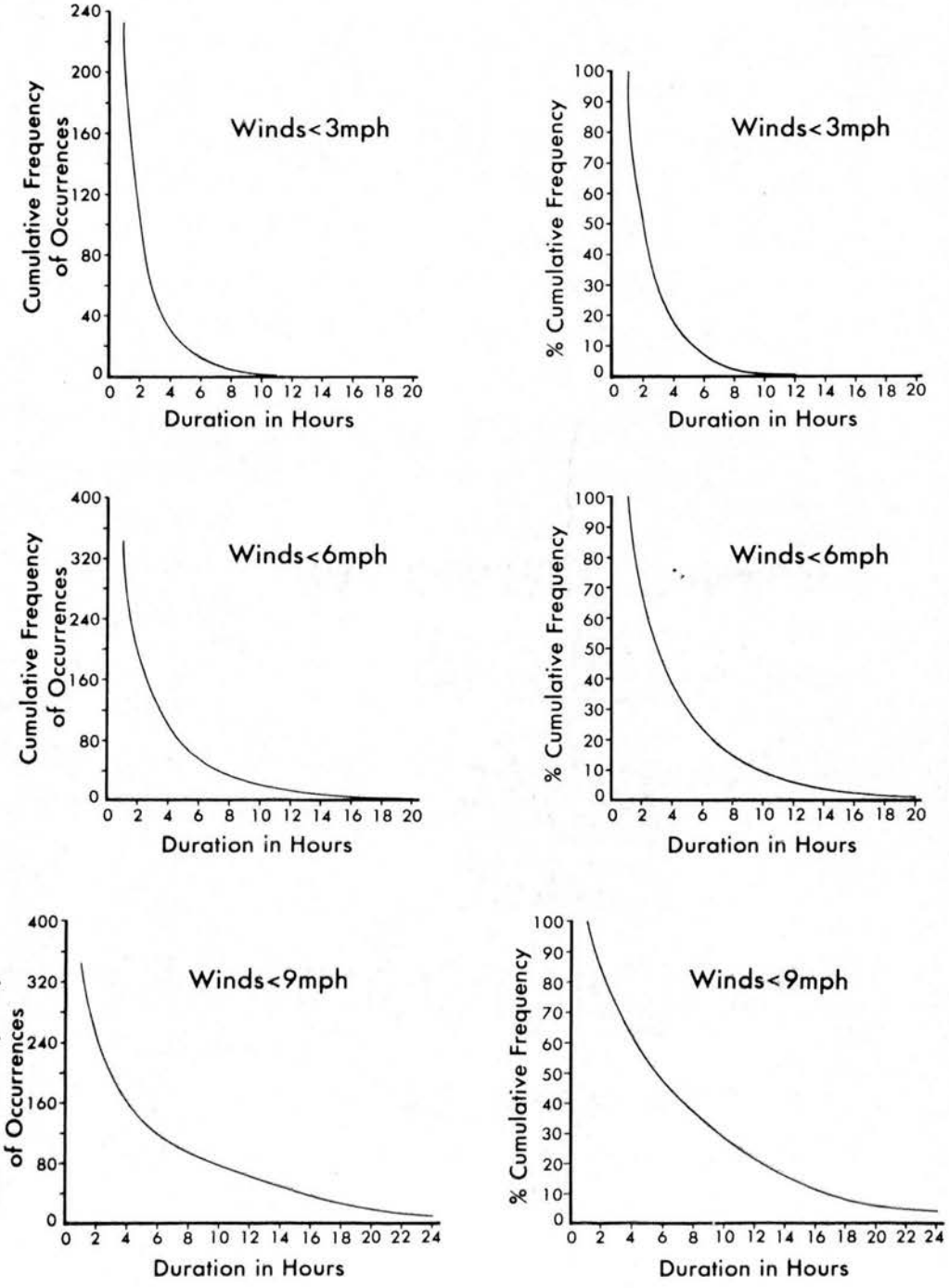


Figure 8.11

DURATION OF LIGHT WINDS at WINNIPEG C.B.C. TOWER

FALL 1969-71

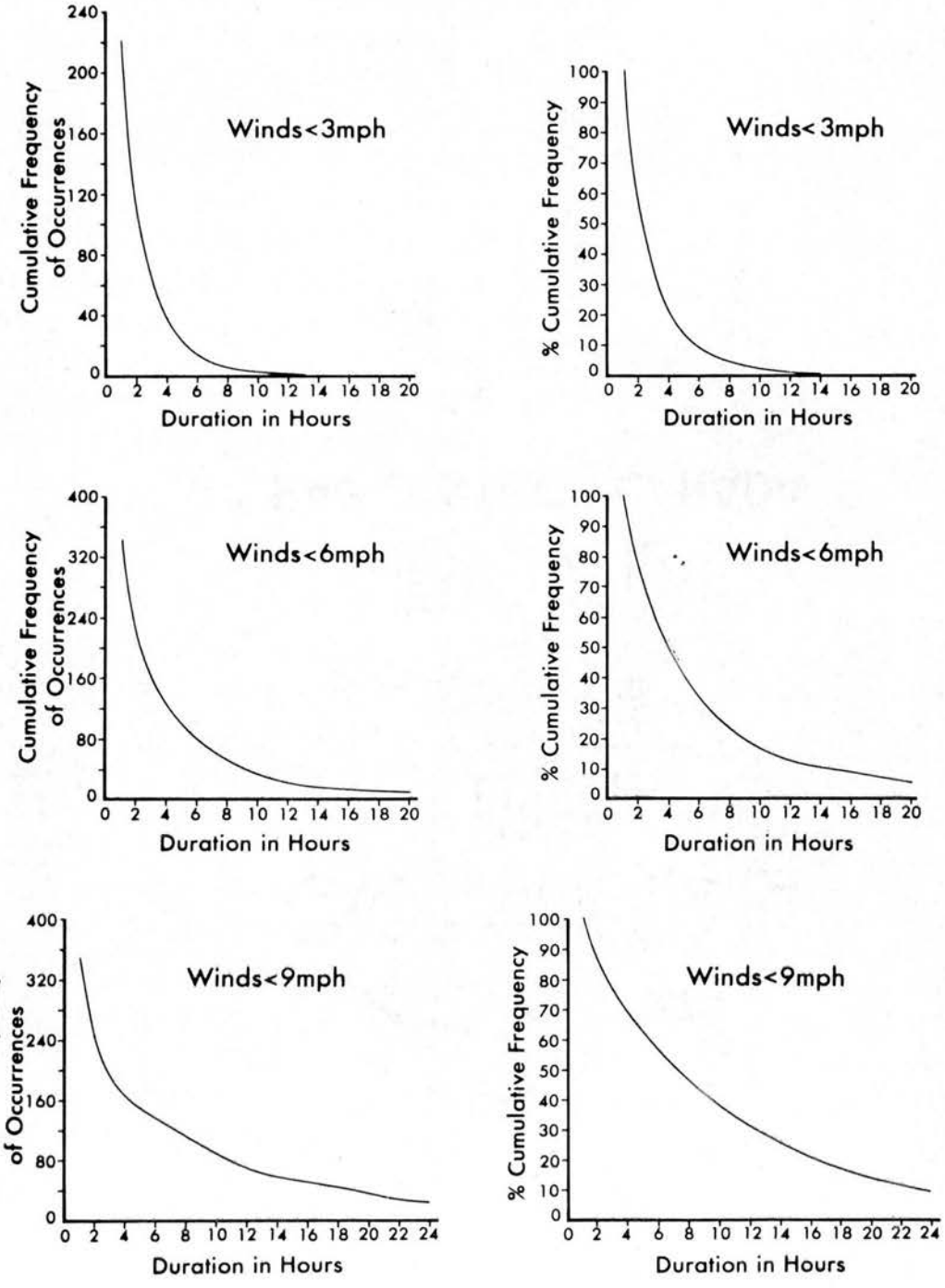


Figure 8.12

DURATION OF LIGHT WINDS at WINNIPEG C.B.C. TOWER

ALL YEAR 1969-72

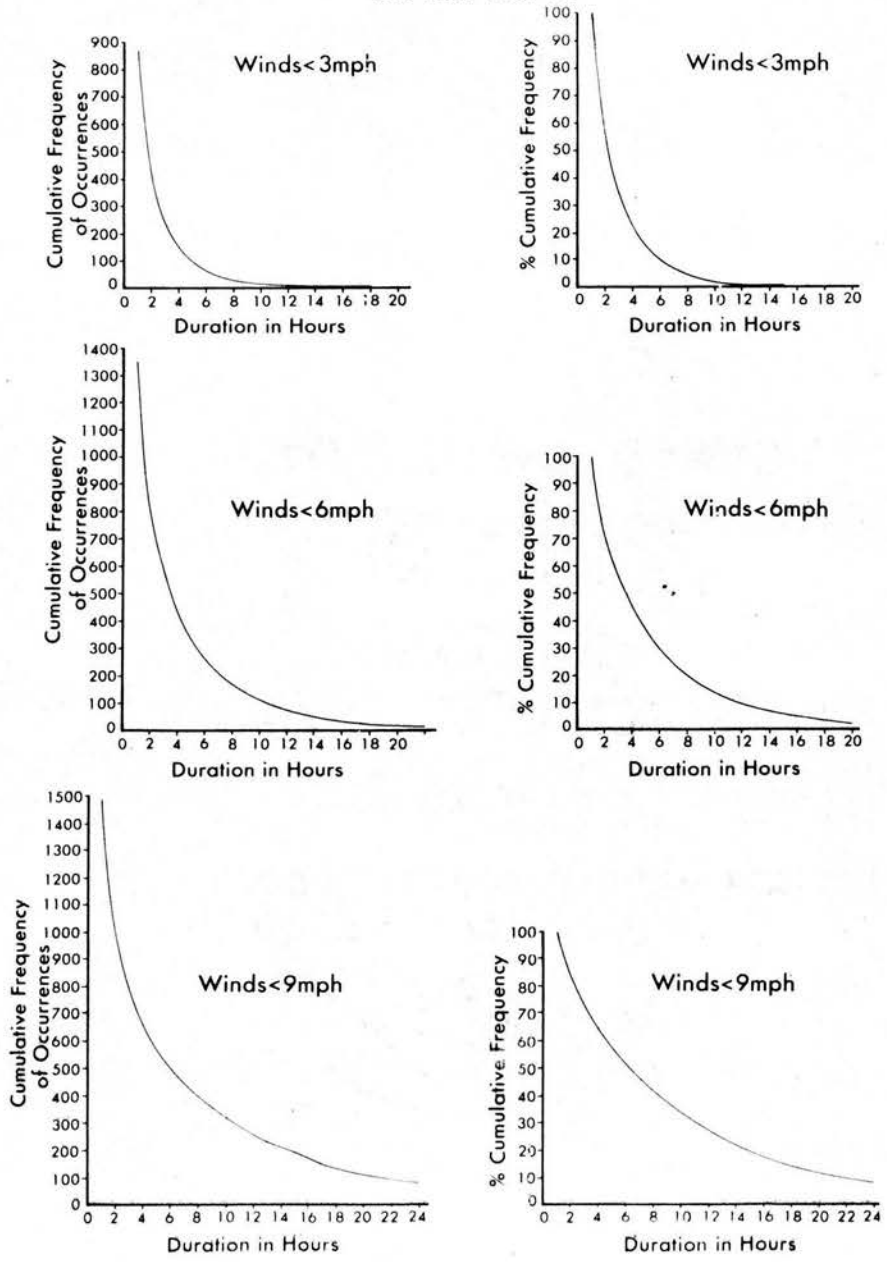


Table 8.15

WINNIPEG CBC TV TOWER STARBUCK

CUMULATIVE FREQUENCY OF WINDS LESS THAN OR EQUAL TO

4 MILES PER HOUR FOR

WINTER 1970 - 1972

DURN IN HOURS	DIRECTION ALL	N	NE	E	SE	S	SW	W	NW
1	220	17	27	32	20	26	35	39	24
2	129	10	14	24	12	16	16	20	17
3	89	6	11	18	11	10	7	13	13
4	64	6	7	14	6	6	4	9	12
5	48	5	5	8	6	4	2	8	10
6	35	5	2	7	2	2	2	8	7
7	25	4	1	6	2	1	2	5	4
8	19	3	1	6	2		1	3	3
9	14	2	1	4	2		1	1	3
10	13	2	1	4	2			1	3
11	9	2	1	4	1				1
12	5	2	1	2					
13	2		1	1					
14	1			1					
15	1			1					
16	1			1					
17	1			1					
18	1			1					
19	1			1					
20	1			1					
21	1			1					
22	1			1					
23	1			1					
24	1			1					
25	1			1					
26	1			1					

Table 8.16

WINNIPEG CBC TV TOWER STARBUCK

CUMULATIVE FREQUENCY OF WINDS LESS THAN OR EQUAL TO

4 MILES PER HOUR FOR

SPRING 1970 - 1972

DURN IN HOURS	DIRECTION ALL	N	NE	E	SE	S	SW	W	NW
1	279	18	53	88	18	32	22	29	19
2	156	12	28	51	9	16	11	17	12
3	91	7	17	26	6	10	6	13	6
4	51	3	10	17	4	4	3	6	4
5	37	2	5	13	4	2	3	4	4
6	28	2	3	11	4	2	1	3	2
7	16	2		8	2	1	1	1	1
8	12	2		5	2	1		1	1
9	9	2		3	1	1		1	1
10	6	1		1	1	1		1	1
11	5	1		1	1	1		1	
12	5	1		1	1	1		1	
13	4			1	1	1		1	
14	4			1	1	1		1	
15	4			1	1	1		1	
16	3			1	1	1			
17	2			1	1				
18	2			1	1				
19	1			1					
20	1			1					
21	1			1					

Table 8.17

WINNIPEG CBC TV TOWER STARBUCK

CUMULATIVE FREQUENCY OF WINDS LESS THAN OR EQUAL TO

4 MILES PER HOUR FOR

SUMMER 1970 - 1971

DURN IN HOURS	DIRECTION ALL	N	NE	E	SE	S	SW	W	NW
1	262	38	34	69	21	28	22	29	21
2	133	20	24	34	7	15	8	16	9
3	71	12	16	17	6	5	4	6	5
4	43	6	11	13	1	3	2	4	3
5	30	4	9	10		2	1	2	2
6	19	3	5	8			1	1	1
7	13	3	3	4			1	1	1
8	6			3			1	1	1
9	4			2			1	1	
10	2			1			1		
11	1			1					

Table 8.18

WINNIPEG CBC TV TOWER STARBUCK

CUMULATIVE FREQUENCY OF WINDS LESS THAN OR EQUAL TO

4 MILES PER HOUR FOR

FALL 1969 - 1971

DURN IN HOURS	DIRECTION ALL	N	NE	E	SE	S	SW	W	NW
1	268	34	26	55	30	22	28	40	33
2	160	21	19	39	16	10	13	19	23
3	103	13	13	21	11	7	8	15	15
4	67	8	9	15	7	5	3	7	13
5	48	6	5	12	5	3	2	4	11
6	36	4	4	9	4	3		4	8
7	25	2	2	6	3	2		3	7
8	18	1	1	4	3	2		2	5
9	13	1	1	3	1	2		1	4
10	9	1		2	1	2		1	2
11	7	1		1	1	2			2
12	6	1		1		2			2
13	3	1		1					1
14	2	1							1
15	2	1							1
16	2	1							1
17	2	1							1
18	2	1							1
19	1	1							
20	1	1							

Table 8.19

WINNIPEG CBC TV TOWER STARBUCK

CUMULATIVE FREQUENCY OF WINDS LESS THAN OR EQUAL TO

4 MILES PER HOUR FOR

ALL-YR 1970 - 1972

DURN IN HOURS	DIRECTION ALL	N	NE	E	SE	S	SW	W	NW
1	1029	107	140	244	89	108	107	137	97
2	578	63	85	148	44	57	48	72	61
3	354	38	57	82	34	32	25	47	39
4	225	23	37	59	18	18	12	26	32
5	163	17	24	43	15	11	8	18	27
6	118	14	14	35	10	7	4	16	18
7	79	11	6	24	7	4	4	10	13
8	55	6	2	18	7	3	2	7	10
9	40	5	2	12	4	3	2	4	8
10	30	4	1	8	4	3	1	3	6
11	22	4	1	7	3	3		1	3
12	16	4	1	4	1	3		1	2
13	9	1	1	3	1	1		1	1
14	7	1		2	1	1		1	1
15	7	1		2	1	1		1	1
16	6	1		2	1	1			1
17	5	1		2	1				1
18	5	1		2	1				1
19	3	1		2					
20	3	1		2					
21	2			2					
22	1			1					
23	1			1					
24	1			1					
25	1			1					
26	1			1					

WINNIPEG CBC TV TOWER STARBUCK

CUMULATIVE FREQUENCY OF WINDS LESS THAN OR EQUAL TO

9 MILES PER HOUR FOR

WINTER 1970 - 1972

DURN IN HOURS	DIRECTION ALL	N	NE	E	SE	S	SW	W	NW
1	406	27	15	26	44	50	56	129	59
2	272	20	12	16	27	32	35	86	44
3	203	14	8	13	22	23	24	60	39
4	171	13	6	11	17	20	16	53	35
5	149	11	6	8	16	15	14	49	30
6	126	10	5	5	14	13	13	41	25
7	116	9	5	3	13	12	10	41	23
8	102	8	5	2	11	10	8	38	20
9	83	7	3	2	7	8	6	31	19
10	73	6	3	1	5	6	5	29	18
11	64	6	3	1	5	5	3	25	16
12	59	6	2		5	5	2	23	16
13	53	6	2		4	4	2	20	15
14	48	6	2		4	4	2	18	12
15	45	6	1		4	3	2	18	11
16	42	6	1		4	3	2	16	10
17	38	4	1		3	3	2	15	10
18	34	4	1		2	3	2	14	8
19	34	4	1		2	3	2	14	8
20	30	4	1		2	3	2	10	8
21	30	4	1		2	3	2	10	8
22	26	3	1		2	3	1	9	7
23	25	3	1		1	3	1	9	7
24	24	3			1	3	1	9	7
25	17	3			1	1	1	6	5
26	16	3			1	1	1	6	4
27	16	3			1	1	1	6	4
28	14	3			1	1	1	5	3
29	12	3			1		1	4	3
30	12	3			1		1	4	3
31	12	3			1		1	4	3
32	10	3					1	3	3
33	10	3					1	3	3
34	10	3					1	3	3
35	10	3					1	3	3
36	9	3					1	2	3
37	8	2					1	2	3
38	7	2					1	1	3
39	7	2					1	1	3
40	6	2					1	1	2
41	6	2					1	1	2
42	6	2					1	1	2
43	5	2						1	2
44	5	2						1	2
45	5	2						1	2
46	5	2						1	2
47	5	2						1	2
48	5	2						1	2
49	4	1						1	2
50	4	1						1	2
51	3	1						1	1
52	3	1						1	1
53	2	1							1
54	2	1							1
55	1	1							
56	1	1							
57	1	1							
58	1	1							
59	1	1							
60	1	1							
61	1	1							

Table 8.21

WINNIPEG CBC TV TOWER STARBUCK

CUMULATIVE FREQUENCY OF WINDS LESS THAN OR EQUAL TO

9 MILES PER HOUR FOR

SPRING 1970 - 1971

DURN IN HOURS	DIRECTION ALL	N	NE	E	SE	S	SW	W	NW
1	279	43	41	43	22	35	20	41	34
2	189	26	26	33	14	23	12	30	25
3	141	20	20	25	11	17	8	23	17
4	115	18	12	20	9	14	7	19	16
5	92	16	11	14	5	12	7	16	11
6	81	15	9	12	5	9	7	16	8
7	65	13	8	8	5	7	4	15	5
8	60	12	7	6	5	7	4	14	5
9	58	12	7	5	5	7	4	13	5
10	56	12	7	5	5	6	4	12	5
11	48	9	7	5	4	5	4	10	4
12	45	7	7	5	3	5	4	10	4
13	40	7	7	4	3	4	4	8	3
14	36	7	6	4	3	4	4	5	3
15	32	6	4	4	3	4	4	4	3
16	28	6	3	4	3	3	3	3	3
17	27	5	3	4	3	3	3	3	3
18	23	3	3	3	2	3	3	3	3
19	21	2	3	3	1	3	3	3	3
20	17	2	3	2	1	3	3	2	1
21	17	2	3	2	1	3	3	2	1
22	13	2	1	1	1	3	2	2	1
23	11	2	1	1		3	2	2	
24	11	2	1	1		3	2	2	
25	10	2	1	1		3	1	2	
26	10	2	1	1		3	1	2	
27	9	2	1	1		3		2	
28	8	1	1	1		3		2	
29	8	1	1	1		3		2	
30	8	1	1	1		3		2	
31	8	1	1	1		3		2	
32	8	1	1	1		3		2	
33	7	1	1			3		2	
34	6		1			3		2	
35	6		1			3		2	
36	5		1			3		1	
37	5		1			3		1	
38	4		1			2		1	
39	2		1			1			
40	1		1						

Table 8.22

WINNIPEG CBC TV TOWER STARBUCK

CUMULATIVE FREQUENCY OF WINDS LESS THAN OR EQUAL TO

9 MILES PER HOUR FOR

SUMMER 1970 - 1971

DURN IN HOURS	DIRECTION ALL	N	NE	E	SE	S	SW	W	NW
1	342	39	26	44	31	55	36	66	45
2	238	34	21	25	20	37	22	47	32
3	204	29	19	22	16	30	19	41	28
4	155	26	16	17	12	24	8	27	25
5	128	21	15	15	11	15	8	22	21
6	113	20	15	11	9	12	7	20	19
7	107	19	14	11	7	12	6	19	19
8	99	19	14	11	7	9	5	15	19
9	85	19	13	8	4	6	4	14	17
10	76	17	11	7	4	5	3	13	16
11	70	16	11	5	3	4	3	12	16
12	61	13	9	5	3	3	3	11	14
13	55	11	9	5	2	3	3	9	13
14	48	10	8	4	2	2	2	8	12
15	42	8	6	4	2	2	1	7	12
16	34	6	5	3	2	1	1	5	11
17	27	6	5	3	2		1	3	7
18	23	5	4	3	1		1	3	6
19	20	5	4	2	1		1	2	5
20	16	1	4	2	1		1	2	5
21	15		4	2	1		1	2	5
22	13		4	2			1	2	4
23	12		3	2			1	2	4
24	9		3	1			1	1	3
25	9		3	1			1	1	3
26	8		3	1			1		3
27	8		3	1			1		3
28	8		3	1			1		3
29	6		2	1			1		2
30	5		2	1			1		1
31	4		2	1					1
32	4		2	1					1
33	3		2	1					
34	3		2	1					
35	3		2	1					
36	2		2						
37	2		2						

WINNIPEG CBC TV TOWER STARBUCK

CUMULATIVE FREQUENCY OF WINDS LESS THAN OR EQUAL TO

9 MILES PER HOUR FOR

FALL 1969 - 1971

DURN IN HOURS	DIRECTION ALL	N	NE	E	SE	S	SW	W	NW
1	350	41	17	25	40	60	28	77	62
2	239	29	10	20	22	41	20	48	49
3	189	25	10	18	14	29	16	34	43
4	161	21	9	14	11	23	13	33	37
5	144	19	9	13	11	19	11	29	33
6	133	17	8	12	10	18	9	28	31
7	120	17	6	11	8	17	8	24	29
8	107	15	5	9	8	16	8	21	25
9	100	14	5	9	8	16	7	17	24
10	87	13	3	8	7	15	5	15	21
11	75	11	3	6	7	13	3	14	18
12	71	11	2	6	7	12	3	13	17
13	62	10	2	4	6	10	3	13	14
14	60	10	2	4	5	10	3	13	13
15	56	10	2	4	2	10	3	13	12
16	49	8	2	4	2	10	2	11	10
17	44	8	2	4	1	10	2	9	8
18	42	8	2	4	1	10	2	8	7
19	36	7	2	4	1	9	1	7	5
20	34	7	1	4	1	8	1	7	5
21	31	4	1	4	1	8	1	7	5
22	26	2		3	1	7	1	7	5
23	23	2		2	1	6	1	7	4
24	23	2		2	1	6	1	7	4
25	20	2		2	1	6		6	3
26	17	2			1	6		6	2
27	15	1				6		6	2
28	13	1				5		5	2
29	13	1				5		5	2
30	12	1				4		5	2
31	9					3		4	2
32	9					3		4	2
33	9					3		4	2
34	9					3		4	2
35	7					2		3	2
36	7					2		3	2
37	6					1		3	2
38	6					1		3	2
39	6					1		3	2
40	6					1		3	2
41	4					1		2	1
42	4					1		2	1
43	4					1		2	1
44	3							2	1
45	3							2	1
46	3							2	1
47	3							2	1
48	3							2	1
49	3							2	1
50	2							1	1
51	2							1	1
52	2							1	1
53	2							1	1
54	2							1	1
55	2							1	1
56	2							1	1
57	1								1
58	1								1
59	1								1
60	1								1
61	1								1
62	1								1
63	1								1
64	1								1
65	1								1
66	1								1

WINNIPEG CBC TV TOWER STARBUCK

CUMULATIVE FREQUENCY OF WINDS LESS THAN OR EQUAL TO

9 MILES PER HOUR FOR

ALL-YR 1970 - 1972

DURN IN HOURS	DIRECTION ALL	N	NE	E	SE	S	SW	W	NW
1	1377	150	99	138	137	200	140	313	200
2	938	109	69	94	83	133	89	211	150
3	737	88	57	78	63	99	67	158	127
4	602	78	43	62	49	81	44	132	113
5	513	67	41	50	43	61	40	116	95
6	453	62	37	40	38	52	36	105	83
7	408	58	33	33	33	48	28	99	76
8	368	54	31	28	31	42	25	88	69
9	326	52	28	24	24	37	21	75	65
10	292	48	24	21	21	32	17	69	60
11	257	42	24	17	19	27	13	61	54
12	236	37	20	16	18	25	12	57	51
13	210	34	20	13	15	21	12	50	45
14	192	33	18	12	14	20	11	44	40
15	175	30	13	12	11	19	10	42	38
16	153	26	11	11	11	17	8	35	34
17	136	23	11	11	9	16	8	30	28
18	122	20	10	10	6	16	8	28	24
19	111	18	10	9	5	15	7	26	21
20	97	14	9	8	5	14	7	21	19
21	93	10	9	8	5	14	7	21	19
22	78	7	6	6	4	13	5	20	17
23	71	7	5	5	2	12	5	20	15
24	67	7	4	4	2	12	5	19	14
25	56	7	4	4	2	10	3	15	11
26	51	7	4	2	2	10	3	14	9
27	48	6	4	2	1	10	2	14	9
28	43	5	4	2	1	9	2	12	8
29	39	5	3	2	1	8	2	11	7
30	37	5	3	2	1	7	2	11	6
31	33	4	3	2	1	6	1	10	6
32	31	4	3	2		6	1	9	6
33	29	4	3	1		6	1	9	5
34	28	3	3	1		6	1	9	5
35	26	3	3	1		5	1	8	5
36	23	3	3			5	1	6	5
37	21	2	3			4	1	6	5
38	17	2	1			3	1	5	5
39	15	2	1			2	1	4	5
40	13	2	1			1	1	4	4
41	10	2				1	1	3	3
42	10	2				1	1	3	3
43	9	2				1		3	3
44	8	2						3	3
45	8	2						3	3
46	8	2						3	3
47	8	2						3	3
48	8	2						3	3
49	7	1						3	3
50	6	1						2	3
51	5	1						2	2
52	5	1						2	2
53	4	1						1	2
54	4	1						1	2
55	3	1						1	1
56	3	1						1	1
57	2	1							1
58	2	1							1
59	2	1							1
60	2	1							1
61	2	1							1
62	1								1
63	1								1
64	1								1
65	1								1
66	1								1

TABLE 8.25

Duration of Light Winds by Direction

Winnipeg C.B.C. 35', 99th Percentile Durations

	≤3	≤6	≤9 M.P.H.
Spring	SE, N	E, N, NW	NE, S, W
Summer	E, W	NE, NW, E	NE, E, NW
Autumn	E, NW	W, N, SW	NW, W, S
Winter	E, N	E, S, N	N, NW, W
All Year	E, SE	W, E, NE	NW, N, W

Figure 9.1

Logical Subdivision of C.B.C. Tower Data by Lapse Rate Type, Season, Wind Speed and Direction

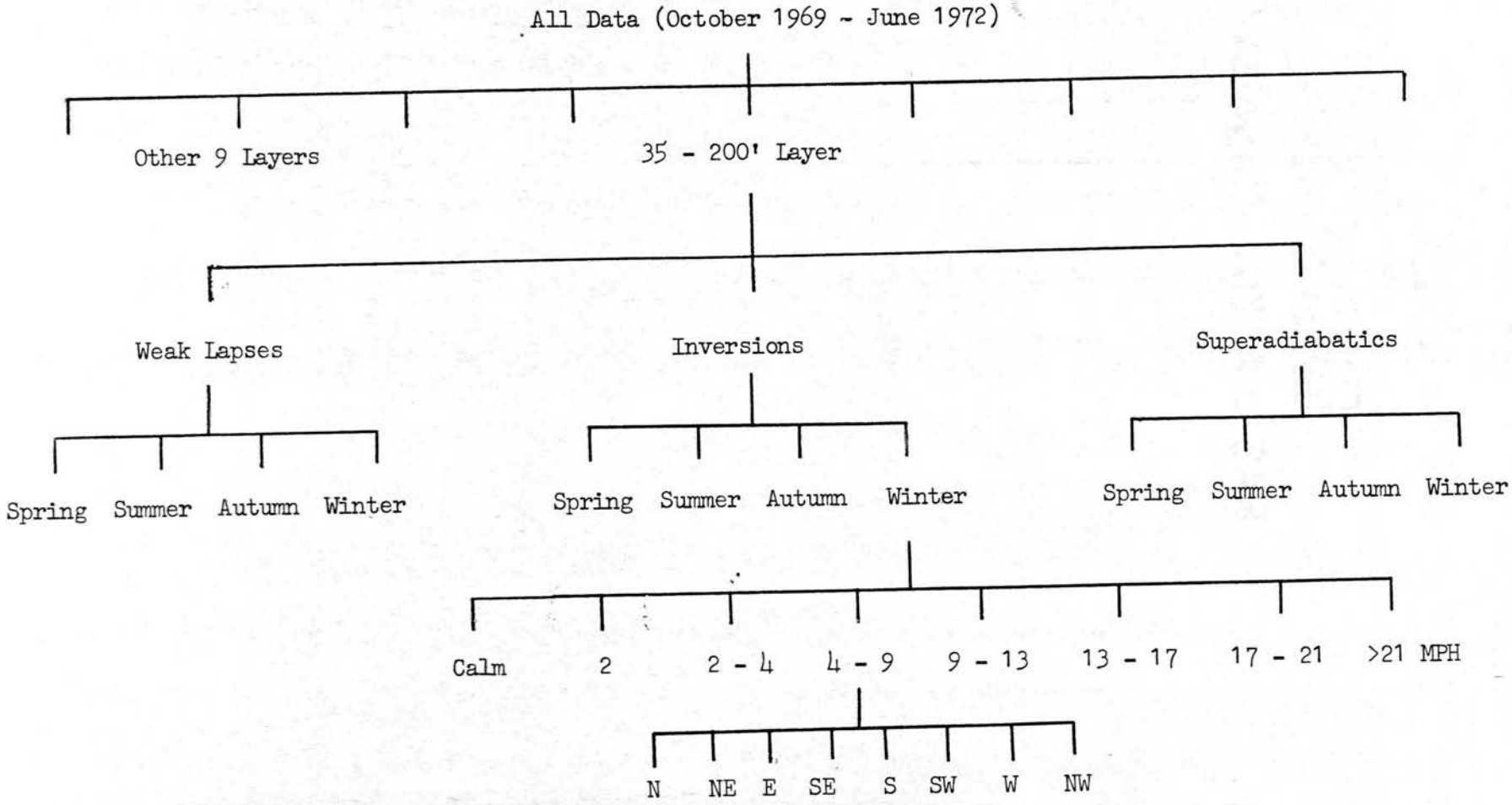


Table 9.[1]

Percent Frequency of 3 Lapse Rate Types by Wind Direction and Season for the 35'-200' Layer, Winnipeg C.B.C. Tower, Oct. 1969- June 1972

Wind Direction	WINTER			SPRING			SUMMER			AUTUMN			ALL YEAR		
	Inv.	Wk. L.R's	Super -ad.	Inv.	Wk. L.R's	Super -ad.	Inv.	Wk. L.R's	Super -ad.	Inv.	Wk. L.R's	Super -ad.	Inv.	Wk. L.R's	Super -ad.
N	49.1	26.8	24.1	41.6	23.9	34.5	42.6	13.9	43.5	35.3	35.8	28.9	42.6	25.3	32.1
NE	34.4	40.7	24.9	38.6	34.0	27.3	45.9	24.8	29.3	39.1	45.2	15.7	39.6	35.9	24.6
E	31.3	45.5	23.2	36.9	42.4	20.7	48.6	20.9	30.5	50.9	32.7	16.7	41.4	36.5	22.0
SE	24.8	54.0	21.2	42.3	20.8	36.9	39.6	13.1	35.3	33.2	31.5	35.3	35.5	28.7	35.8
S	40.8	39.9	19.3	40.1	25.0	34.9	44.1	16.6	39.3	45.4	27.2	27.4	42.5	27.0	30.5
SW	66.1	28.4	5.5	59.9	18.2	21.9	47.0	19.3	33.7	51.9	23.0	25.1	56.4	22.6	21.0
W	69.9	21.1	9.0	58.6	20.0	21.4	42.2	11.1	46.7	45.2	24.3	30.5	54.8	19.7	25.5
NW	52.0	24.7	23.4	35.4	26.2	38.4	34.1	14.2	51.7	35.4	35.1	29.5	41.1	25.8	33.1
ALL	50.3	30.3	19.4	42.4	25.6	32.4	42.6	15.8	41.6	41.2	31.1	27.8	44.3	26.2	29.6

Table 9. 2

Percent Frequency of 3 Lapse Rate Types by Wind Directions and Season for the 35'-810' Layer

Winnipeg C.B.C. Tower, Oct. 1969 - June 1972

	WINTER			SPRING			SUMMER			AUTUMN			ALL YEAR		
Wind Direction	Inv.	Wk. L.R's	Super -ad.	Inv.	Wk. L.R's	Super -ad.	Inv.	Wk. L.R's	Super -ad.	Inv.	Wk. L.R's	Super -ad.	Inv.	Wk. L.R's	Super -ad.
N	50.9	44.4	4.7	39.3	39.8	20.9	37.7	24.1	38.2	28.8	53.6	17.6	40.0	41.1	18.9
NE	50.9	48.2	0.9	31.7	51.4	16.9	46.6	28.9	24.5	45.4	47.0	7.7	41.4	44.9	13.7
E	54.5	45.1	0.4	28.5	58.6	12.9	49.0	30.7	20.3	46.9	41.3	11.8	42.7	45.2	12.1
SE	45.8	50.4	3.8	46.3	31.4	22.3	41.8	22.8	35.4	35.4	43.0	21.6	42.1	36.4	21.4
S	76.1	23.2	0.7	49.8	27.9	22.3	45.8	24.0	30.2	54.1	31.7	14.1	56.0	26.9	17.1
SW	82.5	16.8	0.7	59.8	23.0	17.2	49.4	17.9	31.7	52.0	29.8	18.3	61.6	21.8	16.6
W	66.2	31.7	2.1	43.2	33.3	13.5	39.4	20.0	40.6	35.1	40.6	24.3	49.0	32.0	19.0
NW	45.9	48.5	5.6	31.9	42.8	25.3	31.3	25.4	43.3	28.6	50.9	20.6	35.9	43.8	20.3
ALL	58.0	38.7	3.3	41.8	37.9	20.3	41.5	23.7	34.8	39.0	42.8	18.2	45.4	36.3	18.3

Table 9.[3]

Percent Frequency of 3 Lapse Rate Typesby Wind Speed and Season for the 35'-200' Layer

Winnipeg C.B.C. Tower, Oct. 1969 - June 1972

Wind Speed	WINTER			SPRING			SUMMER			AUTUMN			ALL YEAR		
	Inv.	Wk. L.R's	Super -ad.	Inv.	Wk. L.R's	Super -ad.	Inv.	Wk. L.R's	Super -ad.	Inv.	Wk. L.R's	Super -ad.	Inv.	Wk. L.R's	Super -ad.
Calm	49.5	26.1	24.4	48.3	19.7	32.0	50.0	19.2	30.8	50.9	26.1	23.0	49.6	22.3	28.0
2-4	54.1	24.6	21.3	54.4	14.7	30.9	65.4	4.5	30.1	51.4	28.1	20.5	55.4	19.2	25.4
>4-9	60.1	25.3	14.6	53.5	19.7	27.1	52.8	12.6	34.6	53.6	23.5	23.0	55.0	20.5	24.5
>9-13	64.1	21.7	14.2	54.9	18.6	26.5	52.5	12.1	35.4	53.4	24.2	22.4	56.3	19.3	24.4
>13-17	59.3	23.6	17.1	45.3	24.6	30.3	41.2	13.9	44.9	38.2	30.0	31.8	46.4	23.1	30.5
>17-21	45.3	33.4	21.3	30.2	30.4	39.4	28.5	19.7	51.8	32.7	32.8	34.5	34.8	29.7	35.5
>21	25.0	48.1	26.9	21.9	39.5	38.6	18.7	25.8	55.5	19.8	47.9	32.3	21.8	42.1	36.1

Table 9.4

Percent Frequency of 3 Lapse Rate Types by Wind Speed and Season for the 35'-810' Layer

WinnipegC.B.C. Tower Oct. 1969- June 1972

Wind Speed	WINTER			SPRING			SUMMER			AUTUMN			ALL YEAR		
	Inv.	Wk. L.R's	Super -ad.	Inv.	Wk. L.R'S	Super -ad.	Inv.	Wk. L.R's	Super -ad.	Inv.	Wk. L.R's	Super -ad.	Inv.	Wk. L.R's	Super -ad.
Calm	61.5	34.0	4.5	49.7	26.3	24.0	45.1	15.8	39.1	56.3	30.0	13.8	53.0	26.5	20.5
2-4	64.3	32.8	2.9	48.2	32.0	19.2	41.8	24.7	33.5	38.2	45.3	16.5	49.1	34.0	17.0
>4-9	63.8	34.2	2.0	50.5	29.8	19.6	46.7	21.0	32.3	40.9	45.2	13.9	50.1	32.4	16.7
>9-13	68.6	28.3	3.1	46.4	29.3	24.3	40.8	20.7	38.5	46.1	33.8	20.1	51.1	28.0	20.9
>13-17	67.1	30.0	2.9	46.1	32.6	21.3	38.6	20.0	41.1	39.3	40.0	20.7	47.9	30.9	21.3
>17-21	60.6	35.2	4.2	38.1	37.8	24.1	45.3	18.5	36.2	39.8	36.7	23.5	45.7	32.7	21.6
>21	47.3	49.2	3.5	35.1	48.1	16.9	38.8	31.4	29.8	34.8	49.2	16.0	39.3	45.6	15.1

Table 9.5

Percentage of Total Winds and Lapse Rates from the North West in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Wind	26.6	0.5	2.9	5.2	6.3	4.8	6.8
Superadiabatics	32.1	0.4	2.5	4.0	4.0	6.9	14.2
Weak Lapse Rates	21.6	0.3	1.6	2.3	3.6	5.2	8.6
Inversions	27.5	0.7	3.9	7.5	8.8	3.8	2.8

Lapse Rates as Percentage of Wind Frequency with North Westerly Winds in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	23.4	16.7	16.7	14.9	12.9	27.5	40.6
Weak Lapse Rates	24.7	16.7	16.2	13.3	17.1	32.8	38.7
Inversions	52.0	66.7	67.1	71.8	70.0	39.7	20.7

Table 9.6

Percentage of Total Winds and Lapse Rates from the North in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Wind	17.9	1.6	2.8	3.7	4.4	2.6	2.9
Superadiabatics	22.3	1.6	2.7	2.4	4.9	4.0	6.7
Weak Lapse Rates	15.8	1.0	2.1	2.5	3.6	2.8	3.8
Inversions	17.5	1.9	3.3	4.9	4.7	1.8	0.9

Lapse Rates as Percentage of Wind Frequency with North Winds in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	24.1	19.4	18.8	12.8	21.5	30.3	44.5
Weak Lapse Rates	26.8	19.4	22.4	20.5	24.9	33.6	39.9
Inversions	49.1	61.3	58.8	66.7	53.6	36.2	15.6

- -

For the % of total winds and lapse rates from the north-west :

% Wind = 100 times the number of hours of north-west winds / total number of hours for all winds

% Superadiabatics = 100 times the number of hours with superadiabatics from the north west / total number of hours for all superadiabatics.

For lapse rates as a % of wind frequency: Superadiabatics = number of hours of superadiabatics with NW wind x 100 / number of hours of nw winds

Table 9.7

Percentage of Total Winds and Lapse Rates from the West in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Winds	15.1	0.3	3.1	3.5	3.3	2.7	2.3
Superadiabatics	7.1	0.5	1.6	1.1	1.7	1.0	1.1
Weak Lapse Rates	10.5	0.1	1.8	1.3	2.4	2.1	2.8
Inversions	21.0	0.3	4.5	5.8	4.4	3.7	2.4

Lapse Rates as Percentage of Wind Frequency with Westerly Winds in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	9.0	37.5	9.8	6.2	9.8	7.6	9.6
Weak Lapse Rates	21.1	12.5	17.9	11.5	22.2	23.4	37.0
Inversions	69.9	50.0	72.3	82.3	68.0	69.0	53.3

Table 9.8

Percentage of Total Winds and Lapse Rates from the South in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Winds	13.7	0.3	1.7	2.5	1.6	1.9	5.7
Superadiabatics	13.7	0.3	1.6	2.8	1.7	2.0	5.1
Weak Lapse Rates	18.0	0.3	1.4	1.6	1.1	2.2	11.5
Inversions	11.1	0.3	1.9	2.9	1.9	1.6	22.5

Lapse Rates as Percentage of Wind Frequency with Southerly Winds in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	19.3	21.1	19.8	21.6	20.2	20.7	17.6
Weak Lapse Rates	39.9	26.3	24.8	19.6	20.2	35.1	61.
Inversions	40.8	52.6	55.4	58.8	59.6	44.1	21.5

Table 9.9

Percentage of Total Winds and Lapse Rates from the South West in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Winds	7.6	0.2	1.7	1.7	1.3	1.3	1.3
Superadiabatics	2.2	0.3	0.4	0.5	0.6	0.3	0.1
Weak Lapse Rates	7.1	0.1	1.6	1.5	1.1	1.7	1.1
Inversions	10.0	0.2	2.3	2.3	1.8	1.5	1.9

Lapse Rates as Percentages of Wind Frequency with South Westerly Winds in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	5.5	27.3	4.9	5.9	8.9	3.8	1.3
Weak Lapse Rates	28.4	18.2	28.2	26.7	24.1	39.2	25.6
Inversions	66.1	54.5	67.0	67.3	67.1	57.0	73.1

Table 9.10

Percentage of Total Winds and Lapse Rates from the South East in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>16-21	>21
Winds	7.1	0.4	1.5	1.2	1.0	0.7	2.3
Superadiabatics	7.8	0.1	1.7	1.2	1.4	0.9	2.5
Weak Lapse Rates	12.6	0.6	1.7	1.7	1.7	1.2	5.7
Inversions	3.5	0.3	1.3	0.8	0.4	0.4	0.2

Lapse Rates as Percentages of Wind Frequency With South Easterly Winds in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	21.2	4.8	21.3	20.0	27.6	22.7	21.0
Weak Lapse Rates	54.0	52.4	34.8	44.3	51.7	50.0	73.9
Inversions	24.8	42.9	43.8	35.9	20.7	27.3	5.1

Table 9.11

Percentage of Total Winds and Lapse Rates from the East in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Winds	3.8	0.6	1.4	1.1	0.5	0.1	0.1
Superadiabatics	4.5	1.1	1.0	1.3	1.0	0.1	0.1
Weak Lapse Rates	5.7	0.7	2.2	1.8	0.7	0.2	0.1
Inversions	2.4	0.4	1.0	0.5	0.3	0.1	0.0

Lapse Rates as Percentage of Wind Frequency with Easterly Winds in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	23.2	34.2	13.6	23.4	34.4	16.7	33.3
Weak Lapse Rates	45.5	34.2	48.1	51.6	37.5	50.0	66.7
Inversions	31.3	31.6	38.3	25.0	28.1	33.3	

Table 9.12

Percentage of Total Winds and Lapse Rates from the North East in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Winds	3.5	0.3	1.1	0.9	0.6	0.3	0.2
Superadiabatics	4.5	0.2	0.7	1.1	1.7	0.7	0.2
Weak Lapse Rates	4.7	0.2	1.4	1.4	0.7	0.5	0.6
Inversions	2.4	0.3	1.2	0.6	0.2	0.1	

Lapse Rates as Percentage of Wind Frequency with North Easterly Winds in Winter

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	24.9	12.5	11.8	23.6	51.4	42.1	14.3
Weak lapse rates	40.7	25.0	33.8	45.5	35.1	47.4	78.6
Inversions	34.4	62.5	54.4	30.9	13.5	10.5	7.1

Table 9.13

Percentage of Total Winds and Lapse Rates from the South in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Winds	17.8	0.3	2.6	3.6	3.5	3.3	4.6
Superadiabatics	16.8	0.2	1.7	3.0	3.9	3.1	4.9
Weak Lapse Rates	18.7	0.1	3.1	4.5	3.8	3.2	3.3
Inversions							

Lapse Rates as Percentage of Wind Frequency with Southerly Winds in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	39.3	25.0	27.7	35.5	45.5	40.1	44.4
Weak Lapse Rates	16.6	1.3	21.0	10.2	9.1	17.8	24.8
Inversions	44.1	68.8	51.3	54.2	45.5	42.1	30.8

Table 9.14

Percentage of Total Winds and Lapse Rates from The North West in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Winds	16.6	0.2	2.1	4.2	4.5	3.0	2.6
Superadiabatics	20.6	0.2	2.0	3.8	5.6	4.6	4.5
Weak Lapse Rates	14.9		1.2	3.1	3.7	3.4	3.5
Inversions	13.3	0.4	2.6	5.0	3.8	1.2	0.4

Lapse Rates as Percentage of Wind Frequency with North Westerly Winds in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	51.7	30.0	39.0	37.2	51.4	65.2	72.1
Weak Lapse Rates	14.2		9.0	11.7	12.9	18.1	21.3
Inversions	34.1	70.0	52.0	51.0	35.7	16.7	6.6

Table 9.15

Percentage of Total Winds and Lapse Rates from the North in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Winds	15.0	1.2	3.0	3.8	3.9	1.9	1.2
Superadiabatics	15.7	0.6	2.3	3.3	4.7	3.1	1.6
Weak Lapse Rates	13.1	0.5	1.8	3.1	3.5	1.9	2.3
Inversions	15.0	1.9	4.2	4.5	3.3	0.7	0.4

Lapse Rates as Percentage of Wind Frequency with Northerly Winds in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	43.5	22.2	31.7	36.7	49.7	69.0	55.4
Weak Lapse Rates	13.9	7.4	9.2	13.0	14.2	16.1	30.4
Inversions	42.6	70.2	59.2	50.3	36.1	14.9	14.3

Table 9.16

Percentage of Total Winds and Lapse Rates from the West in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Wind	12.5	0.3	2.2	3.8	2.7	1.6	2.0
Superadiabatics	14.1	0.2	2.3	4.4	2.4	1.8	2.9
Weak Lapse Rates	8.8		0.9	2.0	0.8	2.4	2.6
Inversions	12.4	0.5	2.6	3.8	3.7	1.0	0.9

Lapse Rates as Percentage of Wind Frequency with Westerly Winds in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	46.7	28.6	43.1	48.9	37.3	47.9	60.0
Weak Lapse Rates	11.1		6.9	8.5	4.8	24.7	20.2
Inversions	42.2	71.4	50.0	42.6	57.9	27.4	19.1

Table 9.17

Percentage of Total Winds and Lapse Rates from the South East in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Wind	10.8	0.4	2.2	2.5	2.0	1.3	2.4
Superadiabatics	12.3	0.5	2.3	1.9	2.1	1.9	3.7
Weak Lapse Rates	8.9		0.9	1.4	1.5	1.4	3.8
Inversions	10.1	0.4	2.6	3.5	2.0	0.8	0.8

Lapse Rates as Percentage of Wind Frequency with South Easterly Winds in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	47.3	58.8	43.3	31.0	44.6	58.1	62.3
Weak Lapse Rates	13.1		6.7	8.6	12.0	16.1	24.6
Inversions	39.6	41.2	50.0	60.3	43.5	25.8	13.2

Table 9. 18

Percentage of Total Winds and Lapse Rates from the South West in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Wind	8.7	0.2	2.1	2.2	1.9	1.1	1.1
Superadiabatics	7.0	0.2	1.9	1.3	1.5	0.9	1.2
Weak Lapse Rates	10.6		2.4	1.9	2.4	0.8	3.0
Inversions	9.6	0.3	2.3	3.1	2.2	1.5	0.3

Lapse Rates as Percentage of Wind Frequency with South Westerly Winds in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	33.7	37.5	37.0	25.5	32.2	34.0	45.1
Weak Lapse Rates	19.3		18.0	13.7	20.0	11.3	43.1
Inversions	47.0	62.5	45.0	60.8	47.8	54.7	11.8

Table 9.19

Percentage of Total Winds and Lapse Rates from the North East in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Wind	5.6	0.2	1.8	1.9	1.2	0.4	0.1
Superadiabatics	3.9	0.2	1.1	1.0	1.3	0.3	
Weak Lapse Rates	8.7	0.1	1.6	2.4	2.4	1.5	0.5
Inversions	6.0	0.2	2.5	2.5	0.7	0.1	0.1

Lapse Rates as Percentage of Wind Frequency with North Easterly Winds in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	29.3	37.5	26.5	21.8	44.8	33.3	
WeakLapse Rates	24.7	12.5	14.5	20.7	31.0	61.1	80.0
Inversions	45.9	50.0	59.0	57.5	24.1	5.6	20.0

Table 9.20

Percentage of Total Winds and Lapse Rates from the East in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Wind	4.7	0.2	2.0	1.5	0.8	0.3	
Superadiabatics	3.5	0.1	1.4	1.1	0.7	0.2	
Weak Lapse Rates	6.2		2.0	1.6	1.6	0.8	0.1
Inversions	6.0	0.4	2.6	1.8	0.5	0.2	0.1

Lapse Rates as Percentage of Wind Frequency with Easterly Winds in Summer

	All Speeds	2-4	>4-9	>9-13	>13-17	>17-21	>21
Superadiabatics	30.5	22.2	29.0	30.9	40.0	23.1	
Weak Lapse Rates	20.9		16.1	17.6	34.3	46.2	50.0
Inversions	48.6	77.8	54.8	51.5	25.7	30.8	50.0

Table 9.21a

Lapse Rates as a Percentage of Wind Frequency by Wind Direction

35' - 200' Layer, Winter

Wind Direction	% Superadiabatics / % Wind	% Weak Lapse Rates / % Wind	% Inversions / % Wind
SE	110	177	49
E	118	150	63
NE	128	135	68
S	100	132	81
W	47	70	139
SW	29	93	132
N	125	88	98
NW	120	80	103

Table 9.21b

Wind Speed Ranges (m.p.h.) when Wind Directions Receive more than their Proportionate Share of that Lapse Rate Class

35' - 200' Layer, Winter

Wind Direction	Lapse Rate Class		
	Superadiabatic	Weak Lapse	Inversion
SE	9-21	2+	Never
E	9-17	2+	Never
NE	9-21	4+	2-9
S	9-21	17+	2-17
W	Never	21+	4+
SW	Never	17-21	2+
N	13+	17+	2-17
NW	17+	17+	2-17

NB. For table 9.21(a) % superadiabatics / % Wind is obtained as follows:

$$\frac{\text{100 x (Number of hours with Superadiabatics from that wind direction) / Total number of hours with superadiabatics from all wind directions}}{\text{Number of hours with winds from that direction / Total number of hours for all winds}}$$

Table 9.22a

Lapse Rates as a Percentage of Wind Frequency by Wind Direction

35' - 200' Layer , Summer

Wind Direction	% Superadiabatics % Wind	% Weak Lapse Rates % Wind	% Inversion % Wind
NE	69	155	107
E	82	132	128
SW	80	122	110
S	94	105	104
N	105	87	100
W	113	70	99
SE	114	82	94
NW	124	90	80

Table 9.22b

Wind Speed Ranges (m.p.h.) when Wind Directions Receive more than their Proportionate Share of that Lapse Rate Class

35' - 200'Layer, Summer

Wind Direction	Lapse Rate Class		
	Superadiabatic	Weak Lapse Rate	Inversion
NE	13-17	9+	2-13
E	Never	4+	2-13
SW	21+	4+	2-21
S	13-17, >21	4-17	2-13
N	13+	17+	2-13
W	4-13, 17+	17+	2-17
SE	2-9, 13+	17+	2-13
NW	13+	17+	2-13

Table 9.23 (a)

Inversion Duration (Hours) by Inversion Intensity and Season

Winnipeg C.B.C. Tower Oct. 1969- June 1972

Season	35'-200' Layer					35'-810' Layer				
	Wint.	Spr.	Sum.	Aut.	All Yr.	Wint.	Spr.	Sum.	Aut.	All Yr.
Inv. Intensity °F/1000'										
≤ -1	1.2	1.1	1.4	1.2	1.2	1.8	1.8	1.6	2.0	1.8
<-1--2	2.3	3.0	1.4	1.5	2.2	3.3	4.1	2.6	3.6	3.4
<-2--5	3.9	4.0	3.4	3.3	3.7	7.3	7.6	7.3	7.5	7.4
<-5--10	7.3	8.2	6.6	5.2	6.8	18.2	11.4	9.6	12.7	13.3
<-10--15	8.5	9.0	7.4	8.8	8.4	26.7	15.6	10.8	14.2	17.1
<-15--20	11.4	10.5	8.9	11.5	10.6	51.5	47.2	11.3	21.6	27.3
<-20--25	14.6	12.1	10.0	12.9	12.8	11.5	31.0	-	16.0	17.2
<-25--30	13.8	11.5	10.5	16.5	13.0					
<-30--35	15.2	12.3	10.2	11.3	12.1					
<-35--40	18.0	15.0	11.3	24.2	15.7					
<-40--45	15.0	13.0	11.3	13.8	13.1					
<-45--50	15.7	15.7	11.2	14.3	13.8					
<-50	17.8	21.0	5.8	20.2	11.3					

Table 9.23(b)

Frequency of Inversions by Inversion Intensity and Season

Season	35'-200' Layer					35'-810' Layer				
	Wint.	Spr.	Sum.	Aut.	All Yr.	Wint.	Spr.	Sum.	Aut.	All Yr.
Inv. Intensity °F/1000'										
≤-1	34	33	13	29		52	42	23	55	
<-1--2	25	22	14	17		44	25	27	29	
<-2--5	63	49	33	53		60	69	49	54	
<-5--10	64	41	32	56		85	67	68	60	
<-10--15	35	29	28	35		38	34	39	25	
<-15--20	27	21	27	30		04	04	07	11	
<-20--25	32	20	16	18		02	01	-	02	
<-25--30	28	19	18	16						
<-30--35	13	13	17	11						
<-35--40	16	16	15	05						
<-40--45	06	09	10	09						
<-45--50	03	03	05	03						
<-50	04	08	06	05						

Table 9.24 a

Inversion Duration By 6 Hour Period and Season, Winnipeg C.B.C. Tower Oct. 1969- Dec 1971

(Durations are in hours)

6 Hour Period	35'-200' Layer					35'-810' Layer				
	Winter	Spring	Summer	Autumn	All Year	Winter	Spring	Summer	Autumn	All Year
>4-10	3.8	3.6	1.9	2.6	3.2	5.8	3.3	1.3	2.0	3.8
>10-16	10.2	8.8	3.0	11.9	9.6	14.5	8.2	4.0	5.1	11.4
>16-22	10.6	9.7	8.7	9.5	9.6	14.2	11.6	9.0	11.4	11.5
>22-04	6.1	3.7	3.8	3.7	4.4	11.1	6.1	4.8	4.5	6.7

Table 9.24 b

Inversion Frequency by 6 Hour Period and Season, Winnipeg C.B.C. Tower Oct. 1969- Dec 1971

6 Hour Period	35'-200' Layer					35'-810' Layer				
	Winter	Spring	Summer	Autumn	AllYear	Winter	Spring	Summer	Autumn	AllYear
>4-10	70	20	12	45	147	52	25	14	30	121
>10-16	81	29	12	25	147	44	08	05	12	69
>16-22	146	183	172	169	670	139	147	154	147	587
>22-04	53	50	38	48	189	50	62	40	47	299

Table 9.25

Percent Frequency of Inversions by 6 Hour Period, Duration and Season, Winnipeg C.B.C. Tower Oct. 1969-Dec.1971

35'-200' Layer

	WINTER					SPRING					SUMMER				
			6 Hour Period					6 Hour Period					6 Hour Period		
Duration in Hours	17-22	23-04	5-10	11-16	All	17-22	23-04	5-10	11-16	All	17-22	23-04	5-10	11-16	All
<2	22.5	16.9	39.4	21.1	20	39.7	33.3	11.1	15.9	21	39.5	25.6	18.6	16.3	15
2	35.3	20.6	20.6	23.5	10	32.0	24.0	24.0	20.0	8	38.9	44.4	11.1	5.6	6
3-4	37.0	13.0	32.6	17.4	13	26.3	52.6	15.8	5.3	6	41.9	45.2	6.5	6.5	11
5-6	22.0	17.1	34.1	26.8	12	64.0	24.0	8.0	4.0	8	42.1	52.6	-	5.3	7
7-8	33.3	27.8	11.1	27.8	5	63.6	27.3	4.5	4.5	7	65.2	30.4	4.3	-	8
9-10	45.5	40.9	4.5	9.1	6	84.0	8.0	-	8.0	8	92.7	7.3	-	-	20
11-12	52.4	23.8	-	23.8	6	94.2	3.8	-	1.9	17	100.0	-	-	-	30
13-14	50.0	16.7	-	33.3	5	93.1	-	-	7.0	10	100.0	-	-	-	3
15-16	92.0	-	4.0	4.0	7	90.9	-	-	9.1	7	50.0	-	-	50.0	1
17-20	79.1	-	-	20.9	5	84.6	-	-	15.4	4	-	-	-	-	-
21-24	-	-	-	100.0	2	50.0	-	50.0	-	1					
25-36	12.5	12.5	25.0	50.0	2	-	-	-	-	-					
37-48	-	-	-	100.0	1	-	-	-	100.0	1					
>48						-	-	-	-	-					
All Durations	41.7	15.5	19.7	23.1		65.9	17.7	6.7	9.7		72.2	19.0	4.6	4.2	

Table 9.25ctd.

Percent Frequency of Inversions by 6 Hour Period, Duration and Season, Winnipeg C.B.C. Tower Oct. 1969- Dec.1971

35'-200 ' Layer

Duration in Hours	AUTUMN 6 Hour Period 17-22	23-04	5-10	11-16	All	ALL YEAR 6 Hour Period 17-22	23-04	5-10	11-16	All
<2	18.8	25.0	31.3	15.0	27	31.5	24.9	26.5	17.1	21
2	27.8	11.1	55.6	5.6	6	33.7	24.2	26.3	15.8	8
3-4	35.1	37.8	21.6	5.4	13	36.1	33.1	21.1	9.8	11
5-6	72.7	22.7	4.5	-	8	45.8	26.2	15.9	12.1	9
7-8	63.6	36.4	-	-	4	56.8	29.7	5.4	8.1	6
9-10	79.2	16.7	-	4.2	8	80.2	15.1	0.8	4.0	10
11-12	85.7	4.8	4.8	4.8	7	91.1	4.5	3.9	0.6	15
13-14	97.3	-	-	2.7	13	87.0	3.3	-	9.8	8
15-16	100.0	-	-	-	9	93.2	-	1.4	5.4	6
17-20	72.7	-	27.3	-	4	79.1	-	-	20.9	5
21-24	100.0	-	-	-	0.3	11.1	-	11.1	77.8	1
25-36	-	-	50.0	50.0	0.7	10.0	10.0	30.0	50.0	1
37-48	-	-	100.0	-	0.7	-	-	-	100.0	½
>48	-	-	100.0	-	0.3	-	-	-	100.0	0.1
All Durations	58.2	17.1	15.8	8.9		58.5	17.2	12.1	12.1	

Table 9.26

Percent Frequency of Inversions by 6 Hour Period, Duration and Season, Winnipeg C.B.C. Tower Oct. 1969-Dec. 1971

35'-810' Layer

	WINTER					SPRING					SUMMER				
	6 Hour Period					6 Hour Period					6 Hour Period				
Duration in Hours	17-22	23-04	5-10	11-16	All	17-22	23-04	5-10	11-16	All	17-22	23-04	5-10	11-16	All
<2	40.0	10.0	28.0	22.0	17.2	24.4	36.6	31.7	7.3	16.0	48.8	16.3	25.6	9.3	16.0
2	45.8	12.5	33.3	8.3	8.2	52.6	15.8	26.3	5.3	7.4	25.0	50.0	25.0	0.0	5.9
3-4	22.6	22.6	38.7	16.1	10.7	37.5	41.7	20.8	-	9.4	30.8	61.5	7.7	0.0	9.7
5-6	36.7	26.7	23.3	13.3	10.3	43.5	47.8	8.7	-	9.0	36.8	63.2	-	-	7.1
7-8	23.8	52.4	19.0	4.8	7.2	50.0	42.9	-	7.1	5.5	68.4	31.6	-	-	7.1
9-10	56.3	31.3	12.5	-	5.5	60.0	40.0	-	-	11.7	76.7	23.3	-	-	16.0
11-12	44.4	22.2	11.1	22.2	3.1	90.7	7.0	-	2.3	16.8	98.8	1.2	-	-	30.0
13-14	64.3	28.6	0.0	7.1	4.8	82.6	17.4	-	-	9.0	100.0	-	-	-	7.8
15-16	66.7	6.7	13.3	13.3	5.2	90.9	9.1	-	-	8.6	-	-	-	100.0	0.4
17-20	88.6	-	-	11.4	12.0	90.9	-	-	9.1	4.3					
21-24	35.7	7.1	7.1	50.0	4.8	-	-	-	100.0	0.4					
25-36	53.3	13.3	-	33.3	5.2	-	-	100.0	-	0.4					
37-48	80.0	20.0	-	0.0	3.4	-	-	-	100.0	0.4					
>48	42.9	28.6	14.3	14.3	2.4	100.0	-	-	-	1.2					
All Durations	48.5	18.2	17.9	15.5		60.5	25.8	10.2	3.5		69.5	22.3	6.3	1.9	

Table 9.26 ctd.

Percent Frequency of Inversions by 6 Hour Period, Duration and Season, Winnipeg C.B.C. Tower Oct. 1969-Dec. 1971

35'-810' Layer

Duration in Hours	AUTUMN 6 Hour Period 17-22	23-04	5-10	11-16	All	ALL YEAR 6 Hour Period 17-22	23-04	5-10	11-16	All
<2	29.2	29.2	33.3	8.3	20.3	35.7	22.5	29.7	12.1	17.3
2	50.0	15.0	20.0	15.0	8.4	44.3	21.5	26.6	7.6	7.5
3-4	23.1	30.8	38.5	7.7	11.0	28.0	38.3	27.1	6.5	10.2
5-6	58.8	41.2	-	-	7.2	42.7	42.7	10.1	4.5	8.5
7-8	41.7	58.3	-	-	5.1	45.5	45.5	6.1	3.0	6.3
9-10	55.6	44.4	-	-	7.6	65.4	32.7	1.9	-	10.2
11-12	95.0	-	-	5.0	8.4	92.8	3.9	0.7	2.6	14.5
13-14	97.3	-	-	2.7	15.6	89.5	8.4	-	2.1	9.0
15-16	95.8	-	-	4.2	10.1	85.5	4.8	3.2	6.5	5.9
17-20	91.7	-	-	8.3	5.1	89.7	-	-	10.3	5.5
21-24						33.7	6.7	6.7	53.3	1.4
25-36						50.0	12.5	6.3	31.3	1.5
37-48	100.0	-	-	-	0.8	76.9	15.4	-	7.7	1.2
>48	100.0	-	-	-	0.4	63.6	18.2	9.1	9.1	1.0
All Durations	62.0	18,8	12.7	5.5		59.8	21.5	11.9	6.8	

Table 9.27

Inversion Duration by Inversion Intensity by 6 Hour Period, Winnipeg C.B.C. Tower Oct. 1969 - Dec 1971

	35'-200' WINTER 6 Hour Period						35'-200' SUMMER 6 Hour Period					
Inv. Int. °F/1000'	5-10	11-16	17-22	23-04	All	N	5-10	11-16	17-22	23-04	All	N
<2	1.1	1.5	1.3	1.2	1.2	34	1.0	1.0	-	1.8	1.4	13
2	2.3	1.2	2.2	4.3	2.3	25	1.0	-	1.4	1.5	1.4	14
3-5	3.6	3.5	4.8	3.2	3.9	63	3.2	1.0	3.0	4.7	3.4	33
6-10	6.1	5.3	9.5	6.8	7.3	64	-	5.5	7.2	4.4	6.6	32
11-15	4.6	8.0	10.8	7.2	8.5	35	1.0	2.0	8.3	6.0	7.4	28
16-20	4.8	13.2	13.0	9.3	11.4	27	1.0	16.0	9.8	6.0	8.9	27
21-25	5.0	18.0	14.5	12.0	14.6	32	-	-	10.5	2.0	10.0	16
26-30	4.0	15.7	15.3	9.5	13.8	28	-	-	10.5	-	10.5	18
31-35	4.0	20.0	15.0	11.5	15.2	13	-	-	10.4	7.0	10.2	17
36-40	16.0	20.0	18.9	10.0	18.0	16	-	-	11.1	-	11.1	15
41-45	1.0	22.5	14.7	-	15.0	6	-	-	11.3	-	11.3	10
46-50	-	-	18.5	10.0	15.7	3	-	-	11.3	-	11.2	5
>50	-	20.0	17.0	-	17.8	4	-	1.0	8.2	-	5.8	6
Avg.	3.8	10.2	10.6	6.1	8.5	-	1.9	3.0	8.7	3.8	7.3	-
N	70	81	146	53	-	350	12	12	172	38	-	234

Table 9.27 ctd.

Inversion Average by Inversion Duration by 6 Hour Period, Winnipeg C.B.C. Tower Oct. 1969- Dec. 1971

	35'-200' SPRING						35'-200' AUTUMN					
	6 Hour Period						6 Hour Period					
Inv. Int. °F/1000'	5-10	11-16	17-22	23-04	All	N	5-10	11-16	17-22	23-04	All	N
<2	1.0	1.0	1.3	1.1	1.2	32	1.2	-	1.4	1.1	1.2	29
2	1.8	1.3	4.7	2.2	3.0	22	1.4	1.0	1.8	1.7	1.5	17
3-5	2.6	2.0	6.0	2.8	4.0	49	3.2	4.4	3.7	2.4	3.3	53
6-10	3.7	5.5	9.9	5.7	8.2	41	3.8	1.7	6.9	4.1	5.3	56
11-15	1.0	10.3	9.4	6.7	8.9	29	1.0	10.0	9.5	7.8	8.8	35
16-20	7.0	2.0	11.6	3.0	10.5	21	2.0	21.0	12.8	5.6	11.5	30
21-25	-	14.7	12.2	7.0	12.1	21	-	-	13.2	8.0	12.9	18
25-30	-	6.0	11.9	9.0	11.5	19	-	35.5	13.9	12.0	16.5	16
31-35	-	-	12.6	11.0	12.3	13	-	12.0	11.9	8.5	11.3	11
36-40	-	29.0	13.0	11.0	15.0	15	-	66.0	13.8	-	24.2	5
41-45	-	-	13.0	-	13.0	9	3.0	17.0	14.9	-	13.8	9
46-50	-	-	15.7	-	15.7	3	-	-	14.3	-	14.3	3
>50	24.0	32.5	15.8	-	21.0	8	-	43.0	14.5	-	20.2	5
Avg.	3.6	8.8	9.7	3.7			2.6	11.9	9.5	3.7	7.7	-
N	20	29	183	50			45	25	169	48		287

Table 9.28

Inversion Duration by Inversion Average by 4 Six Hour Periods, Winnipeg C.B.C. Tower Oct. 1969- Dec.1971

	35'-810' Winter 6 Hour Period						35'-810' Summer 6 Hour Period					
Inv. Avg. °F/1000'	5-10	11-16	17-22	23-04	All	N	5-10	11-16	17-22	23-04	All	N
<2	1.7	1.1	1.8	2.3	1.8	52	1.0	1.0	1.3	2.4	1.6	23
2	3.1	2.0	2.9	5.0	3.3	44	1.6	1.0	2.7	3.3	2.6	27
3-5	5.3	3.6	9.4	7.5	7.3	60	1.7	-	8.9	4.5	7.3	49
6-10	21.7	16.9	18.9	14.7	18.2	85	-	8.5	9.9	7.8	9.6	68
11-15	10.0	22.3	27.0	33.5	26.7	38	1.0	1.0	11.5	8.0	10.8	39
16-20	-	62.0	22.0	-	51.5	4	-	-	11.7	9.0	11.3	7
21-25	16.0	-	-	7.0	11.5	2	-	-	-	-	-	-
Avg.	5.8	14.5	14.2	11.1	12.2	-	1.4	4.0	9.0	4.8	7.6	-
N	52	44	139	50	-	285	14	5	154	40	-	213

	35'-810' Spring 6 Hour Period						35'-810' Autumn 6 Hour Period					
Inv. Avg °F/1000'	5-10	11-16	17-22	23-04	All	N	5-10	11-16	17-22	23-04	All	N
<2	1.3	1.0	1.9	2.2	1.8	42	1.8	3.8	2.2	1.5	2.0	55
2	3.1	1.0	4.9	4.3	4.1	25	1.4	1.8	5.7	3.6	3.6	29
3-5	2.6	4.5	9.4	6.3	7.6	69	2.3	2.0	9.4	6.6	7.5	54
6-10	-	18.0	11.8	8.1	11.4	67	3.5	12.3	14.0	6.9	12.7	60
11-15	-	-	16.3	12.0	15.6	34	-	-	14.5	8.0	14.2	25
16-20	-	-	47.2	-	47.2	4	4.0	-	23.3	-	21.5	11
21-25	31.0	-	-	-	31.0	1	-	-	16.0	-	16.0	2
Avg.	3.3	8.2	11.6	6.1	9.2	-	2.0	5.1	11.4	4.5	8.5	-
N	25	8	147	62	-	242	30	12	147	47	-	236

Table 9.29a

Inversion Duration by Wind Direction and Season

Winnipeg C.B.C. Tower Oct. 1969- Dec. 1971

Season / Wind Direction	35'-200' Layer					35'-810' Layer				
	Wint.	Spr.	Sum.	Aut.	All Yr.	Wint.	Spr.	Sum.	Aut.	All Yr.
N	8.6	5.5	6.4	6.3	6.4	6.4	6.7	6.6	4.5	6.0
NE	7.1	6.7	5.4	7.4	6.5	6.9	7.3	7.9	9.5	7.7
E	6.2	6.7	7.2	6.3	6.6	9.5	7.5	7.0	6.7	7.6
SE	5.9	8.8	5.6	8.6	7.1	11.8	8.9	6.0	8.3	8.5
S	11.1	11.6	9.8	10.5	10.8	20.0	11.1	9.6	10.7	13.2
SW	10.8	9.3	9.1	8.9	9.6	14.0	11.0	7.9	10.4	11.0
W	8.4	8.0	7.9	6.5	7.7	10.3	8.6	8.9	9.1	9.4
NW	7.0	9.4	5.5	8.1	7.5	11.3	8.5	6.1	6.3	8.7
All	8.5	8.1	7.3	7.6	7.5	12.2	9.2	7.6	8.5	9.5

Table 9.29b

Inversion Frequency by Wind Direction and Season

Winnipeg C.B.C. Tower Oct. 1969- Dec 1971

Season / Wind Direction	35'-200' Layer					35'-810' Layer				
	Wint.	Spr.	Sum.	Aut.	All Yr.	Wint.	Spr.	Sum.	Aut.	All Yr.
N	49	63	39	54	200	23	19	22	23	86
NE	13	33	21	10	77	17	23	18	12	70
E	19	29	21	20	89	16	24	22	14	76
SE	35	21	27	28	111	26	22	35	31	114
S	46	45	38	39	168	43	43	35	32	153
SW	53	33	31	45	162	50	51	37	46	184
W	68	25	29	47	169	56	21	24	45	146
NW	67	34	28	44	173	54	39	20	33	146
All	350	282	234	287	1153	285	242	213	236	976

Table 9.30a

Inversion Duration by Wind Speed and Season

Winnipeg C.B.C. Tower Oct. 1969- Dec. 1971

Season	35'-200' Layer					35'-810' Layer				
	Wint.	Spr.	Sum.	Aut.	All Yr.	Wint.	Spr.	Sum.	Aut.	All Yr.
Wind Speed M.P.H.										
0-1	1.3	3.0*	1.0*	1.6	1.6	1.0*		1.0*	3.0*	1.7
2	2.0	1.0*	2.7	5.3*	2.8	4.0*			2.0*	3.0
3-4	9.5	7.0	9.3	5.9	8.2	18.7*	6.3	9.2	3.4	8.3
>4-9	9.1	9.2	8.8	9.1	9.0	9.5	10.8	9.3	7.0	9.2
>9-13	9.8	9.5	6.7	7.7	8.5	15.9	9.4	8.5	10.3	11.2
>13-17	8.3	6.6	6.9	6.3	7.1	16.5	10.1	7.7	8.3	10.6
>17-21	6.7	4.2	3.5	5.6	5.4	11.5	8.2	7.4	7.9	9.0
>21-25	1.6	7.8	1.3	2.0*	3.4	9.1	5.1	6.6	10.0	8.1
>25-29	1.3*	1.3*	1.0*	2.0	1.5	6.1	8.7	3.5	8.1	6.4
>29-34	3.0*	1.0*			1.7	6.3	9.0	4.0	9.4	6.9
>34-39						3.3*	14.0*	1.0*	2.0*	3.6

* = Frequency $\leq$ 3

Table 9.30b

Inversion Frequency by Wind Speed and Season

Winnipeg C.B.C. Tower Oct. 1969- Dec. 1971

Season	35'-200' Layer					35'-810' Layer				
	Wint.	Spr.	Sum.	Aut.	All Yr.	Wint.	Spr.	Sum.	Aut.	All Yr.
Wind Speed M.P.H.										
0-1	06	03	03	07	19	01		01	01	03
2	04	02	06	03	17	01			01	02
3-4	15	11	11	09	46	03	06	05	05	19
>4-9	101	114	104	134	453	44	44	30	38	156
>9-13	120	74	68	71	333	60	51	51	56	218
>13-17	56	47	24	38	165	57	65	55	58	235
>17-21	33	19	11	18	81	53	37	37	32	159
>21-25	11	07	04	03	25	30	21	14	28	93
>25-29	03	03	03	04	13	20	11	12	09	52
>29-34	01	02			03	13	06	06	05	33
>34-39						03	01	02	03	09

Table 9.31a

Inversion Duration by Cloud Obscurity and Season , Winnipeg C.B.C. Tower Oct. 1969 - Dec. 1971

Cloud Obscurity in Tenths	35'-200' Layer					35'-810' Layer				
	Winter	Spring	Summer	Autumn	All Year	Winter	Spring	Summer	Autumn	All Year
0-1/2	11.2	12.4	10.4	10.9	11.3	12.3	14.3	9.6	10.9	11.9
>1/2-2.0	9.8	11.1	9.0	10.7	10.0	14.6	10.1	8.3	10.8	10.0
>2.0-4.0	9.4	10.1	8.2	11.5	9.9	20.2	14.9	8.1	12.3	13.8
>4.0-6.0	10.6	7.9	7.0	7.9	8.5	15.2	10.0	8.3	11.4	11.3
>6.0-8.0	5.2	4.3	6.1	6.3	5.8	11.7	6.8	7.6	6.3	7.7
9.0	6.0	3.4	4.6	3.1	4.0	9.1	3.8	5.3	4.0	5.4
10.0	2.8	2.8	2.8	3.4	3.0	4.7	2.5	3.1	3.3	3.4

Table 9. 31b

Inversion Frequency by Cloud Obscurity and Season , Winnipeg C.B.C. Tower Oct. 1969 - Dec. 1971

Cloud Obscurity in Tenths	35'-200' Layer					35'-810' Layer				
	Winter	Spring	Summer	Autumn	All Year	Winter	Spring	Summer	Autumn	All Year
0-1/2	44	42	26	27	139	26	36	27	29	118
>1/2-2.0	59	32	55	39	185	34	32	57	32	155
>2.0-4.0	39	28	42	53	162	38	26	36	43	143
>4.0-6.0	32	24	24	39	119	22	10	25	31	88
>6.0-8.0	16	15	40	46	117	18	15	24	39	96
8.0	12	07	18	32	69	10	06	19	18	53
10.0	29	41	25	51	146	34	33	21	44	132

Table 9.32

Percent Frequency of Inversions by Duration and Cloud Obscurity, Winnipeg C.B.C. Tower Oct.1969 -Dec.1971

35'-200' Layer Winter

Cloud Obscurity in Tenths	Inversion Duration in Hours													No. of Obs.
	<2	2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-20	21-24	25-36	37-48	>48	
$\leq \frac{1}{2}$	15.9	9.1	6.8	-	2.3	11.4	6.8	6.8	13.6	20.5	4.5	2.3	-		44
$>\frac{1}{2}$-2	15.0	5.0	16.7	8.3	6.7	5.0	6.7	6.7	3.3	20.0	5.0	1.7	-		60
>2-4	10.3	7.7	10.3	10.3	10.3	7.7	10.3	12.8	10.3	7.7	-	2.6	-		39
>4-6	15.6	9.4	12.5	9.4	6.3	15.6	6.3	-	6.3	3.1	-	9.4	6.3		32
>6-8	25.0	12.5	18.8	25.0	-	-	6.3	12.5	-	-	-	-	-		16
>8-9	16.7	8.3	25.0	25.0	16.7	-	-	-	-	-	-	8.3	-		12
>9	41.4	27.6	13.8	10.3	-	3.4	-	3.4	-	-	-	-	-		29

35'-200' Layer Spring

Cloud Obscurity in Tenths	Inversion Duration in Hours													No. of Obs.
	<2	2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-20	21-24	25-36	37-48	>48	
$\leq \frac{1}{2}$	2.4	4.8	4.8	4.8	4.8	14.3	19.0	7.1	21.4	14.3	-	-	2.4	-	42
$>\frac{1}{2}$-2	9,4	-	3.1	3.1	9,4	6.3	31.3	21.9	6.3	6.3	3.1	-	-	-	32
>2-4	17.9	7.1	3.6	3.6	3.6	10.7	25.0	17.9	-	7.1	-	-	3.6	-	28
>4-6	20.0	4.0	4.0	16.0	20.0	4.0	4.0	12.0	16.0	-	-	-	-	-	25
>6-8	35.3	5.9	3.5	11.8	-	11.8	11.8	-	-	-	-	-	-	-	17
>8-9	28.6	28.6	-	42.9	-	-	-	-	-	-	-	-	-	-	7
>9	59.1	13.6	6.8	9.1	4.5	2.3	2.3	2.3	-	-	-	-	-	-	44

Table 9.32 ctd.

Percent Frequency of Inversions by Duration and Cloud Obscurity, Winnipeg C.B.C. Tower Oct.1969- Dec.1971

35'-200' Layer Summer

Cloud Obscurity in Tenths	Inversion Duration in Hours														No. of Obs.
	<2	2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-20	21-24	25-36	37-48	>48	
$\leq \frac{1}{2}$	-	-	-	3.2	6.5	32.3	54.8	3.2	-	-					31
$>\frac{1}{2}$-2	6.9	3.4	6.9	5.2	6.9	13.8	53.4	3.4	-	-					58
>2-4	7.0	4.7	14.0	2.3	9.3	25.6	30.2	4.7	2.3	-					43
>4-6	15.4	3.8	15.4	11.5	15.4	3.8	30.8	3.8	-	-					26
>6-8	20.0	15.0	7.5	12.5	10.0	12.5	15.0	5.0	2.5	-					40
>8-9	33.3	5.6	22.2	11.1	5.6	16.7	5.6	-	-	-					18
>9	52.0	16.0	12.0	4.0	8.0	8.0	-	-	-	-					25

35'-200' Layer Autumn

Cloud Obscurity in Tenths	Inversion Duration in Hours														No. of Obs.
	<2	2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-20	21-24	25-36	37-48	>48	
$\leq \frac{1}{2}$	14.8	-	-	11.1	-	7.4	18.5	14.8	29.6	3.7	-	-	-	-	27
$>\frac{1}{2}$-2	17.9	5.1	10.3	-	-	2.6	10.3	23.1	23.1	5.1	-	-	2.6	-	39
>2-4	1.9	5.7	7.5	11.3	9.4	11.3	9.4	20.8	9.4	9.4	-	1.9	-	1.9	53
>4-6	20.0	7.5	15.0	7.5	2.5	15.0	10.0	15.0	2.5	-	2.5	-	2.5	-	40
>6-8	23.4	6.4	25.5	6.4	6.4	12.8	-	10.6	4.3	4.3	-	-	-	-	47
>8-9	62.5	3.1	15.6	6.3	-	6.3	-	3.1	-	3.1	-	-	-	-	32
>9	53.7	11.1	11.1	9.3	3.7	1.9	5.6	1.9	-	-	-	-	-	-	54

Table 9.32 ctd.

Percent Frequency of Inversions by Duration and Cloud Obscurity, Winnipeg C.B.C. Tower Oct.1969- Dec.1971

35'-200' Layer All Year

Inversion Duration in Hours

Cloud Obscurity in Tenths	<2	2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-20	21-24	25-36	37-48	>48	No. of Obs.
$\leq \frac{1}{2}$	8.3	4.2	3.5	4.2	3.5	16.0	22.9	7.6	16.0	11.1	1.4	0.7			144
$>\frac{1}{2}$-2	12.2	3.7	10.0	4.8	5.8	7.4	25.9	11.6	6.9	8.5	2.1	0.5			189
>2-4	8.0	6.1	9.2	7.4	8.6	14.1	17.8	14.1	6.1	6.1	1.2	0.6			163
>4-6	17.9	6.5	12.2	10.6	9.8	10.6	12.2	8.1	5.7	0.8	0.8	2.4			123
>6-8	24.2	10.0	18.3	11.7	5.8	10.8	7.5	5.8	4.2	1.7	-	--			120
>8-9	43.5	7.2	17.4	14.5	4.3	7.2	1.4	1.4	-	1.4	-	1.4			69
>9	52.6	15.8	10.5	8.6	3.9	3.3	2.6	2.0	-	-	-	0.7			152

Table 9.33a

Inversion Duration by Hourly Pressure Change in Millibars and Season, Winnipeg C.B.C. Tower Oct. 1969-Dec. 1971

Pressure Change mb.	35'-200' Layer					35'-810' Layer				
	Winter	Spring	Summer	Autumn	All Year	Winter	Spring	Summer	Autumn	All Year
0-1/4	10.1	10.1	9.1	10.3	9.8	15.2	12.3	9.7	9.8	11.4
>1/4-1/2	10.0	11.5	8.3	10.7	10.1	17.1	11.5	8.3	11.1	11.9
>1/2-3/4	14.5	7.4	6.3	8.9	10.0	11.8	8.8	6.6	11.8	10.2
>3/4-1.0	9.6	12.8	4.8	6.4	8.6	14.7	9.2	5.0	11.2	11.0
>1.0	9.7	4.0	-	3.0	6,7	10.0	5.0	4.0	6.8	7.3

Table 9.33b

Inversion Frequency by Hourly Pressure Change in Millibars and Season, Winnipeg C.B.C. Tower Oct. 1969-Dec. 1971

Pressure Change mb.	35'-200' Layer					35'-810' Layer				
	Winter	Spring	Summer	Autumn	AllYear	Winter	Spring	Summer	Autumn	All Year
0-1/4	76	73	111	108	368	61	66	92	93	312
>1/4-1/2	71	52	62	75	260	58	45	67	68	238
>1/2-3/4	20	12	13	16	61	19	10	10	13	52
>3/4-1.0	18	06	06	09	39	12	09	05	10	36
>1.0	03	02	-	01	06	03	01	01	04	09

Table 9.34

Average Sea Level Pressure by Inversion Duration and Season

Winnipeg C.B.C. Tower, Oct. 1969 - Dec. 1971

Inversion Duration in Hours	35'-200' Layer				35'-810' Layer			
	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn
>2	1019.8	1011.7	1009.9	1011.7	1016.9	1014.6	1007.1	1015.6
2	1018.6	1009.9	1010.1	1014.0	1015.6	1009.5	1008.2	1006.9
3-4	1019.0	1012.9	1009.7	1014.8	1020.4	1013.7	1010.4	1016.1
5-6	1018.6	1012.9	1010.1	1014.9	1015.9	1017.9	1013.8	1016.1
7-8	1022.3	1017.1	1010.7	1015.7	1018.1	1011.4	1008.0	1011.7
9-10	1017.9	1017.0	1011.9	1015.2	1018.4	1017.7	1012.5	1015.3
11-12	1019.7	1015.0	1013.3	1013.9	1014.6	1016.2	1013.1	1017.9
13-14	1021.9	1017.1	1012.0	1014.9	1016.9	1016.1	1013.7	1012.3
15-16	1017.8	1020.3	1010.1	1015.3	1018.8	1017.6	1016.4	1013.9
17-20	1025.6	1026.1	-	1014.7	1018.4	1025.7	-	1014.7
21-24	1025.8	1015.5	-	1014.7	1018.8	1030.4	-	-
24-36	1014.9	-	-	1018.0	1018.3	1014.7	-	-
36-48	1013.4	1027.7	-	1014.9	1024.8	-	-	1020.4
>48	-	-	-	1024.7	-	-	-	1015.2

Table 9.35

Diurnal and Seasonal Distributions of Brief Inversions

% Frequency of Inversions by Period and Season

	35'-200' Layer					35'-810' Layer				
	PERIOD			1 hour or less		PERIOD				
SEASON	5-10	11-16	17-22	23-04	All	5-10	11-16	17-22	23-04	All
Spring	35	35	13	40	21	50	33	07	23	16.0
Summer	62	58	08	20	15	65	80	11	12	16.0
Autumn	54	46	14	40	27	53	31	10	30	20.6
Winter	40	18	11	22	20	27	24	14	09	17.2
All	46	30	11	30	21	43	31	10	18	17.3

	35'-200' Layer					35'-810' Layer				
	PERIOD			2 Hours or less		PERIOD				
SEASON	5-10	11-16	17-22	23-04	All	5-10	11-16	17-22	23-04	All
Spring	65	52	39	51	30	69	44	13	27	23.4
Summer	77	67	12	35	21	88	80	13	25	21.9
Autumn	76	50	16	44	34	67	54	16	36	28.7
Winter	50	28	19	23	30	42	29	22	15	25.4
All	62	40	16	41	29	60	39	16	26	24.8

	35'-200' Layer					35'-810' Layer				
	PERIOD			4 hours or less		PERIOD				
SEASON	5-10	11-16	17-22	23-04	All	5-10	11-16	17-22	23-04	All
Spring	80	55	42	70	36	88	44	19	42	32.8
Summer	92	85	18	61	33	79	80	17	52	31.6
Autumn	93	58	24	72	46	100	69	20	53	39.7
Winter	71	38	31	34	43	65	40	27	28	36.1
All	81	49	23	62	40	83	49	21	44	35.0

Table 9.36

% Frequency of Short Inversions by Cloud Obscurity and Season

	Cloud Obscurity	≤ 1 Hour					≤ 2 Hours					≤ 4 Hours				
		SEASON					SEASON					SEASON				
		Spr.	Sum.	Aut.	Wint.	All	Spr.	Sum.	Aut.	Wint.	All	Spr.	Sum.	Aut.	Wint	All
35'-200' Layer	0-½	2.4		14.8	15.9	8.3	7.7		14.8	25.0	12.5	12.0		14.8	31.8	16.0
	½-2	9.4	6.9	17.9	15.0	12.2	9.4	10.3	23.0	20.0	15.9	12.5	17.2	33.3	36.7	26.0
	2-4	17.9	7.0	1.9	10.3	8.0	25.0	11.7	7.6	18.0	14.1	28.6	25.7	15.1	28.3	23.3
	4-6	20.0	15.4	20.0	15.6	17.9	24.0	19.2	27.5	25.0	24.4	28.0	34.6	42.5	37.5	36.6
	6-8	35.3	20.0	23.4	25.0	24.2	39.2	35.0	30.2	37.5	34.2	62.7	42.5	55.7	56.3	52.5
	9	28.6	33.3	62.5	16.7	43.5	57.2	38.9	65.6	25.0	50.7	57.2	61.1	81.2	50.0	68.1
	10	59.1	52.0	53.7	41.4	52.6	72.7	68.0	64.8	69.0	68.2	79.5	80.0	75.9	82.8	78.7
	All	14.6	15.8	27.4	18.5	21.0	31.8	22.4	33.6	28.8	29.0	38.0	32.4	46.3	42.2	40.0
35'-810' Layer	0-½	13.5	5.9	6.9	7.7	8.8	13.5	8.8	17.2	11.5	12.8	18.9	11.7	24.1	30.7	20.6
	½-2	9.4	16.7	18.8	17.1	15.7	12.5	20.0	18.8	20.0	18.2	15.6	23.3	21.9	28,6	22.2
	2-4	7.4	13.5	9.3	5.1	9.0	7.4	18.9	14.0	10.2	13.1	14.8	27.0	21.0	17.9	20.5
	4-6	-	7.7	6.3	13.6	7.8	10.0	11.5	12.6	18,1	13.4	10.0	23.0	12.6	31.7	20.1
	6-8	13.3	16.7	17.9	16.7	16.7	20.0	20.9	30.7	27.8	26.1	40.0	20.9	46.1	38.9	37.6
	9	50.0	31.6	33.3	-	29.1	50.0	31.6	50.0	30.0	40.0	87.5	63.2	72.1	30.0	63.3
	10	41.2	28.6	47.7	38.2	40.6	61.8	47.6	59.1	58.8	57.9	82.4	76.2	81.8	61.7	75.9
	All	18.4	15.8	20.3	15.8	17.6	24.5	20.8	28.7	25.0	24.8	35.5	30.3	39.7	34.2	35.0

Percentages were calculated as follows : 100 x (Number of occurrences of inversions ≤x hours for that season and cloud obscurity) / total number of occurrences of all inversions for that season and cloud obscurity

Table 9.37

% Frequency of Short Inversions by Wind Direction and Season

		≤ 1 Hour					≤ 2 Hours					≤ 4 Hours				
		SEASON					SEASON					SEASON				
	Wind Direction	Wint.	Spr.	Sum.	Aut.	All	Wint.	Spr.	Sum.	Aut.	All	Wint.	Spr.	Sum.	Aut.	All
35'-200' Layer	N	20.0	37.3	15.6	45.6	29.1	24.0	47.7	24.7	49.1	36.3	38.0	52.3	40.3	56.1	46.7
	NE	28.6	30.6	23.8	10.0	25.9	35.7	38.9	33.3	30.3	35.8	50.0	44.5	42.8	40.0	44.4
	E	21.1	27.6	22.7	38.1	27.5	47.4	43.8	22.7	38.1	38.5	57.9	44.8	27.2	57.1	46.2
	SE	28.6	13.0	20.6	14.3	20.0	48.6	21.7	26.5	14.3	29.2	57.2	26.0	38.3	39.3	41.7
	S	-	2.2	2.3	-	1.1	-	2.2	2.3	7.5	2.8	23.4	6.5	4.6	20.0	13.6
	SW	19.2	12.1	10.0	24.4	17.5	25.0	18.2	13.3	28.8	22.5	38.5	30.3	20.0	44.4	35.0
	W	22.1	17.2	10.3	31.9	22.0	35.3	34.4	27.5	46.8	37.0	45.6	44.7	37.8	57.4	47.4
	NW	25.7	16.7	25.0	34.1	25.8	35.7	19.5	28.5	38.6	32.0	45.7	30.6	50.0	47.7	43.8
	All	20.0	21.1	15.1	27.4	20.9	29.6	29.5	21.4	33.6	28.6	42.6	35.9	32.3	47.8	39.4
35'-810' Layer	N	29.2	32.0	16.9	39.1	25.5	45.9	40.0	29.2	56.5	38.6	50.1	44.0	41.5	72.9	48.8
	NE	35.3	8.7	5.3	8.3	14.1	47.1	17.4	15.8	16.6	24.0	58.9	34.8	36.9	33.3	40.9
	E	25.0	20.0	13.6	21.4	19.5	43.8	36.0	18.1	35.7	32.5	56.3	40.0	40.8	50.2	45.9
	SE	26.9	8.0	26.8	12.9	19.5	42.3	8.0	34.1	16.1	26.0	53.8	24.0	39.0	25.8	35.8
	S	2.2	6.5	2.4	8.8	4.8	2.2	6.5	2.4	11.7	5.4	8.7	10.8	9.7	14.6	10.8
	SW	12.0	16.7	16.7	13.3	14.5	18.0	25.0	16.7	24.4	21.2	28.0	35.4	22.3	33.3	30.1
	W	12.5	27.4	16.0	31.1	19.6	17.9	21.7	20.0	37.8	24.9	30.4	39.1	24.0	48.9	36.3
	NW	21.4	22.0	30.0	24.2	23.3	30.0	36.6	35.0	33.3	33.3	44.6	43.9	40.0	48.5	44.6
	All	17.2	16.0	16.0	20.3	17.3	25.4	23.4	21.9	28.7	24.8	36.1	32.8	31.6	39.7	35.0

Table 9.38

Percent Frequency of Inversions > 8, 12, 16, 24 Hours by Wind Direction and Season for the 35'- 200' Layer

Winnipeg C.B.C. Tower Oct. 1969 - Dec. 1971

% Inversions >8 Hours

Wind Direction	WINT.	SPR.	SUM.	AUT.	ALL YR.
N	42.0	35.8	49.4	26.4	39.1
NE	35.7	41.7	28.5	50.0	38.2
E	26.4	41.7	45.4	38.1	39.6
SE	25.7	60.8	29.3	53.6	40.1
S	57.4	71.6	81.5	62.6	68.3
SW	52.7	48.6	80.0	51.1	57.0
W	42.7	51.6	62.0	33.9	45.2
NW	30.0	41.7	32.1	38.7	35.0
All	40.9	48.6	52.8	42.5	45.8

% Inversions > 12 Hours

Wind Direction	WINT.	SPR.	SUM.	AUT.	ALL YR.
N	26.0	9.0	-	17.6	11.6
NE	14.3	2.8	-	10.0	4.9
E	21.1	24.1	9.1	23.8	19.8
SE	17.1	21.7	2.9	39.4	19.2
S	36.1	39.0	11.7	35.1	30.8
SW	48.0	27.3	3.3	37.7	32.6
W	29.5	34.4	3.4	23.3	24.3
NW	21.4	33.3	-	22.8	21.0
All	28.8	22.8	3.5	27.1	21.0

% Inversions >16 Hours

Wind Direction	WINT.	SPR.	SUM.	AUT.	All YR.
N	14.0	1.5	-	-	3.2
NE	14.3	-	-	10.0	3.7
E	10.5	-	-	9.5	4.4
SE	11.4	-	-	3.6	4.2
S	23.3	10.8	-	10.1	11.4
SW	26.9	12.1	-	6.6	13.2
W	16.2	10.3	-	6.3	9.9
NW	11.4	11.1	-	6.9	8.6
All	16.7	5.7	-	5.8	7.5

% Inversions > 24 Hours

Wind Direction	WINT.	SPR.	SUM.	AUT.	ALL YR.
N	4.0	-	-	-	0.8
NE	-	-	-	-	-
E	-	-	-	-	-
SE	-	-	-	-	-
S	4.2	-	-	2.5	1.7
SW	5.7	3.0	-	2.2	3.2
W	4.4	-	-	2.1	2.3
NW	-	2.8	-	4.6	1.8
All	2.9	0.7	-	1.7	1.4

Table 9.39

Percent Frequency of Inversions > 8, 12, 16, 24, Hours by Wind Direction and Season for the 35'-810' Layer

Winnipeg C.B.C. Tower Oct. 1969 - Dec. 1971

Wind Direction	% Inversions > 8 Hours					% Inversions > 12 Hours				
	WINT.	SPR.	SUM.	AUT.	ALL YR.	WINT.	SPR.	SUM.	AUT.	ALL YR.
N	20.9	36.0	47.7	21.6	36.5	16.7	12.0	1.5	13.0	8.0
NE	23.6	52.2	52.8	67.7	47.9	17.7	8.7	26.4	33.3	19.7
E	31.5	48.0	36.3	28.5	37.7	25.2	12.0	9.1	21.4	15.6
SE	42.4	60.0	41.5	14.6	45.5	38.4	24.0	4.9	32.3	22.7
S	65.2	71.7	75.6	61.7	70.2	54.3	24.0	12.2	41.1	34.8
SW	58.0	49.4	61.2	57.7	58.7	46.0	33.4	5.6	37.7	34.7
W	51.8	56.5	76.0	33.2	53.7	41.1	39.1	20.0	15.5	32.2
NW	39.4	43.9	40.0	33.2	39.5	32.2	29.3	-	21.2	24.8
ALL	46.4	52.8	54.3	47.9	50.2	37.8	24.3	8.2	31.9	25.5

Wind Direction	% Inversions > 16 Hours					% Inversions > 24 Hours				
	WINT.	SPR.	SUM.	AUT.	ALL YR.	WINT.	SPR.	SUM.	AUT.	ALL YR.
N	12.5	4.0	-	-	2.9	4.2	-	-	-	0.7
NE	17.7	-	-	16.7	7.0	5.9	-	-	-	1.4
E	18.9	4.0	-	14.3	7.8	12.6	-	-	-	2.6
SE	38.4	4.0	-	-	8.9	11.5	4.0	-	-	3.2
S	43.4	4.4	-	8.8	15.0	21.7	4.4	-	-	7.2
SW	42.0	10.5	-	8.9	16.8	16.0	2.1	-	2.2	5.6
W	17.9	17.4	-	8.8	12.1	3.6	-	-	4.4	2.7
NW	19.7	7.3	-	-	9.5	9.0	2.4	-	-	4.1
ALL	27.8	6.7	-	6.3	10.6	11.0	2.0	-	1.2	3.7

Table 9.40

Percent Frequency of Inversions > 8, 12, 16, 24 Hours by Cloud Obscurity and Season for the 35'-200' layer

Winnipeg C.B.C. Tower Oct. 1969 - Dec. 1971

% Inversions > 8 Hours

Cloud Obscurity	WINT.	SPR.	SUM.	AUT.	ALL YR.
0-½	65.9	78.5	90.3	74.0	76.4
½-2	48.4	75.2	70.6	66.8	63.4
2-4	51.4	64.3	62.8	64.1	60.6
4-6	47.0	36.0	38.4	47.5	43.0
6-8	18.8	23.6	35.0	32.0	30.0
9	8.3		22.3	12.5	12.8
10	6.8	6.9	8.0	11.3	8.6
ALL	42.7	43.7	52.2	42.5	45.7

% Inversions > 12 Hours

WINT.	SPR.	SUM.	AUT.	ALL YR.
47.7	45.2	3.2	48.1	37.5
36.7	37.6	3.4	53.9	30.1
33.4	28.6	7.0	43.4	28.7
25.1	28.0	3.8	22.5	20.2
12.5		7.5	19.2	11.7
8.3			6.2	4.2
3.4	2.3		3.8	2.7
29.4	24.1	4.1	27.1	21.1

% Inversions > 16 Hours

Cloud Obscurity	WINT.	SPR.	SUM.	AUT.	ALL YR.
0-½	27.3	16.7		3.7	13.9
½-2	26.7	9.4		7.7	11.6
2-4	10.3	10.7		13.2	8.5
4-6	18.8			5.0	6.4
6-8				4.3	1.7
9	8.3			3.1	2.8
10				1.9	0.7
ALL	16.9	6.7		5.8	7.1

% Inversions > 24 Hours

WINT.	SPR.	SUM.	AUT.	ALL YR.
2.3	2.4			1.4
1.7			2.6	1.0
2.6	3.6		3.8	2.4
15.7			2.5	4.8
8.3				1.4
			1.9	0.7
3.9	1.0		1.7	1.6

Table 9.41

Percent Frequency of Inversions > 8,12,16,24, Hours, by Cloud Obscurity and Season for the 35'-810' Layer

Winnipeg C.B.C. Tower Oct. 1969 - Dec. 1971

Cloud Obscurity	% Inversions >8 Hours					% Inversions > 12 Hours				
	WINT.	SPR.	SUM.	AUT.	All YR.	WINT.	SPR.	SUM.	AUT.	ALL YR.
0-½	42.1	72.9	79.5	68.9	67.5	30.6	45.9	11.8	51.7	35.0
½-2	57.2	68.7	65.0	71.9	65.3	42.9	28.1	10.0	62.5	31.4
2-4	71.9	66.6	67.5	67.0	67.8	66.7	37.0	10.8	43.7	39.7
4-6	58.8	60.0	57.7	72.0	63.3	49.8	30.0	11.5	43.8	34.4
6-8	40.1	33.3	45.8	30.9	36.5	34.5	13.3	8.3	15.5	16.7
9	30.0	12.5	26.4	11.2	20.0	30.0	12.5	10.6	5.6	12.7
10	17.5	2.9		13.7	9.8	8.7			4.6	3.8
ALL	47.9	49.0	55.2	48.0	50.2	39.2	25.7	9.5	32.0	26.2

Cloud Obscurity	% Inversions > 16 Hours					% Inversions > 24 Hours				
	WINT.	SPR.	SUM.	AUT.	ALL YR.	WINT.	SPR.	SUM.	AUT.	ALL YR.
0-½	19.1	8.1		13.8	9.6	15.3	2.7			4.0
½-2	31.5	9.4		6.3	10.0	17.2				3.7
2-4	46.2	11.1		9.3	17.1	23.1	11.1		4.6	9.6
4-6	40.8	10.0		9.4	14.4	18.1			3.1	5.5
6-8	11.2			2.6	3.1	5.6				1.0
9	20.0				3.6					
10	5.8			2.3	2.3	2.9				0.8
ALL	26.7	6.1		6.3	9.2	13.6	2.4		1.2	4.0

Table 9.42

Relationship of the Six Variables to the Air Pollution Problem

Variable	Relationship
Duration of Inversion	- length important in the accumulation of pollutants
Wind Speed	- influences mixing and dilution of air pollutants
Temperature	- cold temperatures result in increased heating and hence increased pollution
Pressure	- high pressures generally result in incresed stability
Sky Obscurity	- influences radiation balance and stability
Inversion Intensity	- Stronly related to inversion duration

Figure 9.2

Fig 9.2 LINKAGE TREE GROUPING OF WINTER 35-200' INVERSIONS, WINNIPEG CBC TOWER 1969-1971

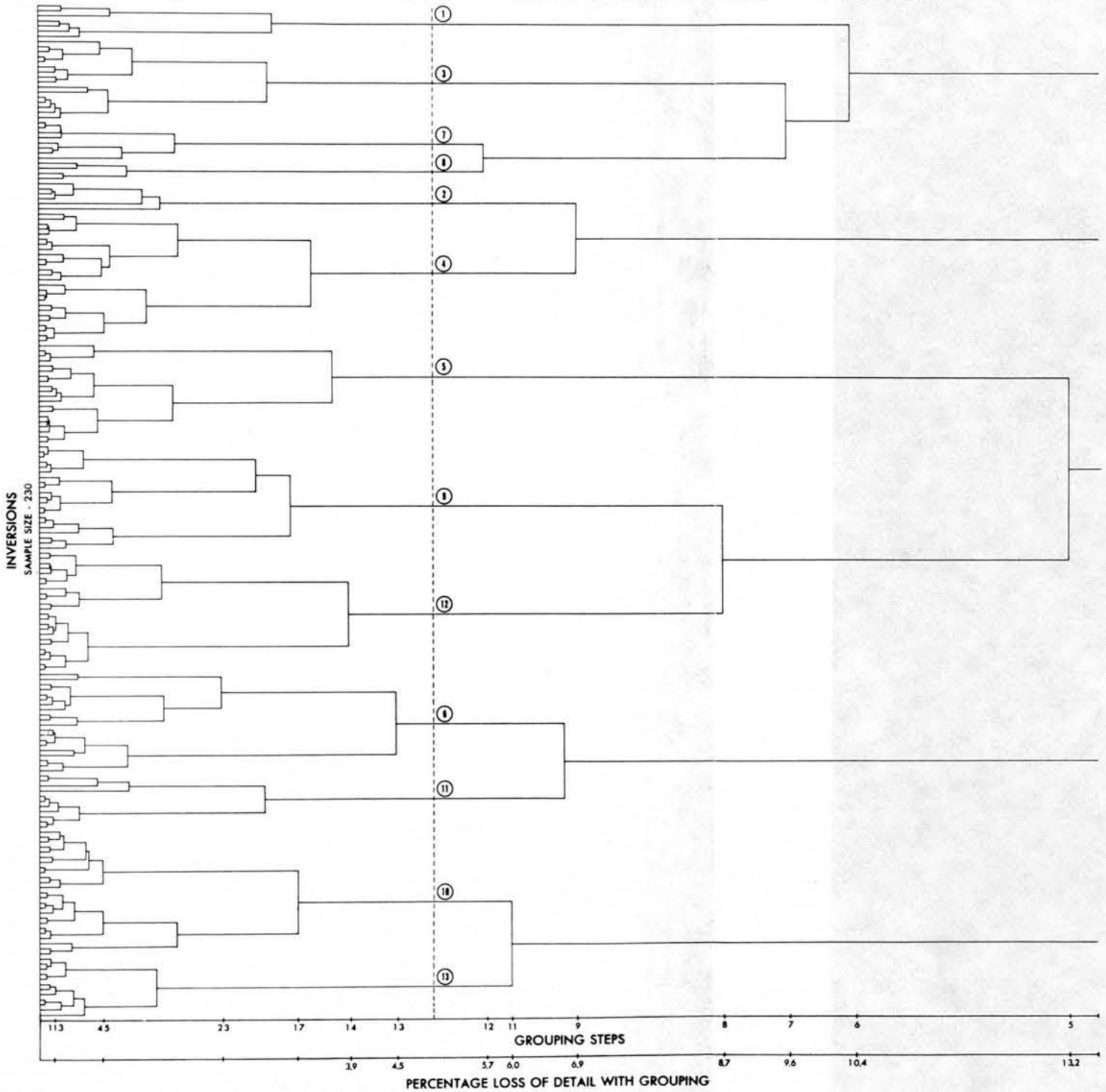


Figure 9.3

Fig. 9.3 LINKAGE TREE GROUPING OF WINTER 35-810' INVERSIONS, WINNIPEG CBC TOWER 1969-1971

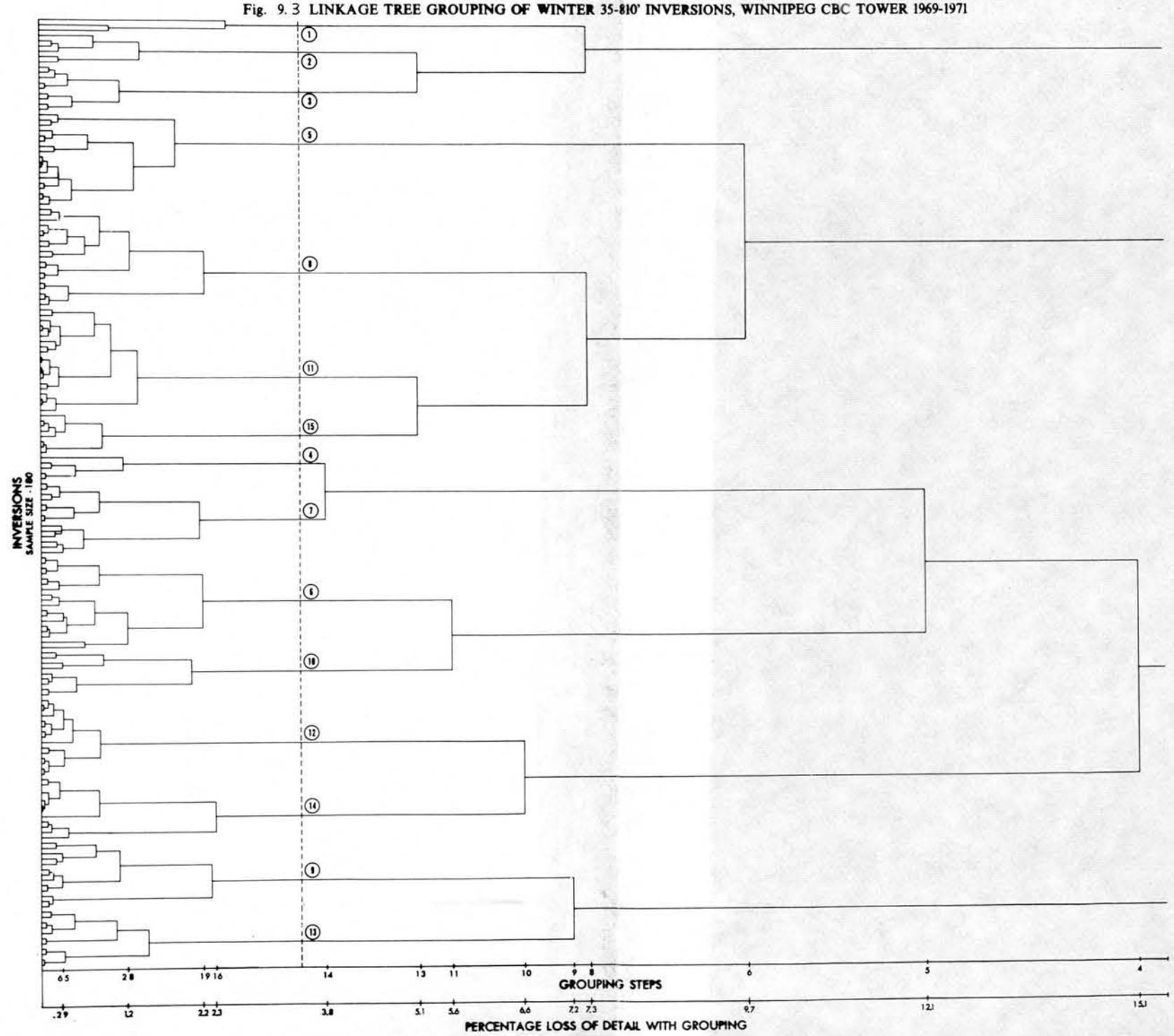


Figure 9.4

Fig. 9. 4-LINKAGE TREE GROUPING OF SUMMER 35-200' INVERSIONS, WINNIPEG CBC TOWER 1969-1971

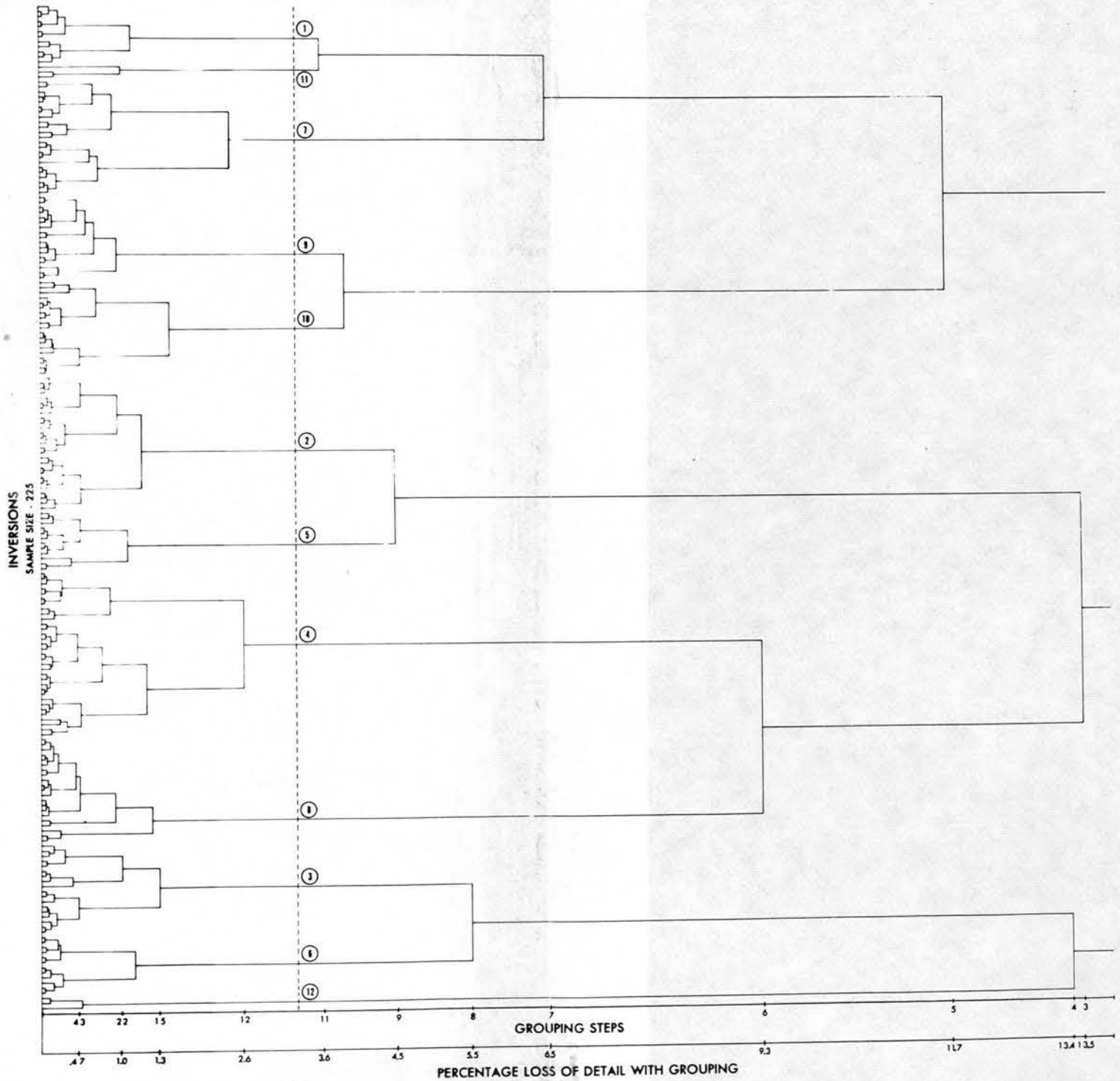


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Figure 9.5

Fig. 9.5 LINKAGE TREE GROUPING OF SUMMER 35-810' INVERSIONS, WINNIPEG CBC TOWER 1969-1971

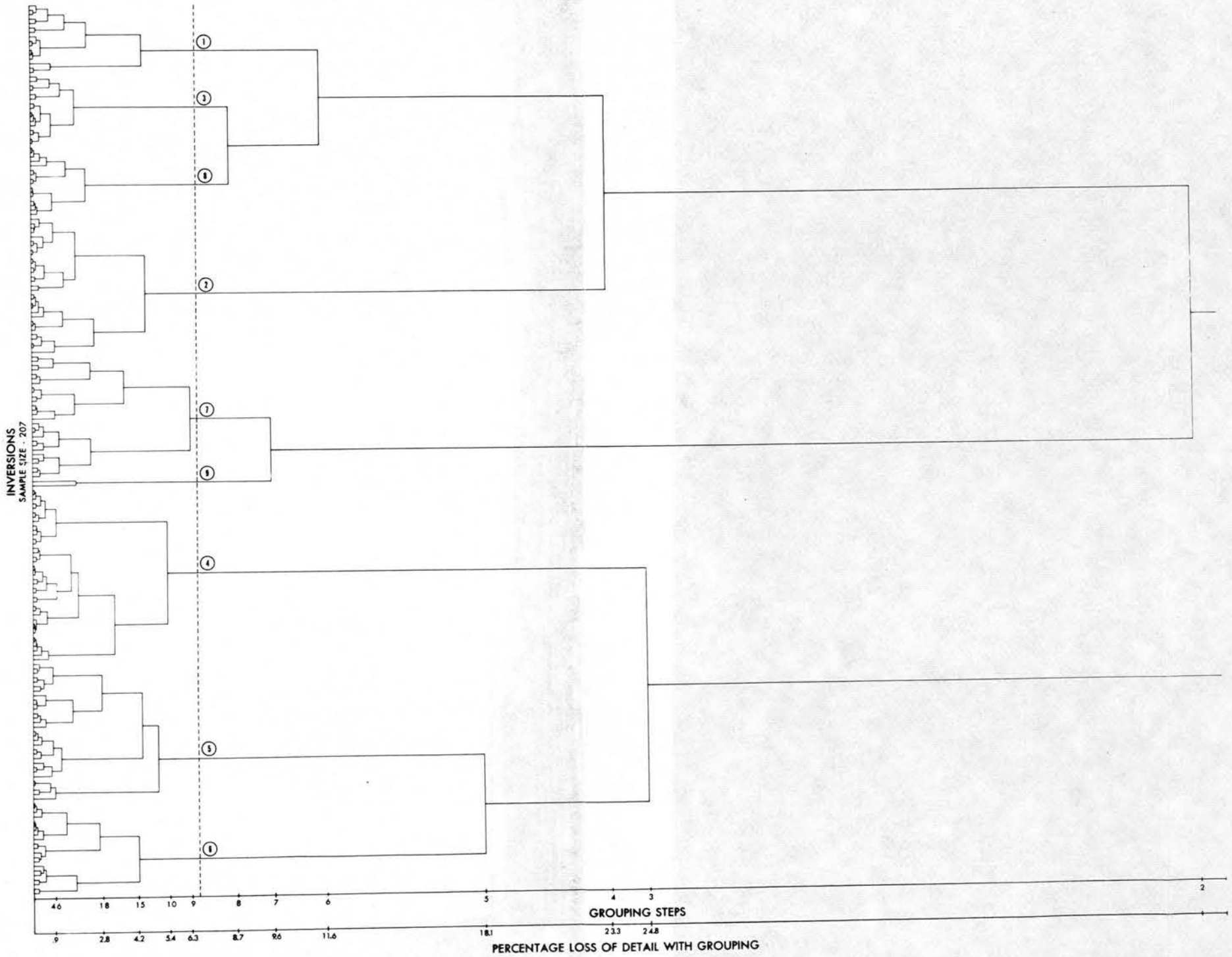

Table 9.43

Results of 6 Variable Cluster Analysis for the 35'-200' Layer, Winnipeg C.B.C. Tower Oct. 1969- Dec. 1971

WINTER

CLUSTER NUMBER	SIZE	VARIABLES ACTIVE IN CLUSTERING						WIND DIRECTION BREAKDOWN BY CLUSTERS								
		Inv. Durn.	Inv. Int.	Wind Speed Avg.	Avg. Obs.	Avg. Temp.	Pres.	NW	N	NE	E	SE	S	SW	W	ALL
1	7	28.1	-29.4	13.5	2.3	21.4	1016.2	-	1	-	-	-	1	4	1	
2	7	19.6	-38.8	7.9	0.8	-25.4	1030.0	-	-	2	1	-	1	-	3	
3	16	14.1	-24.5	10.7	3.4	2.5	1017.6	2	3	-	1	-	5	3	1	
4	31	14.9	-26.0	9.6	1.7	-12.9	1026.1	6	8	-	1	1	2	3	9	
5	25	5.7	-5.7	11.9	7.7	14.5	1022.5	7	4	-	-	4	2	6	2	
6	25	3.9	-4.6	12.3	7.5	19.7	1005.1	3	1	2	1	5	3	5	5	
7	8	15.6	-39.7	9.8	1.7	-0.8	1026.7	3	1	-	-	1	2	1	1	
8	4	16.8	-53.1	9.1	1.5	13.5	1011.6	-	-	-	-	-	3	1	-	
9	24	5.7	-5.9	13.1	3.1	0.6	1012.5	6	4	1	2	3	2	1	5	
10	30	6.1	-5.1	15.0	1.7	-11.6	1023.3	15	4	-	-	-	3	3	5	
11	11	6.3	-18.8	9.4	6.6	14.2	1008.5	-	-	-	-	2	-	3	6	
12	27	4.0	-8.5	7.2	4.3	-0.1	1025.0	4	4	2	3	1	3	4	5	
13	14	3.4	-3.9	5.3	2.0	-15.3	1031.8	5	2	1	1	2	-	1	2	
ALL	230	8.7	-14.3	108	3.8	0.5	1020.0									

Table 9.43 Continued

STATISTICS ON PASSIVE VARIABLES

CLUSTER NUMBER	SIZE	Inv. Max.	Inv. Min.	Wind Speed Max.	Wind Speed Min.	Wind Dirn. Avg.	Max. Obs.	Min. Obs.	Avg. Ht.	Max. Temp.
1	7	-72.5	-1.8	21.3	8.8	5.8	6.0	0.0	2.2	30.4
2	7	-69.0	-3.3	11.9	3.4	5.2	3.4	0.1	2.3	-14.9
3	16	-46.7	-3.0	15.8	6.1	5.2	7.5	0.4	3.0	9.4
4	31	-48.5	-3.8	14.1	5.4	5.7	6.1	0.1	3.2	-5.7
5	25	-12.3	-2.2	14.4	9.3	5.9	9.1	6.0	2.5	17.0
6	25	-8.3	-1.8	14.6	10.4	5.7	8.5	6.4	10.8	20.6
7	9	-67.1	-8.3	13.7	5.7	6.4	5.7	0.0	13.8	8.4
8	4	-86.5	-6.5	12.8	4.3	5.6	5.0	0.0	4.0	21.5
9	24	-10.6	-2.0	15.7	10.4	5.6	4.4	2.6	12.1	2.7
10	30	-11.2	-1.1	17.6	12.6	6.8	3.0	0.9	29.4	-9.4
11	11	-35.8	-5.6	12.2	6.6	6.6	9.2	3.7	3.2	17.4
12	27	-13.9	-3.2	8.8	5.4	5.6	5.9	3.0	8.7	2.3
13	14	-7.7	-1.3	6.5	4.0	5.8	2.9	1.6	21.1	-13.9
ALL	230	-26.8	-2.8	13.9	7.9	5.9	6.0	2.4	9.1	4.5

Table 9.44

Results of 6 Variable Cluster Analysis for the 35'-810' Layer, Winnipeg C.B.C. Tower Oct. 1969- Dec. 1971

WINTER

CLUSTER NUMBER	SIZE	VARIABLES ACTIVE IN CLUSTERING						WIND DIRECTION BREAKDOWN BY CLUSTERS							
		Inv. Durn.	Inv. Int.	Wind Speed Avg.	Avg. Obs.	Avg. Temp.	Pres.	N	NE	E	SE	S	SW	W	NW
1	3	60.7	-11.7	15.0	2.7	13.2	1018.4	-	-	-	-	1	-	-	2
2	6	48.5	-10.4	11.5	2.1	-14.6	1028.6	-	-	1	-	1	1	1	2
3	9	33.8	-10.3	13.5	2.7	-1.7	1022.2	-	1	1	2	1	3	-	1
4	5	25.8	-9.1	18.9	6.2	15.1	1000.4	-	-	-	-	2	3	-	-
5	18	18.2	-7.1	11.2	2.3	-14.9	1025.5	2	-	-	2	2	1	7	4
6	18	15.9	-10.0	14.3	3.4	1.9	1020.7	2	1	-	1	1	6	3	3
7	14	15.7	-9.2	16.8	5.6	16.4	1014.8	-	-	-	2	3	4	3	2
8	19	6.4	-3.4	20.4	1.0	-19.0	1022.1	-	-	-	-	-	4	8	5
9	13	4.7	-2.7	25.3	6.2	28.4	1003.4	1	-	-	1	1	4	4	2
10	9	6.3	-2.9	12.7	5.4	-1.8	1009.9	1	-	1	1	-	-	4	2
11	20	6.4	-4.6	20.1	2.9	-6.6	1024.6	1	-	-	2	3	1	5	7
12	15	3.5	-2.2	9.4	9.3	16.0	1009.4	3	3	-	-	5	3	1	-
13	11	3.0	-3.8	27.2	6.7	9.9	1007.6	4	-	-	1	1	1	3	1
14	12	2.1	-1.3	13.9	8.8	9.9	1024.7	2	1	-	5	1	-	1	2
15	8	2.6	-1.0	5.7	4.2	-6.6	1030.6	-	1	1	1	-	2	2	1
ALL	180	12.4	-5.5	16.2	4.5	1.6	1018.2	16	7	4	18	22	33	42	34

Table 9.44 Continued

STATISTICS ON PASSIVE VARIABLES

CLUSTER NUMBER	SIZE	Inv. Max.	Inv. Min.	Wind Speed Max.	Wind Speed Min.	Wind Dirn. Avg.	Max. Obs.	Min. Obs.	Max. Temp.
1	3	-26.8	-0.2	23.4	4.9	7.5	4.7	0.3	27.0
2	6	-22.2	-0.7	23.8	3.1	6.8	7.0	0.0	-0.5
3	9	-19.8	-0.7	26.2	3.0	5.2	9.4	0.1	8.4
4	5	-20.6	-0.9	30.0	8.6	6.2	10.0	1.2	24.4
5	18	-13.1	-1.0	18.1	4.4	6.5	7.9	0.1	-7.1
6	18	-17.0	-2.0	21.4	9.7	6.2	7.9	0.3	9.7
7	14	-18.4	-1.1	24.7	9.6	6.6	9.4	1.6	24.1
8	19	-6.2	-0.9	24.2	17.0	7.9	1.7	0.6	-16.2
9	13	-4.9	-0.8	28.1	22.9	6.6	7.3	4.9	29.6
10	9	-4.7	-1.3	16.3	9.6	6.1	6.3	4.4	0.8
11	20	-7.5	-1.6	24.3	16.3	6.8	5.8	1.1	-4.5
12	15	-3.1	-1.2	11.2	7.6	4.4	9.7	8.5	16.7
13	11	-6.1	-1.7	29.6	24.5	4.8	7.5	5.3	12.1
14	12	-1.8	-0.9	14.7	13.0	4.8	9.0	8.2	10.2
15	8	-1.5	-0.5	7.1	4.7	5.9	4.8	3.9	-5.5

Table 9.45

Results of 6 Variable Cluster Analysis for the 35'-200' Layer, Winnipeg C.B.C. Tower Oct. 1969 - Dec. 1971

SUMMER

CLUSTER NUMBER	SIZE	VARIABLES ACTIVE IN CLUSTERING						WIND DIRECTION BREAKDOWN BY CLUSTERS							
		Inv. Durn.	Inv. Int.	Wind Speed Avg.	Avg. Obs.	Avg. Temp.	Pres.	N	NE	E	SE	S	SW	W	NW
1	12	10.3	-10.4	13.5	5.0	73.1	1004.7	-	1	1	2	6	2	-	-
2	28	10.9	-24.3	8.2	2.6	57.8	1012.8	3	1	4	2	3	10	2	3
3	25	11.3	-36.5	6.4	1.7	51.9	1018.5	3	2	2	-	4	4	7	3
4	35	8.1	-14.4	7.3	5.2	65.1	1010.9	5	4	3	6	9	5	2	1
5	12	10.0	-30.1	8.6	1.8	67.8	1007.6	3	1	0	2	3	1	2	-
6	16	10.8	-44.1	7.8	0.7	60.8	1013.0	1	-	2	1	4	5	3	-
7	24	2.6	-4.0	18.5	5.0	64.2	1005.6	3	2	1	6	2	4	4	2
8	21	7.4	-11.6	10.0	4.3	51.3	1013.5	5	3	-	1	1	1	1	9
9	26	2.8	-2.9	8.8	8.2	60.6	1012.2	7	3	5	3	-	1	4	3
10	20	2.2	-4.5	5.8	8.4	70.0	1010.2	2	5	3	3	1	-	2	4
11	3	1.0	-0.5	19.6	4.0	88.0	1003.9	3	-	-	-	-	-	-	-
12	3	1.0	-68.1	11.3	1.7	77.3	1013.1	1	-	-	-	-	-	1	1
All	225	7.2	-17.8	9.4	4.5	62.0	1011.3								

Table 9.45 Continued

STATISTICS ON PASSIVE VARIABLES

CLUSTER NUMBER	SIZE	Inv. Max.	Inv. Min.	Wind Speed Max.	Wind Speed Min.	Wind Dirn. Avg.	Max. Obs.	Min. Obs.	Max. Temp.
1		-26.6	-2.2	20.1	6.9	5.0	8.5	1.7	81.3
2		-48.0	-4.4	12.3	4.7	5.4	5.9	0.5	65.4
3		-63.4	-7.1	9.6	2.5	5.7	4.4	0.3	61.0
4		-28.3	-3.5	11.5	3.5	4.6	7.5	2.9	70.5
5		-57.1	-5.2	12.5	4.5	4.4	4.2	0.5	75.8
6		-68.8	-10.0	10.6	4.1	5.6	2.4	0.0	70.8
7		-5.8	-2.4	20.9	17.0	5.2	5.8	4.3	65.2
8		-21.6	-3.0	10.0	6.6	5.5	7.8	1.9	55.3
9		-4.4	-1.8	10.1	7.5	4.2	9.0	7.3	61.8
10		-6.4	-3.4	7.1	4.4	4.8	8.9	8.0	70.7
11		-0.5	-0.5	19.6	19.6	1.5	4.0	4.0	88.0
12		-68.1	-68.1	11.3	11.3	5.8	1.7	1.7	77.3
ALL		-31.4	-4.9	12.5	6.4	5.0	6.5	2.9	67.0

Table 9.46

Results of 6 Variable Cluster Analysis for the 35'-810' Layer, Winnipeg C.B.C. Tower Oct. 1969- Dec. 1971

SUMMER

CLUSTER NUMBER	SIZE	VARIABLES ACTIVE IN CLUSTERING						WIND DIRECTION BREAKDOWN BY CLUSTERS							
		Inv. Durn.	Inv. Int.	Wind Speed Avg.	Avg. Obs.	Avg. Temp.	Pres.	N	NE	E	SE	S	SW	W	NW
1	16	9.5	-8.3	11.6	3.0	70.5	1010.8	1	3	2	2	-	2	5	1
2	32	11.0	-12.1	15.6	1.5	60.9	1012.1	-	-	2	5	9	10	3	2
3	16	9.9	-6.6	17.5	3.9	63.3	1005.1	1	1	1	1	2	7	2	-
4	40	10.9	-8.0	9.5	2.3	52.7	1017.4	6	5	3	1	10	6	4	4
5	34	5.5	-2.9	10.5	7.0	60.2	1013.9	3	7	7	4	2	5	3	4
6	21	6.0	-3.6	18.3	2.7	52.2	1012.1	3	2	1	1	-	2	5	7
7	28	3.7	-3.1	25.5	6.0	69.2	1004.7	3	1	3	14	3	3	1	-
8	18	2.6	-2.1	14.9	6.9	66.5	1005.4	1	1	3	5	5	2	1	-
9	2	1.0	-1.1	27.7	3.5	91.5	N/A	-	-	-	1	-	1	-	-
All		7.6	-6.0	15.1	4.1	61.1	1011.1	18	20	22	34	31	38	24	18

Table 9.46 Continued

STATISTICS ON PASSIVE VARIABLES

CLUSTER NUMBER	SIZE	Inv. Max.	Inv. Min.	Wind Speed Max.	Wind Speed Min.	Wind Dirn. Avg.	Max. Obs.	Min. Obs.	Max. Temp.
1		-12.3	-2.7	17.0	6.2	5.2	5.0	1.4	77.1
2		-18.6	-2.7	21.7	9.1	6.1	3.9	0.2	68.8
3		-11.2	-1.1	24.1	12.1	5.7	6.9	1.1	68.9
4		-13.9	-1.3	14.5	5.0	4.9	5.1	0.4	59.5
5		-4.9	-1.3	13.9	7.6	4.7	8.5	5.1	62.3
6		-5.7	-1.1	21.5	16.0	6.2	4.8	1.6	55.4
7		-5.2	-1.5	28.4	22.9	4.5	7.0	5.2	71.5
8		-3.5	-1.0	17.0	13.0	4.7	7.4	6.2	67.7
9		-1.1	-1.1	27.7	27.7	5.5	3.5	3.5	91.5
All		-9.8	-1.6	19.4	11.1	5.2	6.0	2.6	65.7

Table 9.47

Winter 35 - 200' Inversion Characteristics by Cluster

	Cluster	Duration	Temperature	Pressure	Wind Direction	Wind Speed	Intensity	Sky Obscurity	Summary
Long Inversions	1	+ + +	+ + +	-	SW	+	+		SW winds, long inversions, high temperatures, low pressure and high wind speeds all point to radiation inversions
	2	+ +	- - -	+ +	VAR	- -	+ +	- - -	Classical radiation inversions with light winds, low cloud, and high pressure.
Medium Inversions	8	+ +	+	-	S		+ + +		Advection inversions.
	7	+	+	+	N		+ +	- -	High radiation input.
	3	+			S & SW			VAR	Contains both advection and radiation inversions. Evidence suggests that the radiation inversions are destroyed by changing synoptic conditions.
	4	-	-	+	W, NW, & N			- -	Radiation inversions.
Medium/short Inversions	11	+	+	- -	W & SW			+ +	Advective/Frontal inversions.
	10	-	-		NW, W & N	+ +	-	- -	Radiation inversions.
	9	- -	+	-	NW, W & N	+		+	Short radiation inversions.
	5	- -	+	+	NW & VAR	+		+ +	Radiation/Advection inversions.
Short Inversions	12	- - -		+	VAR	- -		+	Mainly radiation inversions.
	6	- - -	+	- - -	SW, N & W	+	-	+ +	Advection and Frontal inversions
	13	- - -	-	+ +	NW, N & W	- -		-	Radiation inversions.

+ Above Average Blank = Average - Below Average
++ Very much above average -- Very much below average
+++ Highest average values --- Lowest average values

Table 9.48

Winter 35 - 810' Inversion Characteristics by Cluster

[redacted]

Table 9.48

Winter 35' - 810' Inversion Characteristics by Cluster

	Cluster	Duration	Temperature	Pressure	Wind Direction	Wind Speed	Intensity	Sky Obscurity	Summary
Long Inversions	1	+ + +	+		NW, S		+	-	Long radiation inversions (>2½ days). All, broken up by changing synoptic conditions.
	2	+ + +	-	+ +	NW, Var.	-	+	-	Long radiation inversions (>2 days). Almost all destroyed by frontal or cyclonic activity from west.
	3	+ +			SW, Var.		+	-	Long radiation/advection inversions. Considerable variation.
	4	+	+	- - -	SW,S		+	+ +	Classical long advection inversions.
Medium/long Inversions	5	+	-	+	W, NW	- -		-	Radiation inversions. Joins with clusters 8,11,15 at 6 group stage to give a large high pressure radiation group.
Medium Inversions	6	+			SW, W, NW		+		Nocturnal radiation/advection inversions.
	7	+	+	-	SW, S, W		+		Advection inversions- similar to cluster 4 but shorter.
Medium/short Inversions	8	-	-		W, NW, SW	+	-	- -	All 3 groups roughly similar- raiation inversions
	11	-	-		NW, W	+		-	
	10	-		- -	W		-		
Short Inversions	9	-	+ + +	- - -	W, SW	+ +	-	+ +	All 3 groups are advection inversions. May include some frontal inversions.
	12	- -	+	- -	S, Var.	- - -	-	+ + +	
	14	- - -	+	+	SE		- -	+ + +	
	13	- - -	+	- -	N, W	+ +		+ +	Probably frontal inversions
	15	- - -	-	+ +	Var.	- - -	- -		Radiation inversions

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[redacted]

Table 9.49

Summer 35 - 200' Inversion Characteristics by Cluster

[redacted]

Table 9.49

Summer 35'- 200' Inversion Characteristics by Cluster

	Cluster	Duration	Temperature	Pressure	Wind Direction	Wind Speed	Intensity	Sky Obscurity	Summary
	3	+	-	+	W, SW, S, Var.	-	+ +	- -	
Medium	2	+			SW			- -	
Inversions	6	+			SW, S		+ + +	- - -	
	1	+	+	- -	S	+	-		Advecting mT air.
	5	+		-	N, S, Var.		+ +	- -	
	4				S, Var.	-			
	8		-		NW, N		-		
	9	- -			N, Var.		- - -	+ + +	
Short	7	- -			SE, Var.	+ +	- - -		
Inversions	10	- -	+		NE, Var.	- -	- - -	+ + +	
	11	- - -	+ + +	- - -	N	++	- - -		Mainly daytime formation - frontal
	12	- - -	+ +		N, NW, W		+ + +	- -	or thunderstorm origins.

[redacted]

Table 9.50

Summer 35 - 810' Inversion Characteristics by Cluster

Table 9.50

Summer 35' - 810' Inversion Characteristics by Cluster

	Cluster	Duration	Temperature	Pressure	Wind Direction	Wind Speed	Intensity	Sky Obscurity	Summary
Medium Inversions	1	+	+		W, Var.	-	+		
	2	+			SW, S		+ +	- -	
	3	+		- -	SW				
	4	+	-	+	S, Var.	- -	+	-	
Medium-Short Inversions	5				NE, E, Var.	- -	-	+ +	
	6		-		NW, W, Var.		-	-	
Short Inversions	7	- -	+	- -	SE	+ + +	-	+	
	8	- -		- -	SE, S		- -	+ +	
	9	- -	+ + +		SE, SW	+ + +	- -		

TABLE 10.1

Monthly Inversion Index by Heights for Inversions ≤2 hours,

Winnipeg C.B.C. Tower, October 1969 - December 1971

Height Interval	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Ann./Avg.
35-200	8971	9558	13232	5572	4545	5612	7078	9142	6646	5885	5972	4415	7219
35-400	5923	6075	8102	3770	2590	3425	4330	5970	3521	3998	3910	3939	4629
35-600	5134	4976	6279	3077	2029	2741	3286	4616	3456	3227	2708	4149	3807
35-810	3955	3734	4567	2169	1395	1883	2100	3214	2378	2349	2014	3476	2769
200-400	3670	3516	4311	2551	1259	1903	2318	3820	2531	2597	2523	3385	2865
200-600	3639	3322	3726	2235	1142	1746	1907	3014	2324	2232	2356	3457	2592
200-810	2738	2439	2574	1426	761	1026	1070	1925	1497	1491	1439	3200	1798
400-600	3825	3413	3339	2148	1149	1776	1600	2431	2363	2212	2336	3664	2513
400-810	2576	2110	1958	1083	629	730	651	1184	1148	1193	1431	2907	1467
600-810	1784	1247	1162	563	398	281	264	644	588	630	1017	2285	905
Average	4222	4039	4925	2459	1590	2112	2460	3596	2645	2581	2571	3488	3057

TABLE 10.2

Inversions over 24 Hours in Duration

for the 35 - 810' Layer in Winter

Wind Direction	Frequency	Wind Speed Details	
		Frequency	Average Wind Speed
South	10	2	4 - 9
		3	9 - 13
		3	13 - 17
		2	17 - 21
South-West	8	3	9 - 13
		4	13 - 17
		1	17 - 21
North-West	6	4	9 - 13
		1	13 - 17
		1	21 - 25
South-East	3	1	17 - 21
		2	21 - 25
East	2	1	2 - 4
		1	4 - 9
West	2	1	9 - 13
		1	13 - 17
North	1		4 - 9
North-East	1		9 - 13

APPENDIX I

DEGREES FAHRENHEIT - DEGREES CENTIGRADE CONVERSION TABLE

FAHRENHEIT TO CENTIGRADE

Fahrenheit	.0 °C.	.1 °C.	.2 °C.	.3 °C.	.4 °C.	.5 °C.	.6 °C.	.7 °C.	.8 °C.	.9 °C.
+30°	−1.11	−1.06	−1.00	−0.94	−0.89	−0.83	−0.78	−0.72	−0.67	−0.61
29	1.67	1.61	1.56	1.50	1.44	1.39	1.33	1.28	1.22	1.17
28	2.22	2.17	2.11	2.06	2.00	1.94	1.89	1.83	1.78	1.72
27	2.78	2.72	2.67	2.61	2.56	2.50	2.44	2.39	2.33	2.28
26	3.33	3.28	3.22	3.17	3.11	3.06	3.00	2.94	2.89	2.83
+25	−3.89	−3.83	−3.78	−3.72	−3.67	−3.61	−3.56	−3.50	−3.44	−3.39
24	4.44	4.39	4.33	4.28	4.22	4.17	4.11	4.06	4.00	3.94
23	5.00	4.94	4.89	4.83	4.78	4.72	4.67	4.61	4.56	4.50
22	5.56	5.50	5.44	5.39	5.33	5.28	5.22	5.17	5.11	5.06
21	6.11	6.06	6.00	5.94	5.89	5.83	5.78	5.72	5.67	5.61
+20	−6.67	−6.61	−6.56	−6.50	−6.44	−6.39	−6.33	−6.28	−6.22	−6.17
19	7.22	7.17	7.11	7.06	7.00	6.94	6.89	6.83	6.78	6.72
18	7.78	7.72	7.67	7.61	7.56	7.50	7.44	7.39	7.33	7.28
17	8.33	8.28	8.22	8.17	8.11	8.06	8.00	7.94	7.89	7.83
16	8.89	8.83	8.78	8.72	8.67	8.61	8.56	8.50	8.44	8.39
+15	−9.44	−9.39	−9.33	−9.28	−9.22	−9.17	−9.11	−9.06	−9.00	−8.94
14	10.00	9.94	9.89	9.83	9.78	9.72	9.67	9.61	9.56	9.50
13	10.56	10.50	10.44	10.39	10.33	10.28	10.22	10.17	10.11	10.06
12	11.11	11.06	11.00	10.94	10.89	10.83	10.78	10.72	10.67	10.61
11	11.67	11.61	11.56	11.50	11.44	11.39	11.33	11.28	11.22	11.17
+10	−12.22	−12.17	−12.11	−12.06	−12.00	−11.94	−11.89	−11.83	−11.78	−11.72
9	12.78	12.72	12.67	12.61	12.56	12.50	12.44	12.39	12.33	12.28
8	13.33	13.28	13.22	13.17	13.11	13.06	13.00	12.94	12.89	12.83
7	13.89	13.83	13.78	13.72	13.67	13.61	13.56	13.50	13.44	13.39
6	14.44	14.39	14.33	14.28	14.22	14.17	14.11	14.06	14.00	13.94
+ 5	−15.00	−14.94	−14.89	−14.83	−14.78	−14.72	−14.67	−14.61	−14.56	−14.50
4	15.56	15.50	15.44	15.39	15.33	15.28	15.22	15.17	15.11	15.06
3	16.11	16.06	16.00	15.94	15.89	15.83	15.78	15.72	15.67	15.61
2	16.67	16.61	16.56	16.50	16.44	16.39	16.33	16.28	16.22	16.17
1	17.22	17.17	17.11	17.06	17.00	16.94	16.89	16.83	16.78	16.72
+ 0	17.78	17.72	17.67	17.61	17.56	17.50	17.44	17.39	17.33	17.28
− 0	−17.78	−17.83	−17.89	−17.94	−18.00	−18.06	−18.11	−18.17	−18.22	−18.28
1	18.33	18.39	18.44	18.50	18.56	18.61	18.67	18.72	18.78	18.83
2	18.89	18.94	19.00	19.06	19.11	19.17	19.22	19.28	19.33	19.39
3	19.44	19.50	19.56	19.61	19.67	19.72	19.78	19.83	19.89	19.94
4	20.00	20.06	20.11	20.17	20.22	20.28	20.33	20.39	20.44	20.50
− 5	−20.56	−20.61	−20.67	−20.72	−20.78	−20.83	−20.89	−20.94	−21.00	−21.06
6	21.11	21.17	21.22	21.28	21.33	21.39	21.44	21.50	21.56	21.61
7	21.67	21.72	21.78	21.83	21.89	21.94	22.00	22.06	22.11	22.17
8	22.22	22.28	22.33	22.39	22.44	22.50	22.56	22.61	22.67	22.72
9	22.78	22.83	22.89	22.94	23.00	23.06	23.11	23.17	23.22	23.28
−10	−23.33	−23.39	−23.44	−23.50	−23.56	−23.61	−23.67	−23.72	−23.78	−23.83
11	23.89	23.94	24.00	24.06	24.11	24.17	24.22	24.28	24.33	24.39
12	24.44	24.50	24.56	24.61	24.67	24.72	24.78	24.83	24.89	24.94
13	25.00	25.06	25.11	25.17	25.22	25.28	25.33	25.39	25.44	25.50
14	25.56	25.61	25.67	25.72	25.78	25.83	25.89	25.94	26.00	26.06
−15	−26.11	−26.17	−26.22	−26.28	−26.33	−26.39	−26.44	−26.50	−26.56	−26.61
16	26.67	26.72	26.78	26.83	26.89	26.94	27.00	27.06	27.11	27.17
17	27.22	27.28	27.33	27.39	27.44	27.50	27.56	27.61	27.67	27.72
18	27.78	27.83	27.89	27.94	28.00	28.06	28.11	28.17	28.22	28.28
19	28.33	28.39	28.44	28.50	28.56	28.61	28.67	28.72	28.78	28.83
−20	−28.89	−28.94	−29.00	−29.06	−29.11	−29.17	−29.22	−29.28	−29.33	−29.39

FAHRENHEIT TO CENTIGRADE

Fahrenheit	.0 °C.	.1 °C.	.2 °C.	.3 °C.	.4 °C.	.5 °C.	.6 °C.	.7 °C.	.8 °C.	.9 °C.
−20°	−28.89	−28.94	−29.00	−29.06	−29.11	−29.17	−29.22	−29.28	−29.33	−29.39
21	29.44	29.50	29.56	29.61	29.67	29.72	29.78	29.83	29.89	29.94
22	30.00	30.06	30.11	30.17	30.22	30.28	30.33	30.39	30.44	30.50
23	30.56	30.61	30.67	30.72	30.78	30.83	30.89	30.94	31.00	31.06
24	31.11	31.17	31.22	31.28	31.33	31.39	31.44	31.50	31.56	31.61
−25	−31.67	−31.72	−31.78	−31.83	−31.89	−31.94	−32.00	−32.06	−32.11	−32.17
26	32.22	32.28	32.33	32.39	32.44	32.50	32.56	32.61	32.67	32.72
27	32.78	32.83	32.89	32.94	33.00	33.06	33.11	33.17	33.22	33.28
28	33.33	33.39	33.44	33.50	33.56	33.61	33.67	33.72	33.78	33.83
29	33.89	33.94	34.00	34.06	34.11	34.17	34.22	34.28	34.33	34.39
−30	−34.44	−34.50	−34.56	−34.61	−34.67	−34.72	−34.78	−34.83	−34.89	−34.94
31	35.00	35.06	35.11	35.17	35.22	35.28	35.33	35.39	35.44	35.50
32	35.56	35.61	35.67	35.72	35.78	35.83	35.89	35.94	36.00	36.06
33	36.11	36.17	36.22	36.28	36.33	36.39	36.44	36.50	36.56	36.61
34	36.67	36.72	36.78	36.83	36.89	36.94	37.00	37.06	37.11	37.17
−35	−37.22	−37.28	−37.33	−37.39	−37.44	−37.50	−37.56	−37.61	−37.67	−37.72
36	37.78	37.83	37.89	37.94	38.00	38.06	38.11	38.17	38.22	38.28
37	38.33	38.39	38.44	38.50	38.56	38.61	38.67	38.72	38.78	38.83
38	38.89	38.94	39.00	39.06	39.11	39.17	39.22	39.28	39.33	39.39
39	39.44	39.50	39.56	39.61	39.67	39.72	39.78	39.83	39.89	39.94
−40	−40.00	−40.06	−40.11	−40.17	−40.22	−40.28	−40.33	−40.39	−40.44	−40.50
41	40.56	40.61	40.67	40.72	40.78	40.83	40.89	40.94	41.00	41.06
42	41.11	41.17	41.22	41.28	41.33	41.39	41.44	41.50	41.56	41.61
43	41.67	41.72	41.78	41.83	41.89	41.94	42.00	42.06	42.11	42.17
44	42.22	42.28	42.33	42.39	42.44	42.50	42.56	42.61	42.67	42.72
−45	−42.78	−42.83	−42.89	−42.94	−43.00	−43.06	−43.11	−43.17	−43.22	−43.28
46	43.33	43.39	43.44	43.50	43.56	43.61	43.67	43.72	43.78	43.83
47	43.89	43.94	44.00	44.06	44.11	44.17	44.22	44.28	44.33	44.39
48	44.44	44.50	44.56	44.61	44.67	44.72	44.78	44.83	44.89	44.94
49	45.00	45.06	45.11	45.17	45.22	45.28	45.33	45.39	45.44	45.50
−50	−45.56	−45.61	−45.67	−45.72	−45.78	−45.83	−45.89	−45.94	−46.00	−46.06
51	46.11	46.17	46.22	46.28	46.33	46.39	46.44	46.50	46.56	46.61
52	46.67	46.72	46.78	46.83	46.89	46.94	47.00	47.06	47.11	47.17
53	47.22	47.28	47.33	47.39	47.44	47.50	47.56	47.61	47.67	47.72
54	47.78	47.83	47.89	47.94	48.00	48.06	48.11	48.17	48.22	48.28
−55	−48.33	−48.39	−48.44	−48.50	−48.56	−48.61	−48.67	−48.72	−48.78	−48.83
56	48.89	48.94	49.00	49.06	49.11	49.17	49.22	49.28	49.33	49.39
57	49.44	49.50	49.56	49.61	49.67	49.72	49.78	49.83	49.89	49.94
58	50.00	50.06	50.11	50.17	50.22	50.28	50.33	50.39	50.44	50.50
59	50.56	50.61	50.67	50.72	50.78	50.83	50.89	50.94	51.00	51.06
−60	−51.11	−51.17	−51.22	−51.28	−51.33	−51.39	−51.44	−51.50	−51.56	−51.61
61	51.67	51.72	51.78	51.83	51.89	51.94	52.00	52.06	52.11	52.17
62	52.22	52.28	52.33	52.39	52.44	52.50	52.56	52.61	52.67	52.72
63	52.78	52.83	52.89	52.94	53.00	53.06	53.11	53.17	53.22	53.28
64	53.33	53.39	53.44	53.50	53.56	53.61	53.67	53.72	53.78	53.83
−65	−53.89	−53.94	−54.00	−54.06	−54.11	−54.17	−54.22	−54.28	−54.33	−54.39
66	54.44	54.50	54.56	54.61	54.67	54.72	54.78	54.83	54.89	54.94
67	55.00	55.06	55.11	55.17	55.22	55.28	55.33	55.39	55.44	55.50
68	55.56	55.61	55.67	55.72	55.78	55.83	55.89	55.94	56.00	56.06
69	56.11	56.17	56.22	56.28	56.33	56.39	56.44	56.50	56.56	56.61
−70	−56.67	−56.72	−56.78	−56.83	−56.89	−56.94	−57.00	−57.06	−57.11	−57.17

FAHRENHEIT TO CENTIGRADE

Fahrenheit	.0 °C.	.1 °C.	.2 °C.	.3 °C.	.4 °C.	.5 °C.	.6 °C.	.7 °C.	.8 °C.	.9 °C.
+130°	+54.44	+54.50	+54.56	+54.61	+54.67	+54.72	+54.78	+54.83	+54.89	+54.94
129	53.89	53.94	54.00	54.06	54.11	54.17	54.22	54.28	54.33	54.39
128	53.33	53.39	53.44	53.50	53.56	53.61	53.67	53.72	53.78	53.83
127	52.78	52.83	52.89	52.94	53.00	53.06	53.11	53.17	53.22	53.28
126	52.22	52.28	52.33	52.39	52.44	52.50	52.56	52.61	52.67	52.72
+125	+51.67	+51.72	+51.78	+51.83	+51.89	+51.94	+52.00	+52.06	+52.11	+52.17
124	51.11	51.17	51.22	51.28	51.33	51.39	51.44	51.50	51.56	51.61
123	50.56	50.61	50.67	50.72	50.78	50.83	50.89	50.94	51.00	51.06
122	50.00	50.06	50.11	50.17	50.22	50.28	50.33	50.39	50.44	50.50
121	49.44	49.50	49.56	49.61	49.67	49.72	49.78	49.83	49.89	49.94
+120	+48.89	+48.94	+49.00	+49.06	+49.11	+49.17	+49.22	+49.28	+49.33	+49.39
119	48.33	48.39	48.44	48.50	48.56	48.61	48.67	48.72	48.78	48.83
118	47.78	47.83	47.89	47.94	48.00	48.06	48.11	48.17	48.22	48.28
117	47.22	47.28	47.33	47.39	47.44	47.50	47.56	47.61	47.67	47.72
116	46.67	46.72	46.78	46.83	46.89	46.94	47.00	47.06	47.11	47.17
+115	+46.11	+46.17	+46.22	+46.28	+46.33	+46.39	+46.44	+46.50	+46.56	+46.61
114	45.56	45.61	45.67	45.72	45.78	45.83	45.89	45.94	46.00	46.06
113	45.00	45.06	45.11	45.17	45.22	45.28	45.33	45.39	45.44	45.50
112	44.44	44.50	44.56	44.61	44.67	44.72	44.78	44.83	44.89	44.94
111	43.89	43.94	44.00	44.06	44.11	44.17	44.22	44.28	44.33	44.39
+110	+43.33	+43.39	+43.44	+43.50	+43.56	+43.61	+43.67	+43.72	+43.78	+43.83
109	42.78	42.83	42.89	42.94	43.00	43.06	43.11	43.17	43.22	43.28
108	42.22	42.28	42.33	42.39	42.44	42.50	42.56	42.61	42.67	42.72
107	41.67	41.72	41.78	41.83	41.89	41.94	42.00	42.06	42.11	42.17
106	41.11	41.17	41.22	41.28	41.33	41.39	41.44	41.50	41.56	41.61
+105	+40.56	+40.61	+40.67	+40.72	+40.78	+40.83	+40.89	+40.94	+41.00	+41.06
104	40.00	40.06	40.11	40.17	40.22	40.28	40.33	40.39	40.44	40.50
103	39.44	39.50	39.56	39.61	39.67	39.72	39.78	39.83	39.89	39.94
102	38.89	38.94	39.00	39.06	39.11	39.17	39.22	39.28	39.33	39.39
101	38.33	38.39	38.44	38.50	38.56	38.61	38.67	38.72	38.78	38.83
+100	+37.78	+37.83	+37.89	+37.94	+38.00	+38.06	+38.11	+38.17	+38.22	+38.28
99	37.22	37.28	37.33	37.39	37.44	37.50	37.56	37.61	37.67	37.72
98	36.67	36.72	36.78	36.83	36.89	36.94	37.00	37.06	37.11	37.17
97	36.11	36.17	36.22	36.28	36.33	36.39	36.44	36.50	36.56	36.61
96	35.56	35.61	35.67	35.72	35.78	35.83	35.89	35.94	36.00	36.06
+ 95	+35.00	+35.06	+35.11	+35.17	+35.22	+35.28	+35.33	+35.39	+35.44	+35.50
94	34.44	34.50	34.56	34.61	34.67	34.72	34.78	34.83	34.89	34.94
93	33.89	33.94	34.00	34.06	34.11	34.17	34.22	34.28	34.33	34.39
92	33.33	33.39	33.44	33.50	33.56	33.61	33.67	33.72	33.78	33.83
91	32.78	32.83	32.89	32.94	33.00	33.06	33.11	33.17	33.22	33.28
+ 90	+32.22	+32.28	+32.33	+32.39	+32.44	+32.50	+32.56	+32.61	+32.67	+32.72
89	31.67	31.72	31.78	31.83	31.89	31.94	32.00	32.06	32.11	32.17
88	31.11	31.17	31.22	31.28	31.33	31.39	31.44	31.50	31.56	31.61
87	30.56	30.61	30.67	30.72	30.78	30.83	30.89	30.94	31.00	31.06
86	30.00	30.06	30.11	30.17	30.22	30.28	30.33	30.39	30.44	30.50
+ 85	+29.44	+29.50	+29.56	+29.61	+29.67	+29.72	+29.78	+29.83	+29.89	+29.94
84	28.89	28.94	29.00	29.06	29.11	29.17	29.22	29.28	29.33	29.39
83	28.33	28.39	28.44	28.50	28.56	28.61	28.67	28.72	28.78	28.83
82	27.78	27.83	27.89	27.94	28.00	28.06	28.11	28.17	28.22	28.28
81	27.22	27.28	27.33	27.39	27.44	27.50	27.56	27.61	27.67	27.72
+ 80	+26.67	+26.72	+26.78	+26.83	+26.89	+26.94	+27.00	+27.06	+27.11	+27.17

FAHRENHEIT TO CENTIGRADE

Fahrenheit	.0 °C.	.1 °C.	.2 °C.	.3 °C.	.4 °C.	.5 °C.	.6 °C.	.7 °C.	.8 °C.	.9 °C.
+80°	+26.67	+26.72	+26.78	+26.83	+26.89	+26.94	+27.00	+27.06	+27.11	+27.17
79	26.11	26.17	26.22	26.28	26.33	26.39	26.44	26.50	26.56	26.61
78	25.56	25.61	25.67	25.72	25.78	25.83	25.89	25.94	26.00	26.06
77	25.00	25.06	25.11	25.17	25.22	25.28	25.33	25.39	25.44	25.50
76	24.44	24.50	24.56	24.61	24.67	24.72	24.78	24.83	24.89	24.94
+75	+23.89	+23.94	+24.00	+24.06	+24.11	+24.17	+24.22	+24.28	+24.33	+24.39
74	23.33	23.39	23.44	23.50	23.56	23.61	23.67	23.72	23.78	23.83
73	22.78	22.83	22.89	22.94	23.00	23.06	23.11	23.17	23.22	23.28
72	22.22	22.28	22.33	22.39	22.44	22.50	22.56	22.61	22.67	22.72
71	21.67	21.72	21.78	21.83	21.89	21.94	22.00	22.06	22.11	22.17
+70	+21.11	+21.17	+21.22	+21.28	+21.33	+21.39	+21.44	+21.50	+21.56	+21.61
69	20.56	20.61	20.67	20.72	20.78	20.83	20.89	20.94	21.00	21.06
68	20.00	20.06	20.11	20.17	20.22	20.28	20.33	20.39	20.44	20.50
67	19.44	19.50	19.56	19.61	19.67	19.72	19.78	19.83	19.89	19.94
66	18.89	18.94	19.00	19.06	19.11	19.17	19.22	19.28	19.33	19.39
+65	+18.33	+18.39	+18.44	+18.50	+18.56	+18.61	+18.67	+18.72	+18.78	+18.83
64	17.78	17.83	17.89	17.94	18.00	18.06	18.11	18.17	18.22	18.28
63	17.22	17.28	17.33	17.39	17.44	17.50	17.56	17.61	17.67	17.72
62	16.67	16.72	16.78	16.83	16.89	16.94	17.00	17.06	17.11	17.17
61	16.11	16.17	16.22	16.28	16.33	16.39	16.44	16.50	16.56	16.61
+60	+15.56	+15.61	+15.67	+15.72	+15.78	+15.83	+15.89	+15.94	+16.00	+16.06
59	15.00	15.06	15.11	15.17	15.22	15.28	15.33	15.39	15.44	15.50
58	14.44	14.50	14.56	14.61	14.67	14.72	14.78	14.83	14.89	14.94
57	13.89	13.94	14.00	14.06	14.11	14.17	14.22	14.28	14.33	14.39
56	13.33	13.39	13.44	13.50	13.56	13.61	13.67	13.72	13.78	13.83
+55	+12.78	+12.83	+12.89	+12.94	+13.00	+13.06	+13.11	+13.17	+13.22	+13.28
54	12.22	12.28	12.33	12.39	12.44	12.50	12.56	12.61	12.67	12.72
53	11.67	11.72	11.78	11.83	11.89	11.94	12.00	12.06	12.11	12.17
52	11.11	11.17	11.22	11.28	11.33	11.39	11.44	11.50	11.56	11.61
51	10.56	10.61	10.67	10.72	10.78	10.83	10.89	10.94	11.00	11.06
+50	+10.00	+10.06	+10.11	+10.17	+10.22	+10.28	+10.33	+10.39	+10.44	+10.50
49	9.44	9.50	9.56	9.61	9.67	9.72	9.78	9.83	9.89	9.94
48	8.89	8.94	9.00	9.06	9.11	9.17	9.22	9.28	9.33	9.39
47	8.33	8.39	8.44	8.50	8.56	8.61	8.67	8.72	8.78	8.83
46	7.78	7.83	7.89	7.94	8.00	8.06	8.11	8.17	8.22	8.28
+45	+7.22	+7.28	+7.33	+7.39	+7.44	+7.50	+7.56	+7.61	+7.67	+7.72
44	6.67	6.72	6.78	6.83	6.89	6.94	7.00	7.06	7.11	7.17
43	6.11	6.17	6.22	6.28	6.33	6.39	6.44	6.50	6.56	6.61
42	5.56	5.61	5.67	5.72	5.78	5.83	5.89	5.94	6.00	6.06
41	5.00	5.06	5.11	5.17	5.22	5.28	5.33	5.39	5.44	5.50
+40	+4.44	+4.50	+4.56	+4.61	+4.67	+4.72	+4.78	+4.83	+4.89	+4.94
39	3.89	3.94	4.00	4.06	4.11	4.17	4.22	4.28	4.33	4.39
38	3.33	3.39	3.44	3.50	3.56	3.61	3.67	3.72	3.78	3.83
37	2.78	2.83	2.89	2.94	3.00	3.06	3.11	3.17	3.22	3.28
36	2.22	2.28	2.33	2.39	2.44	2.50	2.56	2.61	2.67	2.72
+35	+1.67	+1.72	+1.78	+1.83	+1.89	+1.94	+2.00	+2.06	+2.11	+2.17
34	+1.11	+1.17	+1.22	+1.28	+1.33	+1.39	+1.44	+1.50	+1.56	+1.61
33	+0.56	+0.61	+0.67	+0.72	+0.78	+0.83	+0.89	+0.94	+1.00	+1.06
32	0.00	+0.06	+0.11	+0.17	+0.22	+0.28	+0.33	+0.39	+0.44	+0.50
31	−0.56	−0.50	−0.44	−0.39	−0.33	−0.28	−0.22	−0.17	−0.11	−0.06
+30	−1.11	−1.06	−1.00	−0.94	−0.89	−0.83	−0.78	−0.72	−0.67	−0.61