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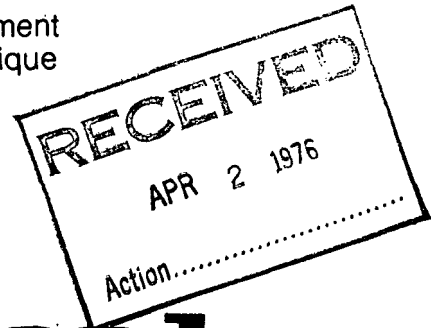


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Technical Memoranda

THE 1974 VICTORIA DAY RAINSTORM
IN WINNIPEG AND VICINITY

by

K.A. FLUTO AND P.B. LEMIEUX

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ENVIRONMENT CANADA - ATMOSPHERIC ENVIRONMENT SERVICE
4905 Dufferin Street
Downsview, Ontario

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ABSTRACT

Rainfall amounts and intensities over southern Manitoba during the 1974 Victoria Day weekend are analysed and compared with record values for various time intervals.

Factors which contributed to extensive flooding of streets and basements in Winnipeg City at the end of this weekend are discussed.

LA TEMPÊTE DE PLUIE DU JOUR DE LA FÊTE DE LA REINE VICTORIA
A WINNIPEG ET DANS LA RÉGION

par

K. A. Fluto et P. B. Lemieux

RESUME

Les auteurs analysent la hauteur et l'intensité des pluies qui sont tombées dans le sud du Manitoba pendant la fin de semaine de la fête de la Reine Victoria et comparent ces valeurs aux enregistrements records pour divers intervalles de temps.

Ils étudient également les facteurs qui ont contribué aux graves inondations des rues et des sous-sols à Winnipeg à la fin du congé.

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(Manuscript received November 18, 1975)

1. Introduction

The general public sometimes suspects that the weather displays a certain perversity with respect to holiday weekends; during the May Long Weekend in 1974, the residents of Winnipeg could scarcely be faulted for such feelings. May had been noticeably rainy, and a climax of sorts was reached when three and one half to four inches of rain fell on the Saturday, Sunday and Monday, May 18, 19 and 20. Runoff water disrupted traffic and damaged streets, and the flooding of over 30 thousand basements caused damage estimated to be in excess of 7 million dollars.

2. The Synoptic Situation

Prior to the Victoria Day storm, upper level charts showed a deep trough over the southwestern United States and a strong southerly flow across the northern plains (Figs. 1 and 2). On May 19, a disturbance moved through this trough and tracked northeastward, resulting in a general rainfall of one to two inches over southern Manitoba, with the heavier amounts being recorded along the Red River Valley.

In the wake of this system, another more intense wave, also involving the Polar Front, developed over northern Colorado. The strong southerly flow ahead of this rather slow moving system brought increasingly moister air over the Dakotas. This airmass was potentially unstable and lifting associated with the Polar Wave was sufficient to release this instability on the evening of May 20th. Heavy thunderstorms moved across southern Manitoba and substantial rainfall occurred in the Winnipeg area.

3. Precipitation Distribution

Table 1 shows rainfall amounts recorded at several stations across southern Manitoba during the Victoria Day weekend. Also listed for comparison are the monthly normals for these stations. This comparison reveals that total rainfall during the weekend exceeded the monthly normal at many places.

Table No. 1 Rainfall Totals (Inches)

May 18 - May 20, 1974

Station	60 Hours Prior to Storm	0000Z May 21 to 1200Z May 21	Total for Weekend	Climatic Normal for May
1. Beausejour	1.57	0.75	2.32	2.47
2. Boissevain	0.74	0.29	1.03	2.50
3. Brandon	0.66	0.16	0.82	1.95
4. Carman	2.35	1.26	3.61	-
5. Deerwood	2.65	0.81	3.46	2.52
6. Elm Creek	2.00	1.00	3.00	-
7. Emerson	1.41	0.30	1.71	2.30
8. Gimli	0.85	0.78	1.63	2.21
9. Gladstone	0.63	0.61	1.24	2.06
10. Morden	1.75	2.45	4.20	2.52
11. Morris	1.49	1.66	3.15	2.14
12. Neepawa	0.74	0.36	1.10	2.11
13. Pilot Mound	2.17	0.65	2.82	2.37
14. Portage la Prairie	1.51	0.69	2.20	2.54
15. St. Boniface Water Works	2.09	1.39	3.48	2.25
16. St. Norbert	2.46	1.56	4.02	-
17. Selkirk	2.54	0.50	3.04	-
18. Spruce Stn. No. 43	1.85	0.92	2.77	-
19. Steinbach	1.58	0.92	2.50	2.78
20. Stonewall	1.99	0.52	2.51	2.40
21. Treherne	1.98	0.12	2.10	-
22. Winnipeg Airport	2.33	1.37	3.70	2.25
23. Winnipeg Sewage Treatment Plant	1.99	1.27	3.26	-

These rainfall amounts are also plotted in Figs. 7 and 8 and show that the heaviest falls extended from Morden northeastward through Winnipeg. This line would appear to coincide with the upper level wind maximum.

4. Precipitation Intensity

Table 2 shows the rate of rainfall in the Winnipeg area during the Victoria Day storm. Comparison with the values listed in Table 3 shows that new record values for May of 0.99 inches in 30 minutes and 1.13 inches in 60 minutes were established at Winnipeg Airport. Rates of fall for 5, 10 and 15 minutes were near record values for May, but the total for 24 hours was well below the established record of 2.66 inches. It is also apparent that the 24 hour amount was considerably less than the annual record of 6.00 inches (June).

Table No. 2 1974 Victoria Day Storm
Rainfall Rates and Totals (Inches)

Station	Greatest Rainfall in:					Total for Storm
	5 Min.	10 Min.	15 Min.	30 Min.	60 Min.	
Winnipeg Airport	.37	.64	.74	.99	1.13	1.37
Winnipeg S. T. P.	.29	.52	.64	1.03	1.16	1.27
St. Boniface W.W.	.30	.57	.79	1.11	1.17	1.39
St. Norbert	-	-	-	-	-	1.56

Table No. 3
Record Rainfall Rates for Winnipeg Airport (Inches)

Month	Record Rainfall in:						Record Total For Month
	5 Min.	10 Min.	15 Min.	30 Min.	60 Min.	24 Hrs.	
Jan.	-	-	-	-	-	.15	3.36
Feb.	-	-	-	-	-	.30	3.54
Mar.	.03	.04	.07	.10	.10	1.26	3.00
Apr.	.08	.15	.18	.31	.51	1.44	5.64
May	.38	.74	.85	.92	.92	2.66	6.38
June	.36	.70	.88	1.12	1.40	6.00	10.07
July	.70	.97	1.39	1.55	1.55	5.26	7.77
Aug.	.42	.65	.80	1.41	1.41	3.33	7.11
Sept.	.49	.92	1.17	1.74	1.88	3.21	6.15
Oct.	.13	.15	.18	.29	.40	2.93	5.67
Nov.	.05	.07	.08	.11	.15	1.75	3.55
Dec.	-	-	-	-	-	.60	3.99

5. Runoff and Damage

Prior to the Victoria Day weekend, groundwater in southern Manitoba was already substantial due to the melting of heavy winter snows. The flow rate of Sturgeon Creek had reached a record value of 2800 C.F.S. (previous record 1750 C.F.S.) at Grace Hospital during the Spring runoff. This had caused pronounced flooding across Portage and Ness Avenues and traffic normally using these main thoroughfares had to be rerouted for approximately one week.

By May 18th, the flow rate of Sturgeon Creek had dropped to 200 C.F.S. but the ground was still nearly saturated. Heavy rain during the earlier part of the holiday weekend served to complete this saturation and to place a substantial load on the city storm sewer system.

When rainfall of record intensity fell on the evening of May 20th, runoff was immediate and spectacular. The flow rate of Sturgeon Creek jumped abruptly to near 2000 C.F.S.; Portage Avenue was again flooded and would be closed for repair for five weeks. Storm sewers were unable to handle the additional burden and as a result, many other streets were flooded to such an extent that they were impassable for several

hours. Water in depths from a few inches to several feet caused extensive damage to basements in many parts of the city.

It is interesting to note that although rainfall of record intensity was associated with this storm, there were no reports of significant damage due to lightning, hail or high winds.

6. Summary

Spring runoff was heavy across southern Manitoba in 1974 and the ground was still nearly saturated in mid May. Substantial rainfall at the beginning of the Victoria Day weekend served to complete this saturation and intense rainfall from heavy thunderstorms on the evening of May 20th caused extensive flooding and damage in Winnipeg City.

APPROVED,



J.R.H. Noble,
Assistant Deputy Minister,
Atmospheric Environment Service.

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1. Heino, Ron L.: Design Curves for High-Intensity, Short Duration Rainfall at Winnipeg, Manitoba. Department of Civil Engineering, University of Manitoba.
2. Atmospheric Environment Service: Temperature and Precipitation, Prairie Provinces, 1941 - 1970.
3. Atmospheric Environment Services: Monthly Meteorological Summary, Winnipeg, Manitoba - May, 1974.

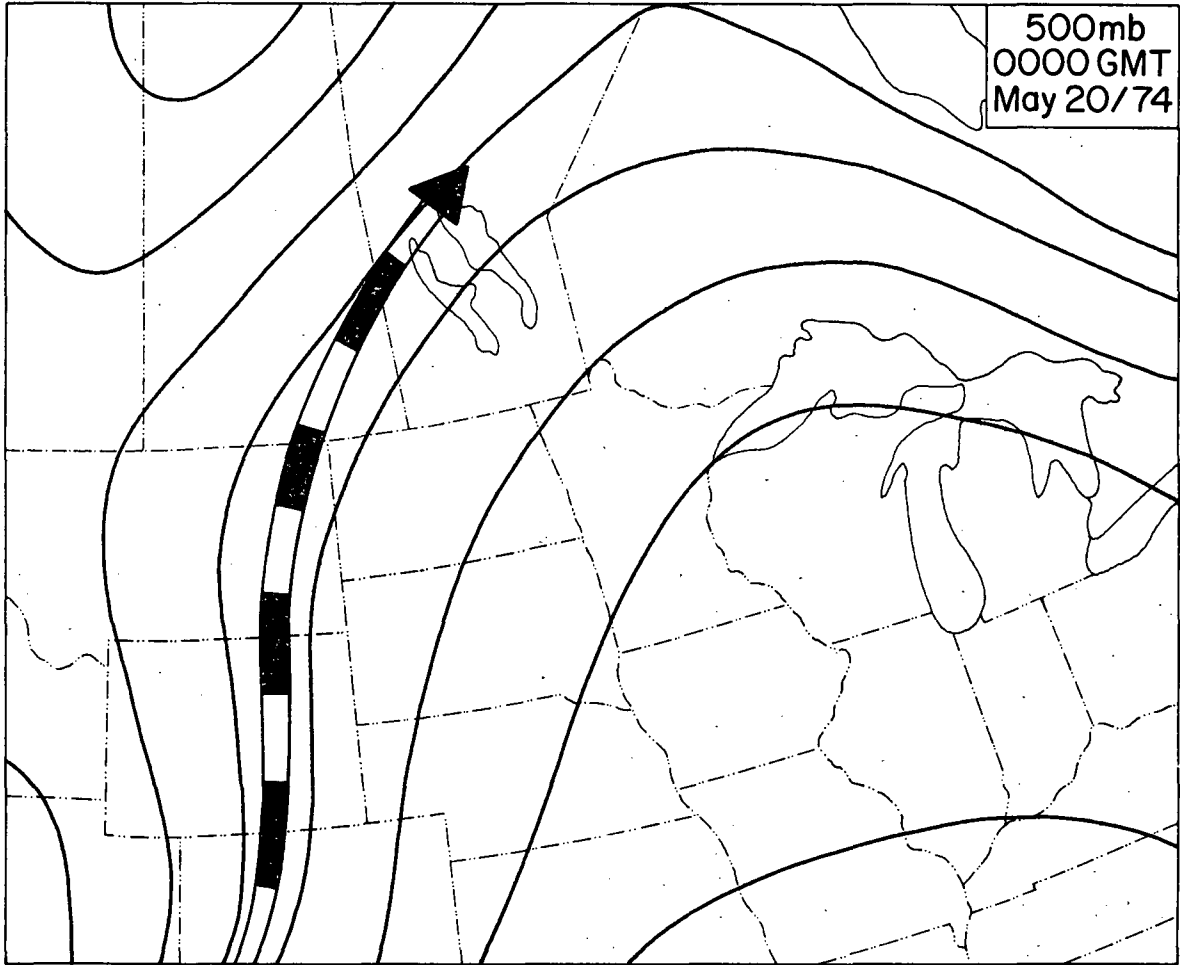


Figure 1

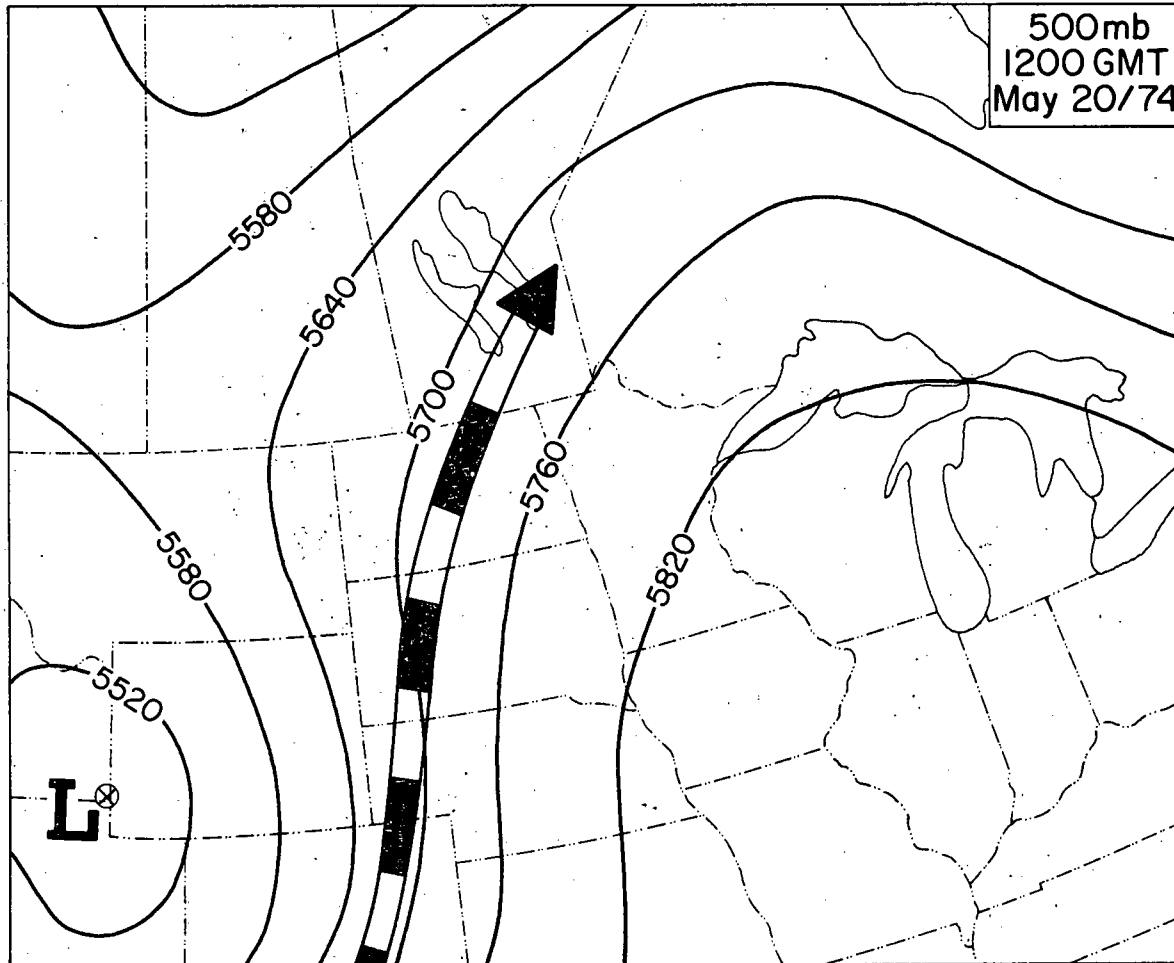


Figure 2

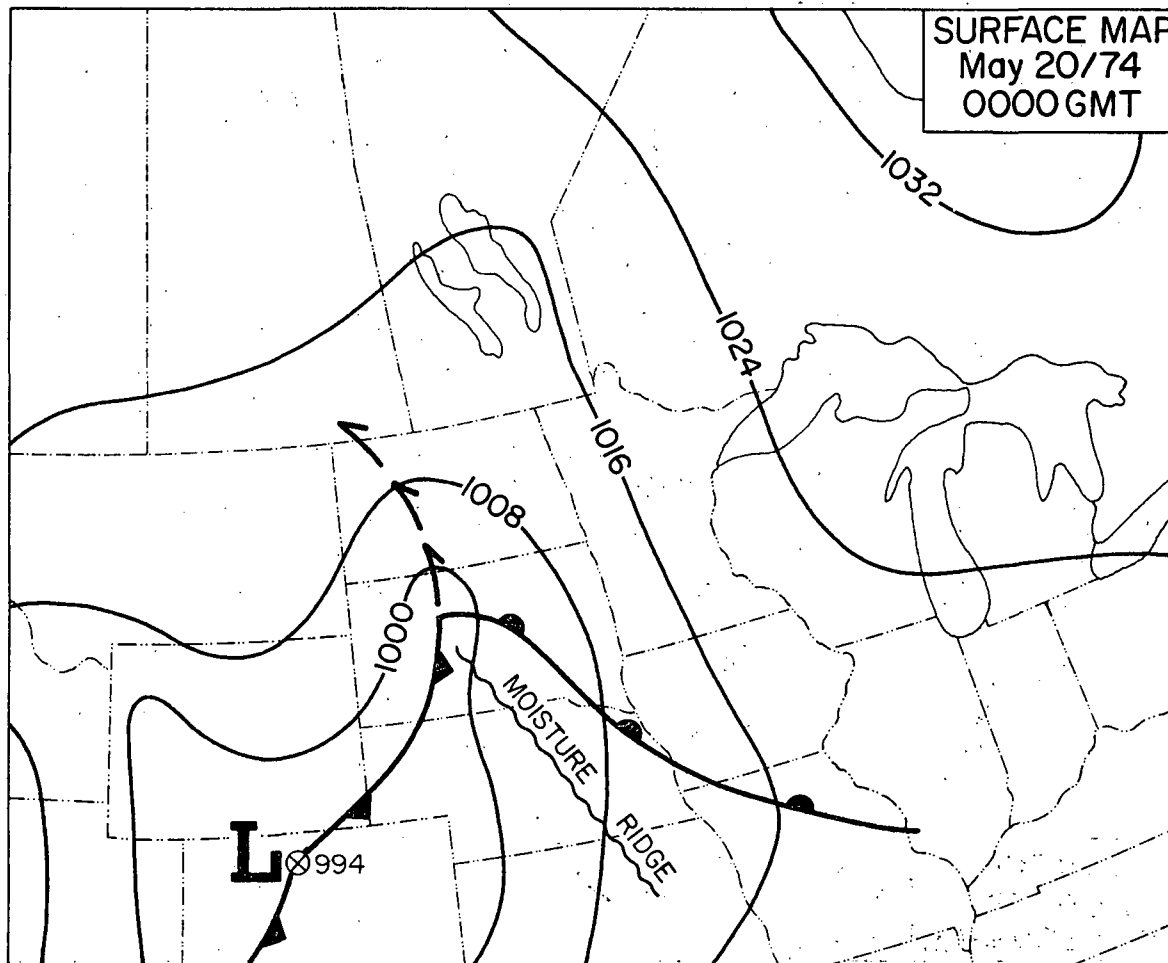


Figure 3

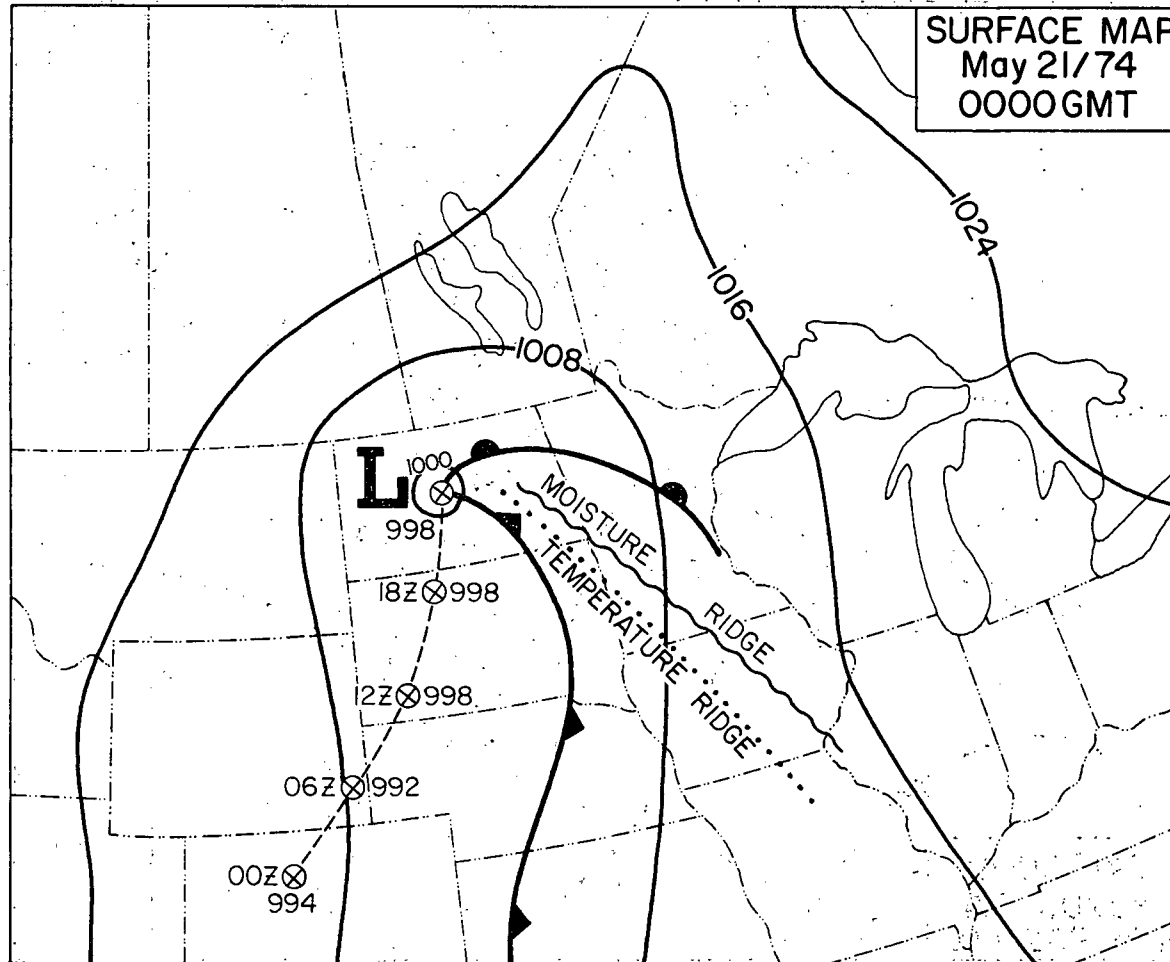


Figure 4

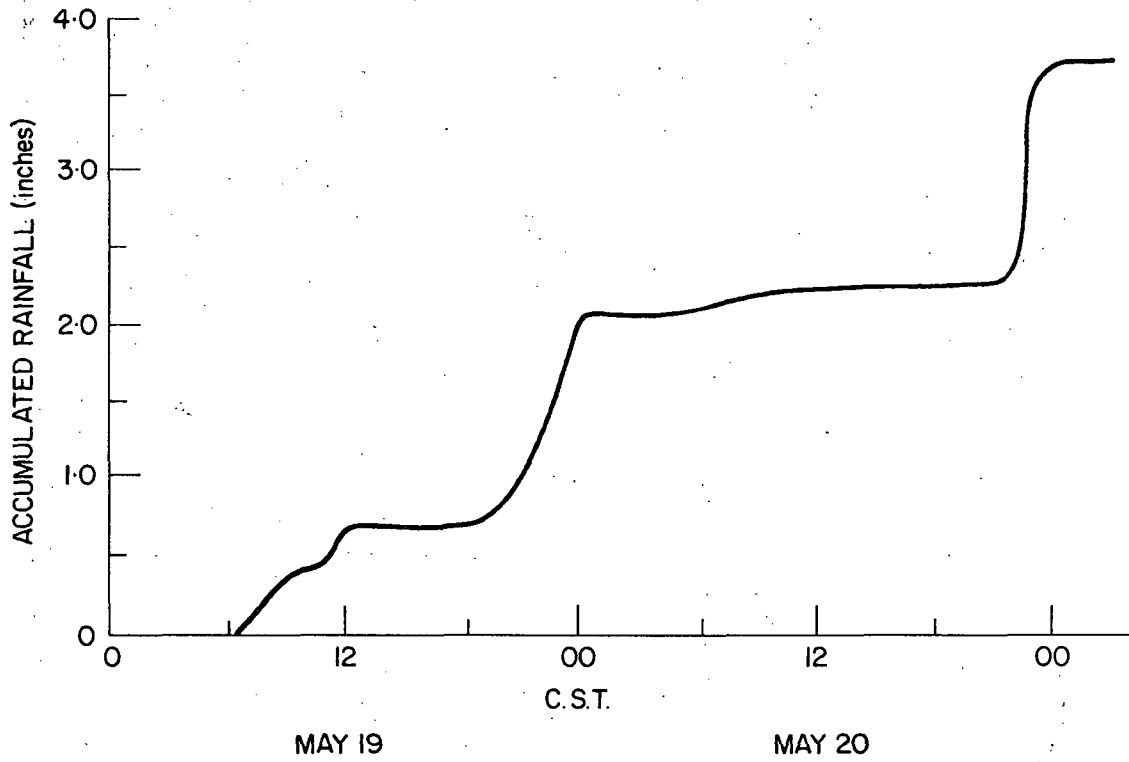


Figure 5
Mass Curve
Winnipeg International Airport
May 19 - May 21, 1974

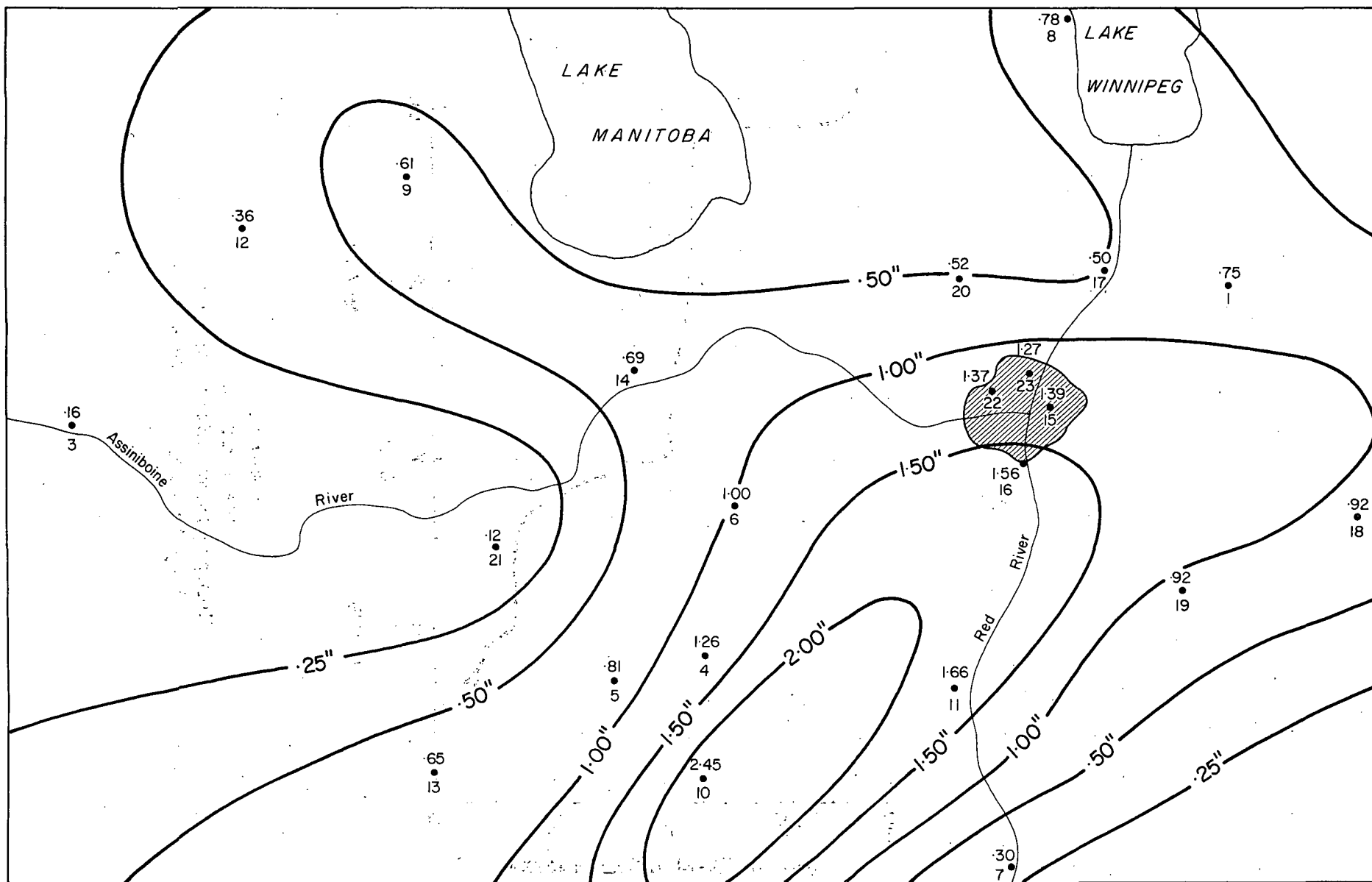


Figure 6
 Total Rainfall Victoria Day Storm, 1974 (0000Z May 21 - 1200Z May 21)

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