A SUBMISSION TO THE GOVERNMENT OF SASKATCHEWAN

REGARDING TIME ZONING IN SASKATCHEWAN

by

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The Honourable W. Ross Thatcher,
Premier,
Province of Saskatchewan.

Sir:

As the only professional astronomer in the province of Saskatchewan, I beg your consideration of the enclosed report on time.

Since time is determined by the astronomers of the world, I feel that I should express some relevant thoughts on the question of the time zoning of Saskatchewan.

In my report I have covered the basic definition of time, the development of timekeeping, and the evolution of the standardized system of time zoning in use today in North America.

After a careful study, which immediately preceded this report, I found myself able to reach only one conclusion as to the proper time that should be in use in Saskatchewan. That conclusion is that the entire province of Saskatchewan should be using Mountain Standard Time. I have come to this conclusion from the following considerations:

1. The true time for Saskatchewan is that of the 105th meridian, which runs through the centre of the province; this time is commonly called Mountain Standard Time.

2. Private interests are endeavouring to promote agreement on a continent-wide time change from standard time to daylight time during the summer months. Unless the province of Saskatchewan is using Mountain Standard Time, cooperation with the rest of the continent in this endeavour is not feasible.

3. The possible establishment of a uniform prairie regional time zone might be possible using Mountain Standard Time; no other time in use on the prairies could be adopted by all three provinces concerned.

It is my hope that the enclosed report will facilitate a broadened discussion of time when the legislature considers the question this session.

Respectfully submitted,

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Mr. Premier, and Honourable Gentleman

Twentieth century communication and rapid transportation have shrunk the physical world to one community. As a result time has become of paramount importance in daily life both for the scheduling and delineating of affairs at home and in planning and effecting efficient contact with distant communities. On the North American continent the presently existent time problems often make more difficulties than are necessary.

The Origin and Measurement of Time

Time might be defined as a practical scheme which allows the events of life to be related one to another. The introduction of agriculture into the culture of early man bound his activities to the changing seasons. The time for plowing, sowing and harvesting of crops were determined by the position of the sun in the sky. The commencement of the calendar year was set to occur at the beginning of the farming cycle. In ancient Egypt the inundation of the Nile signified the start of the new year. Our present calendar is a refinement of the solar calendar introduced into Egypt in 4236 B.C.

The importance of the sun in connection with time does not end with the calendar. As far back as records of human culture can be traced, the sun has served as the time determiner. The units of day and night refer to the presence and absence of this heavenly body. Earliest man was content to divide time into just day and night. As civilization developed and more complex routines were introduced into daily life, a more refined unit of time was required.

The sundial was the earliest device put to use to subdivide the day. The sundial had the inherent disadvantage that it could only indicate time on sunny days and no time could be indicated by it at night.

The water clock was invented to similate the intervals of time shown by the sundial. Time then became divisible into units corresponding to the rate at which a vessel with a hole in its bottom would pour water into a standard container. The intervals of time which we now call hours were marked when the standard container overflowed. The three-minute egg timer, in which sand pours from one vessel to another, is a variation of this type of clock still in use today.

The next refinement in timekeeping was not to come until the seventeenth century when the motion of the pendulum was employed to measure an even smaller unit of time, the second. With the subsequent development of the watch, man has acquired a device which has enabled him to organize his life with ever increasing complexity.

The Determination of Time

The motion of the sun across the sky is a reflection of the earth's rotation upon its axis. In reality then, it has been the rotation of the earth which has provided the standard for timekeeping since the dawn of civilization. For men of the Judaic-Christian tradition the length of the day has been determined from one complete revolution of the earth relative to the sun.

Scientists have shown the rotating earth to be almost a perfect natural timepiece. The unit of time known as the solar day is the interval between the passages of the sun across the south point of the sky on two consecutive days. The earliest sundials crudely subdivided this interval into 12 sub units of equal duration, the hours. The advent of gravity clocks (the early water clock and the much later pendulum clock) showed discrepancies exist in the natural clock. Slight variations occur in the motion of the earth over the year; the variations are consistent and recur annually. In order to avoid having days of variable length and hence hours, minutes and seconds whose length varies from day to day, astronomers at the British Royal Observatory defined the average length of day over the whole year to be the standard unit of time.

In 1750 this new unit of time was introduced as the mean solar day, and it is still in use today. The mean solar day differs only slightly from the actual length of day as defined by the motion of the sun. The use of the mean solar day allowed a simple mechanical device to be used to record uniform time intervals. As a consequence, timekeeping devices became available to almost every individual citizen. Timekeeping thus became a matter of public concern rather than being retained as the private domaine of a small elite group of highly-trained individuals. None the less the clocks of the world are still regulated and kept in synchronization by the major observatories of the world.

In the latter part of the eighteenth century each town had its own standard timepiece which defined the local time in use. The first time service was instigated in London in 1760 when time was carried from the Greenwich observatory to the individual timepieces belonging to a series of local subscribers.

In America the United States Naval Observatory was established in 1844 to define the correct time for the United States government. Time signals were distributed to the nation by telegraph beginning in 1865.

The Dominion Observatory at Ottawa was completed in 1905 and has supplied time to Canadians since that date. However, it was not until August 28, 1941, that the Dominion Observatory Time became the official time standard for Canada.

Local Time

Ignoring the slight variations in the motion of the earth, the interval between two passages of the sun across the south point of the sky defines one mean solar day. The instant the sun crosses the south point we call noon. Only points on a single north-south line on the earth's surface can have the sun due south at any one instant. These points we say lie along a north-south meridian, so that noon occurs simultaneously along any single meridian.

Every other meridian on the earth has a different noon, and hence a different time. All those meridians lying east of the noon meridian have times already past noon; that is, their time is advanced, or fast, relative to the noon meridian. The meridians to the west of the noon meridian have not yet reached noon so their time is retarded or slow relative to the noon meridian.

The exact time for any location on the earth is the time shown on a sundial at that location. This sundial time requires only slight adjustment in order to obtain Local Mean Time, the time a local watch would keep. The true time for any community is then corrected sundial time or Local Mean Time.

However, to adopt the true time for each community would be a regression into the nineteenth century. On such a system, when the true time at Moose Jaw is noon, the true time at Yorkton would be 12 minutes past noon; at Saskatoon it would be 4 minutes before noon while at Swift Current the true time would be 8 minutes before noon. Truly this situation would be more untenable today in the space age that it was prior to the agreement of 1883 when standardized time was introduced into North America.

Standardized Time

The first attempt at time standardization was necessitated by the rapid expansion of rail travel in the latter quarter of the nineteenth century. No longer was it feasible to have the local decon, reeve or storekeeper decree the correct time for a community. By agreement all of England reluctantly adopted the local time of the Greenwich Observatory as the only time to be used in the whole country.

When the railroad spread westward across North America, a new problem in time standardization arose. To adopt a single time for the whole continent, say that of the head office in New York, produced the following difficulty. If the true time in New York was noon, the sun would be due south. At St. Louis the sun would be one hour east of the south point; the sundial would read 11 o'clock. At Denver the sun would be two hours east of south so the sundial there would read 10 o'clock. In California the sun would be three hours from south; the sundial would indicate the hour as 9 o'clock. To adopt New York time for all of these locations would make it noon at all four locations regardless of where the sun was or what the sundial read. As a consequence, Californians would arise about two hours before sunrise and go to bed just after sunset in order to conform with the New York clock.

An acceptable standardization plan was proposed in 1878 by Sir Stanford Fleming, a Canadian. He proposed the division of the whole earth into 24 standard time zones. Each of the time zones was to be one hour different from the neighbouring zones. Each time zone was defined equally on either side of a standard meridian. The meridians were to be placed every 15^{o} of longitude around the earth's surface. Since the British had already adopted Greenwich time as the standard for the whole island, Fleming suggested that the prime meridian should be chosen as the one running through the Royal Greenwich Observatory.

North American acceptance of Fleming's idea was greatly abetted by the efforts of an American, William Frederick Allen. Both Allen and Fleming were engineers with experience in surveying the railroads across the west. On October 11, 1883, a General Time Convention was held in the United States, attended by most of the nation's railroads. The convention accepted the proposal to divide the United States into four time zones based on the mean solar time at Fresco, California (120th Meridian Time), Denver, Colorado (105th Meridian Time), Memphis, Tennessee (90th Meridian Time) and Philadelphia, Pennsylvania (75th Meridian Time).

In Canada a compatable plan was followed based upon an extension of the chosen American Meridians. Those meridians described the local time in Canada at Kamloops, British Columbia (120th Meridian Time), Regina, N.W.T. (105th Meridian Time), Fort William, Ontario (90th Meridian Time), and Cornwall, Ontario (75th Meridian Time).

An additional meridian running through Sydney, Nova Scotia (60th Meridian Time) was required to complete the time zones necessary for Canada. These time zones have come to be known as Pacific Standard Time (120th Meridian), Mountain Standard Time (105th Meridian), Central Standard Time (90th Meridian), Eastern Standard Time (75th Meridian) and Atlantic Standard Time (60th Meridian). The geographical distribution of Fleming's proposed time zones are shown in Figures I and II and are listed in Table A below:

TABLE A

Original Time Zones Proposed by Sir Stanford Fleming, 1878

Atlantic Standard Time

Provinces of Prince Edward Island and Nova Scotia.

Eastern Standard Time

Provinces of New Brunswick, Quebec and Ontario.

States of Maine, Vermont, Massachusetts, New Hampshire, Connecticut, New York, Pennsylvania, Rhode Island, New Jersey, Maryland, the Virginia's, the Carolina's, Georgia and Florida.

Central Standard Time

Province of Manitoba, Territory of Keewatin.

States of Minnesota, Wisconsin, Michigan, Iowa, Ohio, Illinois, Indiana, Kentucky, Missouri, Arkansas, Tennessee, Alabama, Mississippi and Louisiana.

FIGURE I

Standard Time Zones Proposed by Fleming - 1878

FIGURE II

Proposed Time Zones for Western Canada - 1878

Mountain Standard Time

Territories of Assiniboia, Saskatchewan, Alberta and Athabasca.

States of Montana, the Dakota's, Wyoming, Nebrasca, Colorado, Kansas, New Mexico, Texas, Utah and Arizona.

Pacific Standard Time

Province of British Columbia.

States of Washington, Idaho, Oregon, Nevada, and California.

The transportation interests on both sides of the International Boundary quickly implemented the use of standardized time. At noon on Sunday, November 18, 1883, all railroad timepieces were set to the newly designated standard times.

The times adopted by the railroads were governed by the divisional points in use on the railroads of the day rather than by political units as had been proposed by Fleming and Allen (Figures III and IV).

The resulting public outcry was enormous. The general feeling was that "vested interests" were trying to make time obey the profit-seeking whims of the railroad directors. A typical expression of this feeling was "that the sun was being forced to rise and set by railroad time rather than by God's time". The fear was expressed "that even the planets and the stars would in future have to govern their movements by a railroad timetable arranged for the convenience of the magnates of the day".

The 1883 outcry sounds not too unlike that in twentieth century Saskatchewan concerning more recent railroad inovations. Despite the fact that the railway interests had adjusted Fleming's time zones to

FIGURE III

Railroad Division Points and U.S. Time Zones

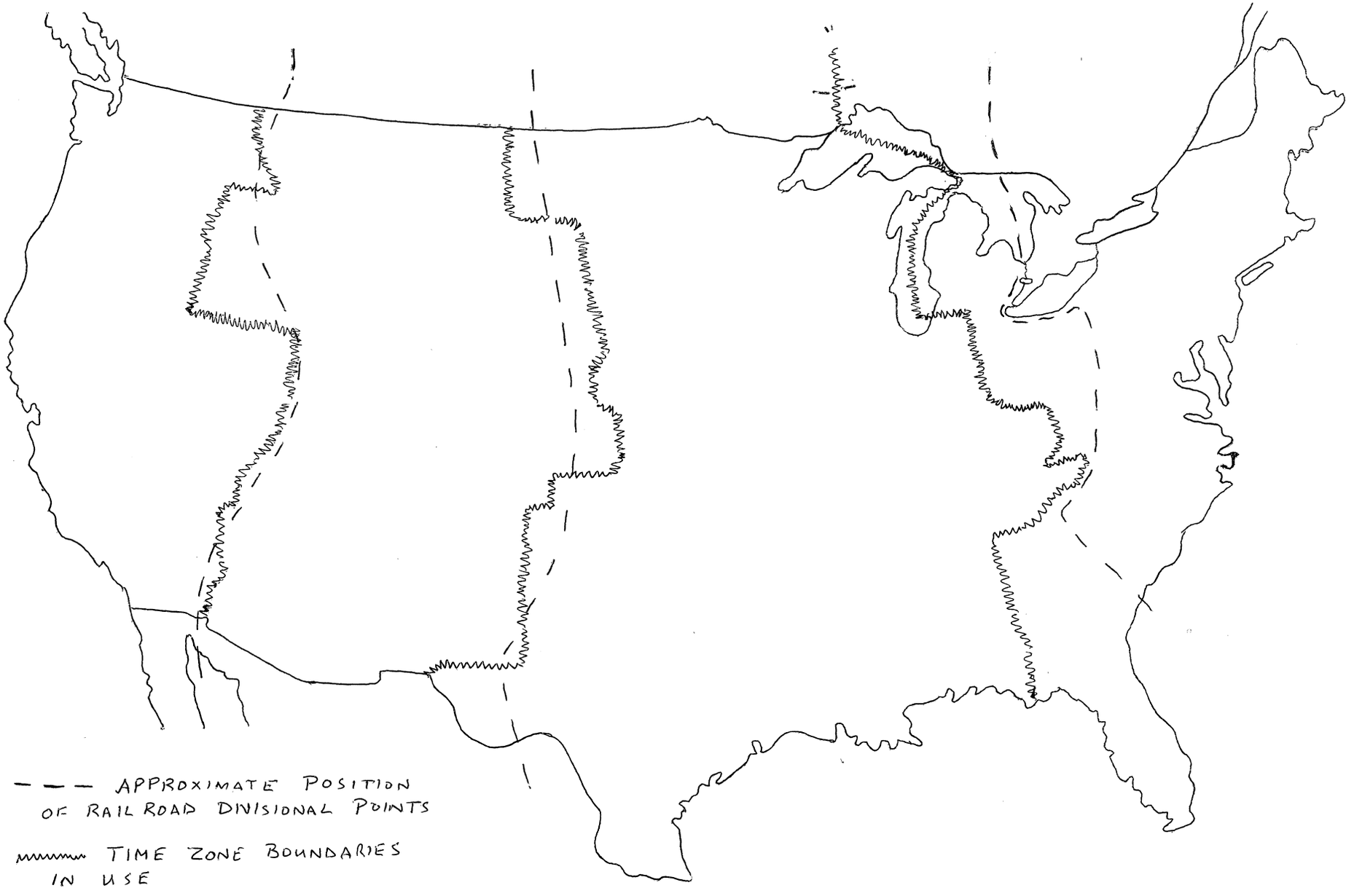
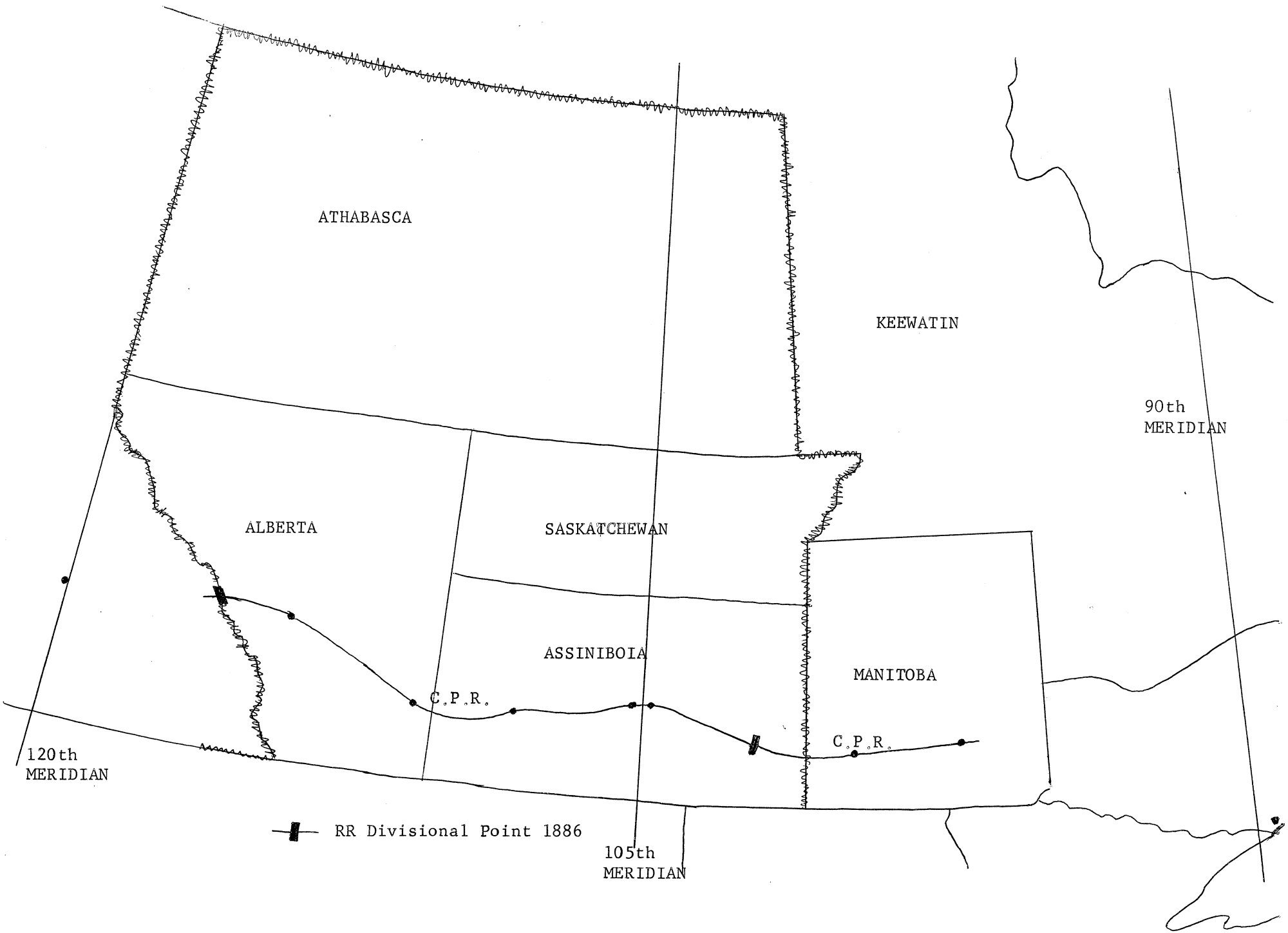


FIGURE IV

105th Meridian Time Zone in Western Canada - 1886



suit their own convenience, the inherent advantage of standardized time soon showed themselves, and the outcry against it quickly subsided.

Prior to its adoption in North America, the Canadian Institute had presented Sir Stanford Fleming's proposal for world-wide time zoning to the leading governments of the world. This led to Czar Alexander III calling an International Time Convention. In 1882 delegates from twenty-six nations met in Rome. The meeting reconvened in Washington in 1884 under the name of the Prime Meridian Conference. It was agreed between the delegates to adopt the Greenwich Meridian as the prime meridian for the purposes of geographical reckoning (0^{o} of longitude) and for the measurement of time (0 hours of time).

Since the 1884 agreement there has been a gradual increase in the number of nations of the world accepting the notion of standard time. Official legislation has often lagged behind the actual use of standard time in a region. The senate of Canada did not pass the "Reckoning of Time Act" until 1890. This act made the following divisions of time to be in force after July 1, 1891.

The provinces of Prince Edward Island and Nova Scotia shall use 60th meridian time, 4 hours slower than Greenwich.

The provinces of New Brunswick, Quebec and Ontario shall use 75th meridian time, 5 hours slower than Greenwich.

The province of Manitoba shall use 90th meridian time, 6 hours slower than Greenwich.

The territories of Saskatchewan and Assiniboia shall use 105th meridian time, 7 hours slower than Greenwich.

The territories of Alberta and Athabasca and the province of British Columbia shall use 120th meridian time, 8 hours slower than Greenwich.

This act empowers the Governors-in-Council of the provinces and territories to thereafter alter the time as need arises.

In 1909 the legislature of the province of Saskatchewan passed into law an act declaring "the time known as mountain standard time the time used in the province of Saskatchewan". This act has been re-interpreted in 1920, 1930 and 1940 and was repealed in 1959. The legislation of 1959 stated that any official reference to time shall be deemed to be Mountain Standard Time.

The Mountain Standard Time Zone

Originally, the time zone proposed for Saskatchewan was 105th meridian time. Let us consider the time zone associated with this meridian. Ideally Fleming's original time zones were to be 15^{o} of longitude in width centered on the standard meridian. The central meridian, in this case 105^{o} west longitude, runs through Saskatchewan passing very close to the towns of Pense, Nokomis, Melfort and Foxford. The eastern boundary of the time zone should be at 97^{o} 30' west longitude, a north-south line passing about 15 miles west of Winnipeg, Manitoba. The western boundary of the time zone should be at 112^{o} 30' west longitude, a north-south line passing about 20 miles east of Lethbridge, Alberta. The idealized mountain standard time zone extends for over 180 miles east and 110 miles west of the province of Saskatchewan.

Let us consider what it means to accept standard time as opposed to using local time for each location. The adoption of standard time over a region introduces a clock error for all points within the region whose position is not on the standard meridian. This clock error

indicates the time interval between 12 o'clock and true noon (when the sun is due south at the location). Points in the western portion of each standard time zone have fast time relative to the meridian; their clock reads 12 o'clock before the sun is due south. We define fast time as having a positive clock error.

In a similar way points in the eastern half of each standard time zone have slow time relative to the meridian. By slow time we mean the sun reaches south before the clock reads 12 o'clock, by definition, a negative clock error.

The further from the central meridian the location lies, the greater its clock error. To be included within the idealized time zone, the clock error of any location must not exceed thirty minutes. Figure V shows the idealized standard time zones for the prairie provinces and the associated clock errors for a few prairie locations.

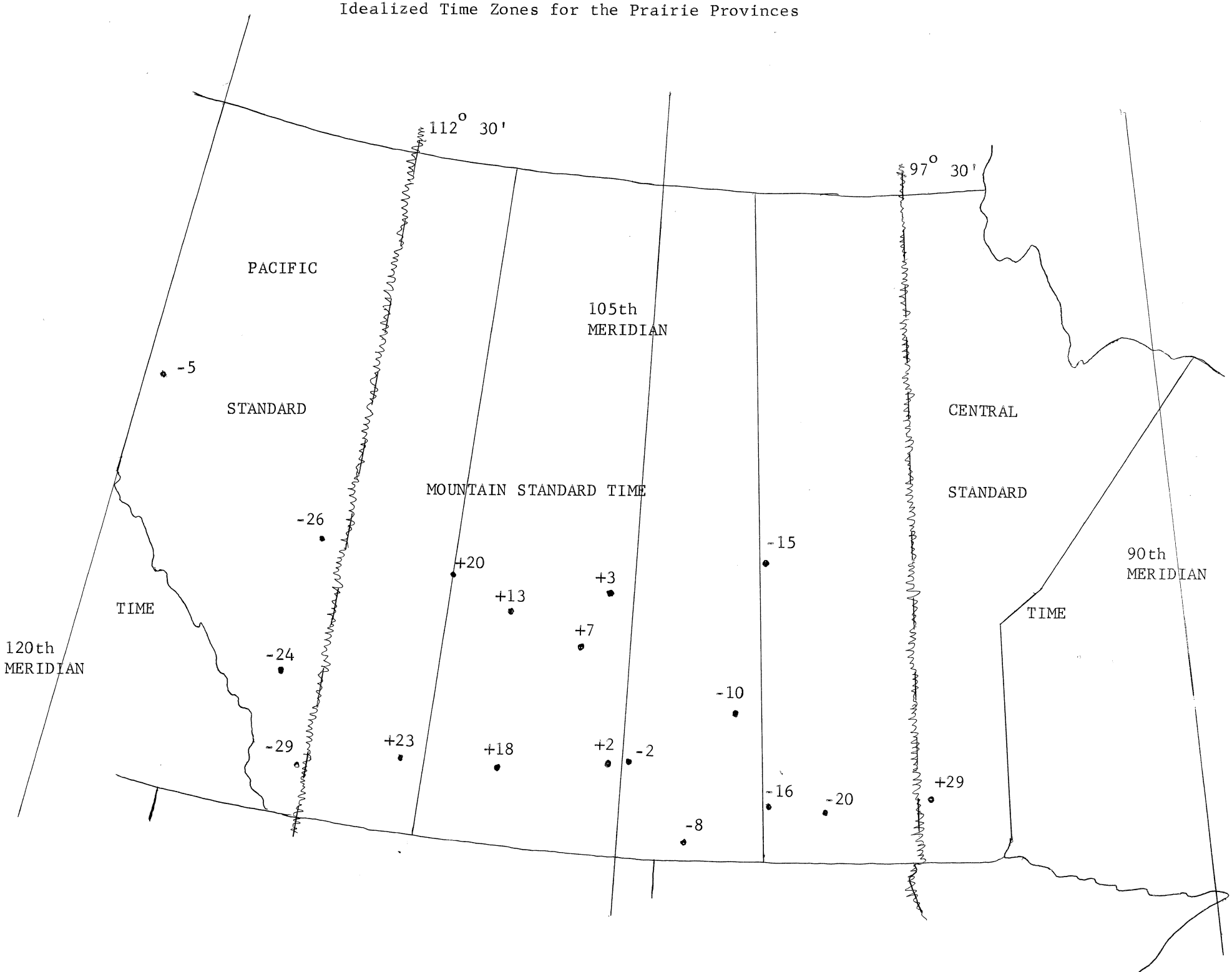
The Introduction of Daylight Saving Time

Daylight saving time was proposed by an Englishman, William Willet, to prevent the waste of daylight. During the first world war, Germany adopted the idea to save electricity and fuel. Her European adversaries also adopted the new time, being followed by both Canada and the United States. The use of daylight saving time was first used as an emergency wartime measure; however the use of this time has continued since world war one in many areas, mainly during the summer months.

By definition daylight saving time is the adoption of the standard time of the adjacent time zone lying to the east of any location. The clock is advanced by one hour or runs continually fast by one hour. When using daylight saving time, the sun rises one hour later, noon occurs one

FIGURE V

Idealized Time Zones for the Prairie Provinces



hour later and the sun sets one hour later than using standard time reckoned from the local time zone meridian.

From February 9, 1942, to September 14, 1945, an Order-in-Council required the continuous use of daylight saving time in Canada. The clocks of the entire nation ran fast by one hour for over three and one-half years. During this interval daylight saving time became extremely popular amongst the people of Canada, as it did in the United States where similar wartime time laws were in effect.

Today in the United States 31 of the 50 states use daylight saving time in summer. In Canada 8 of the 10 provinces use summer daylight saving time. Not all states and provinces change time simultaneously. Many time changes do not occur on a state-wide or province-wide basis, so that mixed time regions occur in some areas due to the introduction of daylight saving time. However in about half of those regions where time changes occur, the changes are simultaneous.

In the interest of business, a private group of American citizens, in Washington, are endeavouring to promote legislation to effect continent wide adoption of daylight saving time from the last Sunday in April to the last Sunday in September. This movement for consistency with regard to time changes is growing. If a majority of states can be mustered on the time change issue, federal legislation will soon follow in the United States.

Such legislation will directly affect Canadians, and a majority of Canadian provinces will probably follow the American lead. A continental time change will then occur, with a small number of regions being excepted. In the present expansive phase of its development, Saskatchewan should not be one of these exceptions.

The Westward Shift of the Time Zones

Prior to the standardization of time, the time in use was local mean time. The proposal of 1878 by Sir Stanford Fleming made the time divisions for North America coincident with existing political boundaries. His original suggested boundary lines had the merit of keeping time zone boundaries roughly along major geographic barriers of the continent. The change from Pacific to Mountain time occured in many regions at the crest of a mountain range. The change from Mountain to Central time was to occur at the Red and Missouri rivers in the North. Central time changed to Eastern time along a portion of the Appalachian Mountains. Fleming's time zones were reasonably symmetric, and the standard time proposed for each region was never very deviant from true time.

The railroads, however, chose to change time not at the zone boundaries proposed by Fleming but at places having greater convenience for the railroad operation. Railway time was changed at the divisional points as they existed on the railroads in 1883 when the American railroads adopted standardized time. The Canadian Pacific Railroad, which was completed in 1885, placed its divisional points at locations roughly corresponding to those in use south of the forty-ninth parallel.

A major discrepancy arose between railroad time and Fleming's standard time zones at the Western boundary of the central time zone. Rather than changing time at Fargo and Omaha, the railroads did not change time until several hundred miles west of these rail points. Likewise in Canada instead of changing time at Winnipeg as they should have, the change occurred at Broadview, Saskatchewan.

It must be remembered that the railroads were the supply lines to the sparcely populated west. So there were strong practical reasons on both sides of the International Border for the affected communities to adopt railroad time for general use. The westward shift of the time zones in the United States can be seen in Figure VI; comparison of the present time zones with the nineteenth century railroad divisional points may be seen in Figures III and V.

In both Canada and the United States the westward shift of the time zones has not always produced completely desirable consequences. In Saskatchewan the location of the railroad divisional points in the eastern portion of the province resulted in two times being used within the province. The majority of Saskatchewan, lying west of the divisional points, traditionally has used Mountain Standard Time, while the communities lying east of the divisional points have found it more expedient to use Central Standard Time (Figure VII).

Social factors operative within postwar Saskatchewan have facilitated an even greater westward shift of Central Standard Time within the province. Today the intrusion of Central Standard Time into eastern and urban Saskatchewan coupled with the use of daylight saving time in central and western Saskatchewan (both on the local option basis) has created a chaotic situation.

Instead of being in the middle of a time zone, as Saskatchewan should be, we find ourselves relegated to being the buffer zone between two overextended time zones of the neighbouring provinces.

FIGURE VI

Westward Shift of the Time Zones

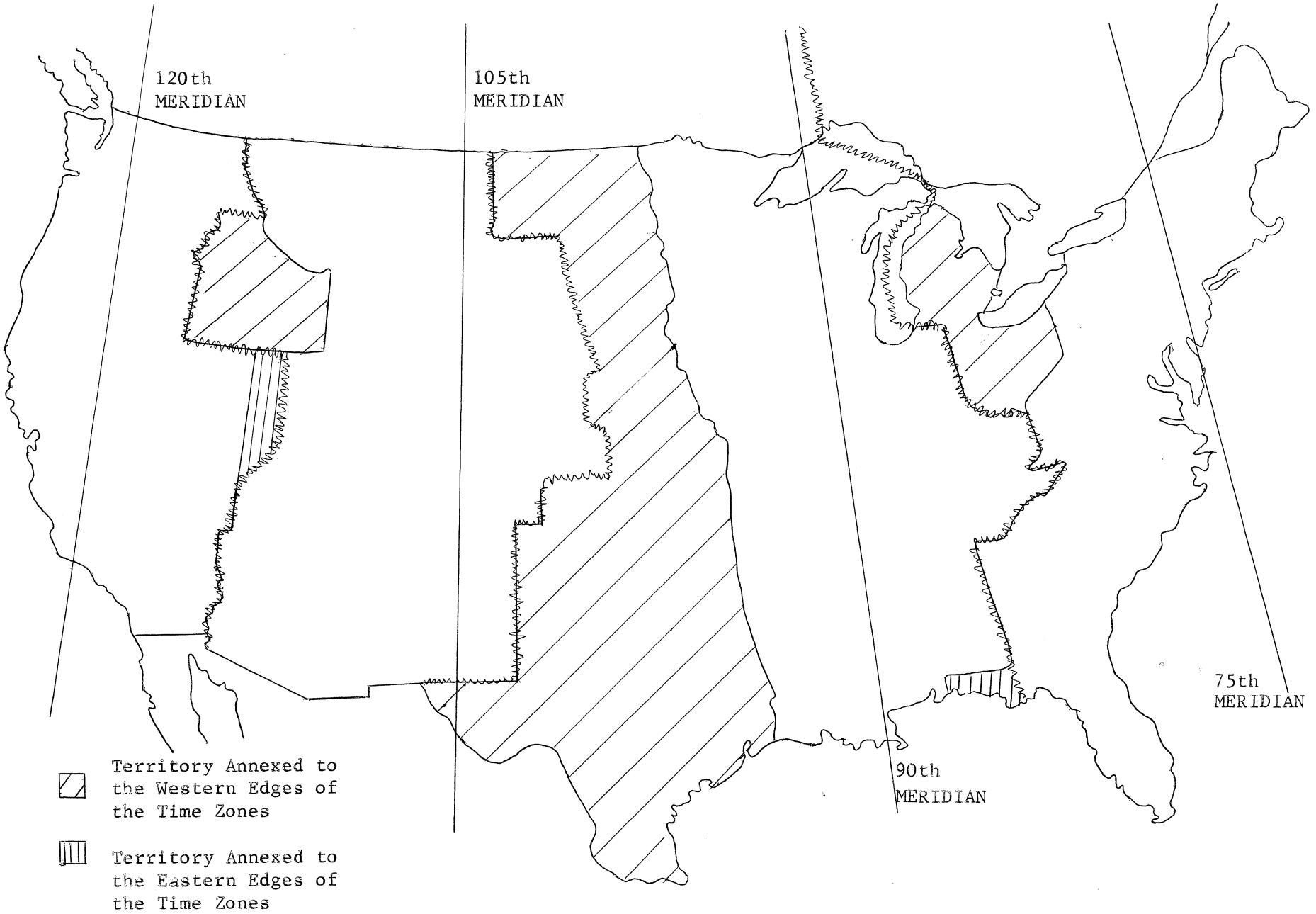
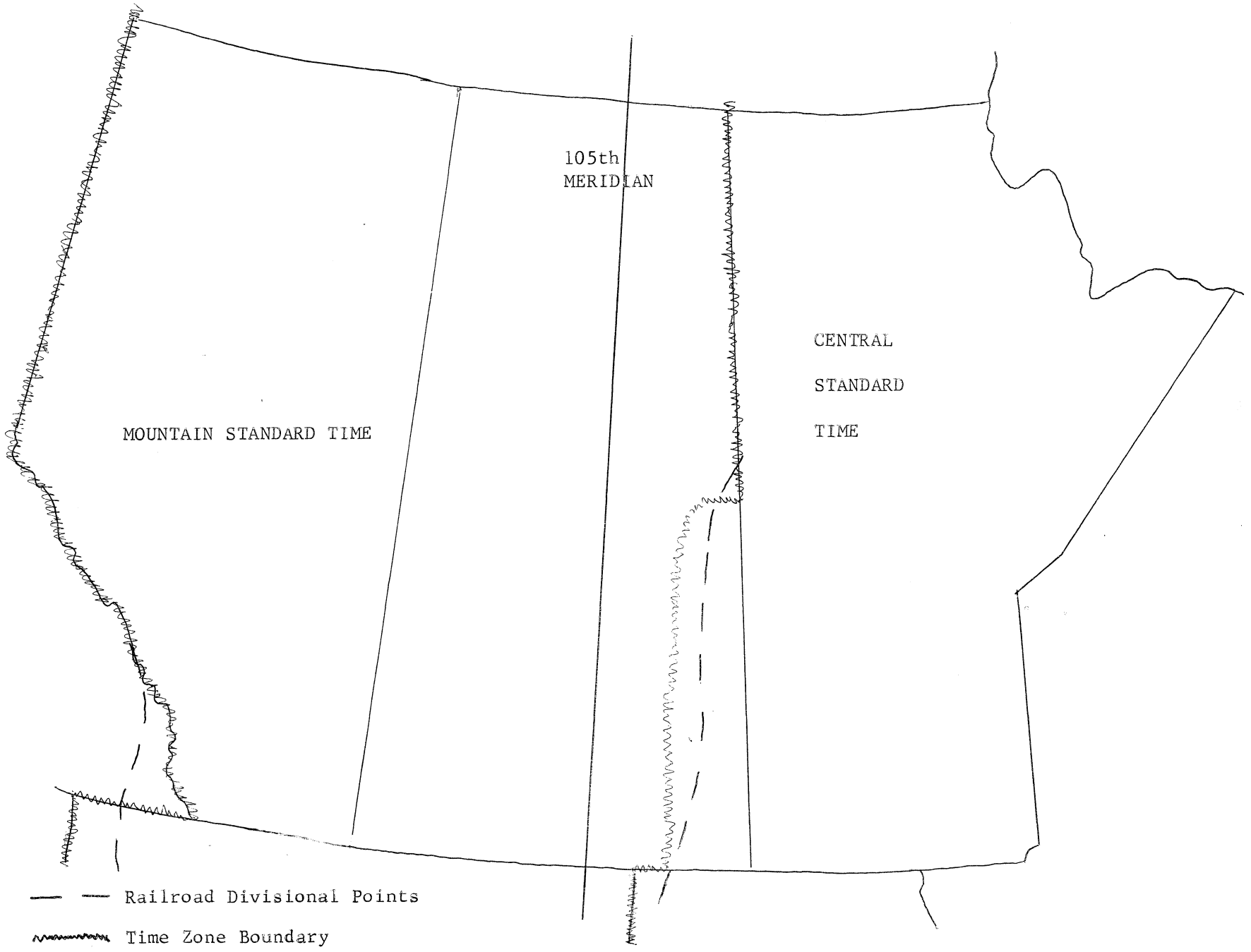


FIGURE VII

Western Canadian Time Zones - 1950



The 1956 plebiscite on time showed that a large majority of the people of Saskatchewan want uniformity of time within the province. As worded the plebiscite was unable to yield a consensus as to which time.

It is apparent that people do not like changes in time for any reason. Everybody seems to want the same time as his neighbours and business contacts use. This holds apparently, even if the business contact is 360 miles away in Winnipeg or 475 miles away in Calgary.

It is equally apparent from reasons previously mentioned that the whole continent cannot use the same time with convenience. Even if the continent could revert to the use of a single time, in our rapidly shrinking world, we would still be faced with intercontinental time differences. We must accept time changes as inevitable.

Faced with time changes then, the question is, where are time changes accomplished most conveniently? The political boundaries seem to be the most desirable places to change time; this at least ensures consistent time within any one province. Furthermore, when the time zone boundaries can also be made to coincide with natural geographic divisions of population, even more convenient regional time zones can result.

The Saskatchewan Problem

One consequence of the westward shift of the time zones relative to the standard meridians is that many points within the time zones now in use have clock errors which are greater than thirty minutes. This is equivalent to such a location being on daylight saving time for the whole year. The use of 90th meridian time (Central Standard

Time) in Saskatchewan the year around means that clock errors are computed from the meridian running north across Canada a few miles west of Fort William, Ontario (Figure VIII). As a consequence every point in Saskatchewan has a clock error between +46 and +80 minutes. Noon is late by three-quarters of an hour at the eastern border of the province and by one hour and twenty minutes at the western border. Thus every point in Saskatchewan that uses Central Standard Time on a year-round basis is on perpetual daylight saving time. Midwinter sunrise at Yorkton does not occur until six minutes to nine (8:54 a.m.); the sun sets at 4:45 p.m. On the other side of the province, mid-winter sunrise at Swift Current occurs at 9:10 a.m.; sunset at 5:18 p.m. (Using Mountain Standard Time, these times would each be one hour earlier.)

If Saskatchewan were to officially adopt Central Standard Time and it became necessary to convert to daylight saving time in summer, clock time would be referred to the 90th meridian near Cornwall, Ontario. Summer clock errors would be one hour forty-five minutes in the eastern part of the province and two hours and twenty minutes in the west. Midsummer sunrise at Estevan would be ten minutes to six (5:50 a.m.); sun sets at 10:01 p.m. At North Battleford midsummer sunrise would occur at 6:04 a.m.; sun sets at 10:24 p.m. A sunset time of 10 o'clock would no doubt please some of the populous; however, I doubt if the mothers of the province faced with putting children to bed two hours before sundown could agree.

If daylight saving time is even a remote possibility, Central Standard Time is not the answer for Saskatchewan.

FIGURE VIII

Clock Errors Using Central Standard Time in Saskatchewan

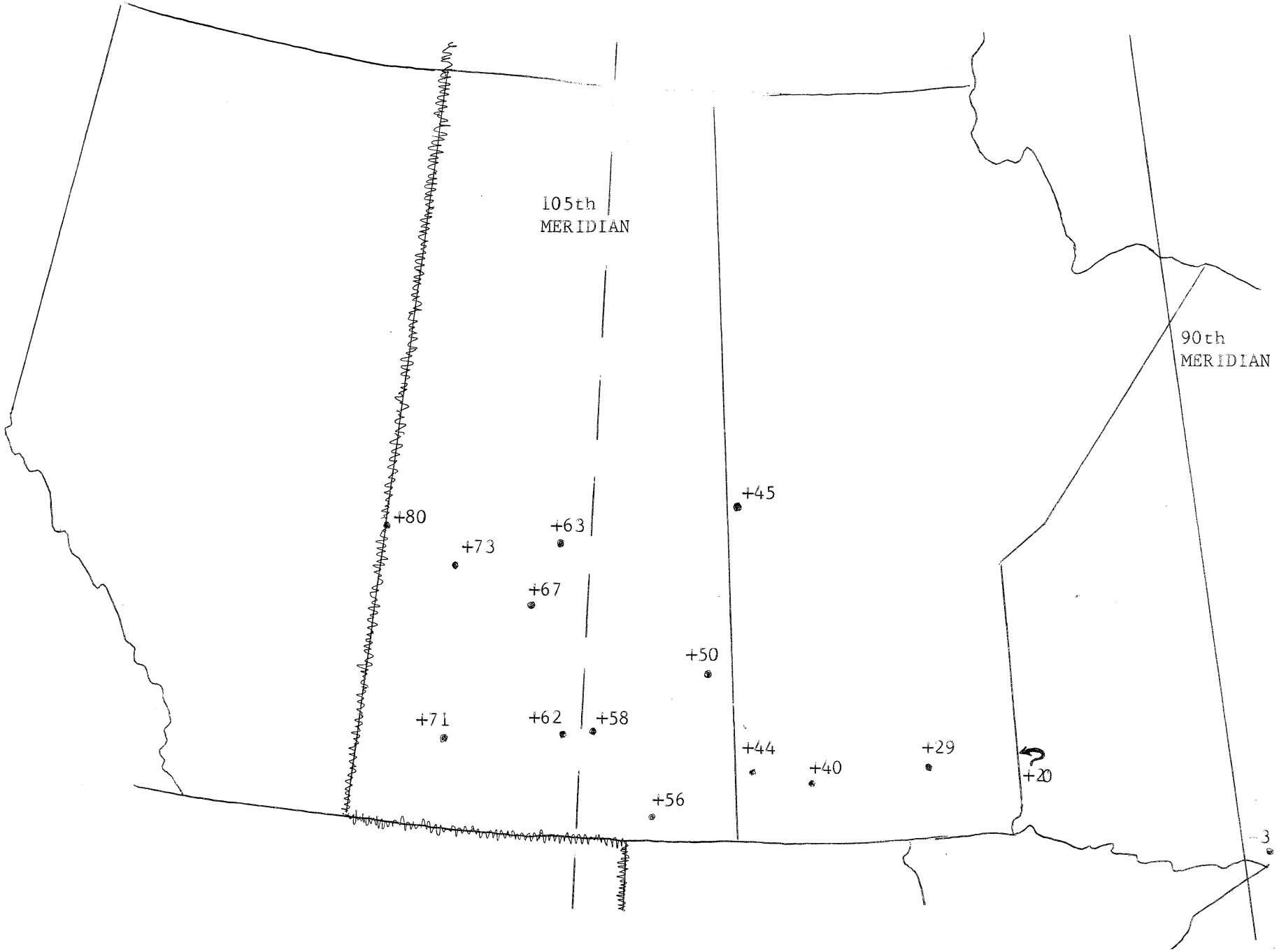


TABLE B

Comparison of Clock Errors for Some Saskatchewan Points

	Clock Error Using	
	Central Standard Time	Mountain Standard Time
Moosemin	+ 47	- 13
Yorkton	+ 50	- 10
North Portal	+ 50	- 10
Broadview	+ 51	- 9
Melville	+ 51	- 9
Estevan	+ 52	- 8
Weyburn	+ 55	- 5
Indian Head	+ 55	- 5
Fort Qu'Appelle	+ 56	- 4
Regina	+ 58	- 2
Moose Jaw	+ 62	+ 2
Prince Albert	+ 63	+ 3
Saskatoon	+ 67	+ 7
Swift Current	+ 71	+ 11
Biggar	+ 72	+ 12
North Battleford	+ 73	+ 13
Kindersley	+ 77	+ 17
Maple Creek	+ 78	+ 18
Lloydminster	+ 80	+ 20

An advance of +30 to +90 minutes is considered to be the normal daylight saving time advance.

+ indicates true local time is faster than time at the standard meridian.

- indicates true local time is slower than time at the standard meridian.

Let us now consider the adoption of Mountain Standard Time on a province-wide basis. Using this time, no point in Saskatchewan would have a clock error in excess of twenty minutes. All points in the province are thus within one-third of an hour of true time. Points near the centre of Saskatchewan would have almost exactly true time (Figure IX).

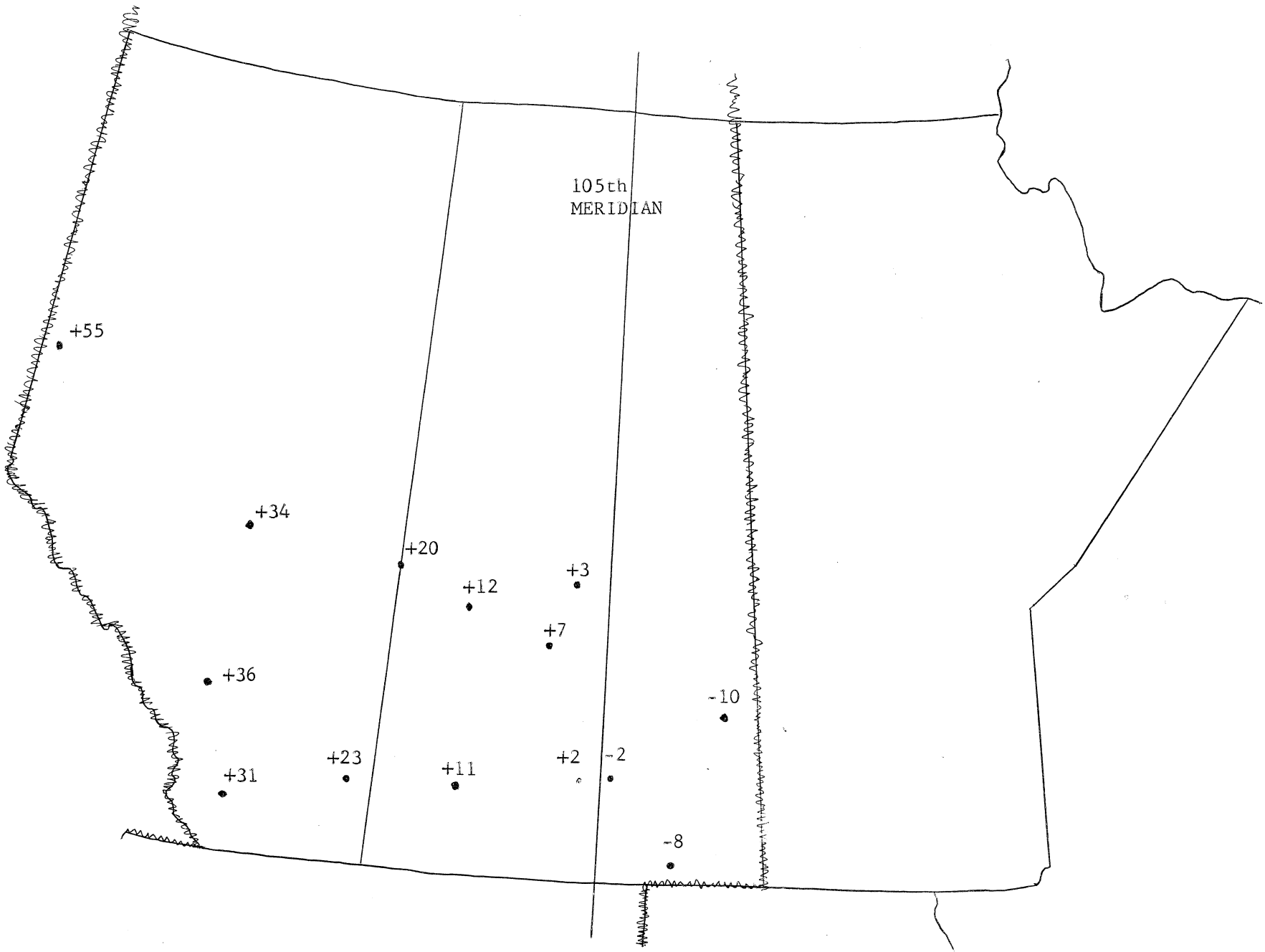
Consider midsummer sunrise at Moose Jaw; it would occur at five minutes before four (3:55 a.m.) with sunset at 8:15 p.m. Midwinter sunrise at Prince Albert would be at 8:17 a.m. with sunset at 3:55 p.m. Civil twilight begins at Regina in mid-May at 3:33 a.m. and ends at 8:07 p.m. At Saskatoon in late August civil twilight begins at 4:32 a.m. and ends at 7:43 p.m. (See Tables C and D at the end of this report for a more complete table of times of sunrises, sunsets and beginnings and endings of civil twilight for various Saskatchewan points.)

Province-wide daylight saving time in summer would alter each affected time by one hour to the present Central Standard Time now in use in these urban centres. (Affected times would be one hour ~~earlier~~ later than those listed above.)

Adoption of province-wide Mountain Standard Time would eliminate the conflict making time changes necessary within the province. It would achieve a better compromise of time for all regions of the province. Of distinct advantage would be the feasibility of conforming with the rest of the continent in making daylight saving time changes without seriously hampering the residents of the western portion of the province. The use of Mountain Standard Time would in winter produce a better distribution of the shortened daylight hours relative to the normal daily lives of Saskatchewan residents.

FIGURE IX

Clock Errors Using Mountain Standard Time in Saskatchewan



On Mountain Standard Time there exists the possibility of a Prairie Region using a single time. With Alberta already using Mountain Standard Time in all areas, and with the province of Saskatchewan uniformly on Mountain Standard Time, the province of Manitoba might also consider adopting the same time as we use since over half of the province of Manitoba lies within the Mountain Standard Time zone. In Table E the clock errors for a few Manitoba and Alberta points are considered. If a single time zone is desirable for all three prairie provinces, that time can only be Mountain Standard Time.

In a world which is shrinking as technology makes travel more feasible, the consequence has been that business, agricultural and recreational circles of influence are continually widening. Where the next town was once remote, today New York is within direct-dialing distance of much of the province. Vacations that once involved a major trip of a few miles to the beach now extend over hundreds, and sometimes thousands, of miles which are easily traveled on fine highways.

The interaction between people in widely separated places is increasing. This demands a rigid adherence to an agreed-upon time system. Time differences once established should be consistent the year around in order to facilitate easy interaction. A businessman in Halifax differing in time by three hours from his customer in Saskatoon should not have to worry about the calendar date in order

TABLE E

Comparison of Clock Errors For Some Prairie Points

	Clock Error Using		
	Pacific Standard Time	Mountain Standard Time	Central Standard Time
Manitoba			
Manitoba - Ontario Boundary	--	-40	+20
Winnipeg	--	-31	+29
*Portage la Prairie	--	-27	+33
*Brandon	--	-20	+40
*Dauphin	--	-20	+40
*Virden	--	-16	+44
*The Pas	--	-15	+45
Saskatchewan			
*Yorkton	-70	-10	+50
*Weyburn	-65	- 5	+55
*Moose Jaw	-58	+ 2	+62
*Saskatoon	-53	+ 7	+67
*North Battleford	-47	+13	+73
*Maple Creek	-42	+18	+78
Alberta			
*Medicine Hat	-37	+23	--
*Coronation	-34	+26	--
Lethbridge	- 29	+31	--
Edmonton	-26	+34	--
Calgary	-24	+36	--
Banff	-18	+42	--
Grande Prairie	- 5	+55	--

*Points which actually are within the Mountain Standard Time Zone.

to [illegible] the time differential; it must be fixed the year around.

In order to achieve time uniformity, we in Saskatchewan must compromise. The compromise must be based not upon personal nor local convenience alone but also upon provincial, national and even continental factors. It must be remembered that the original introduction of standardized time was not wanted until after it had been used. It seems that many Saskatchewan residents do not desire any change in the times they use, but a change is needed and that change should be to Mountain Standard Time.

It is my submission that Saskatchewan adopt Mountain Standard Time on a province-wide basis, and further, that the province actively enter into discussion with those interested groups promoting continental time changes in order to express the views of our people with regard to time changes during the year.

TABLE C

Mountain Standard Times of Sunrise and Sunset
(Eastern Saskatchewan Points)

	Yorkton		Estevan	
	Sunrise a.m.	Sunset p.m.	Sunrise a.m.	Sunset p.m.
April 30/66	4:26	7:09	4:34	7:06
May 15/66	4:01	7:33	4:10	7:28
May 30/66	3:43	7:54	3:54	7:46
June 19/66	3:34	8:08	3:47	8:00
June 29/66	3:37	8:09	3:50	8:01
July 4/66	3:41	8:07	3:54	8:00
August 18/66	4:40	7:07	4:47	7:04
August 28/66	4:56	6:45	5:02	6:43
September 12/66	5:19	6:12	5:23	6:12
September 27/66	5:43	5:38	5:45	5:40
December 21/66	7:50	3:45	7:44	3:56
December 31/66	7:54	3:52	7:47	4:03
January 5/67	7:53	3:58	7:46	4:09

TABLE C

Mountain Standard Times of Sunrise and Sunset

(Central Saskatchewan Points)

	Moose Jaw		Prince Albert	
	Sunrise a.m.	Sunset p.m.	Sunrise a.m.	Sunset p.m.
April 30/66	4:41	7:19	4:33	7:29
May 15/66	4:17	7:41	4:05	7:52
May 30/66	4:00	8:00	3:45	8:16
June 19/66	3:52	8:14	3:36	8:32
June 29/66	3:55	8:15	3:39	8:33
July 4/66	3:59	8:14	3:43	8:31
August 18/66	4:55	7:16	4:48	7:25
August 28/66	5:10	6:55	5:05	7:02
September 12/66	5:32	6:23	5:33	6:27
September 27/66	5:55	5:50	5:57	5:51
December 21/66	7:58	4:02	8:14	3:47
December 31/66	8:03	4:09	8:17	3:55
January 5/67	8:02	4:15	8:16	4:01

TABLE C

Mountain Standard Times of Sunrise and Sunset

(Western Saskatchewan Points)

	Swift Current		North Battleford	
	Sunrise a.m.	Sunset p.m.	Sunrise a.m.	Sunset p.m.
April 30/66	4:50	7:27	4:43	7:39
May 15/66	4:26	7:50	4:15	8:05
May 30/66	4:09	8:09	3:55	8:26
June 19/66	4:01	8:23	3:46	8:39
June 29/66	4:04	8:24	3:49	8:43
July 4/66	4:08	8:23	3:53	8:41
August 18/66	5:04	7:25	4:58	7:35
August 28/66	5:19	7:04	5:15	7:12
September 12/66	5:41	6:32	5:41	6:37
September 27/66	6:04	5:59	6:07	6:01
December 21/66	8:07	4:11	8:24	3:57
December 31/66	8:10	4:18	8:27	4:05
January 5/67	8:09	4:24	8:26	4:11

TABLE D

Mountain Standard Times for Civil Twilight

Regina

	Civil Twilight Begins	Sunrise	Sunset	Civil Twilight Ends
April 30/66	4:00	4:37	7:14	7:50
May 15/66	3:33	4:13	7:37	8:02
May 30/66	2:23	3:56	7:56	8:39
June 19/66	3:04	3:48	8:10	8:54
June 29/66	3:07	3:51	8:11	8:55
July 4/66	3:11	3:55	8:10	8:54
August 18/66	4:15	4:51	7:12	7:48
August 28/66	4:32	5:06	6:51	7:25
September 12/66	4:55	5:28	6:19	6:42
September 27/66	5:19	5:51	5:46	6:18
December 21/66	7:16	7:54	3:58	4:36
December 31/66	7:21	7:59	4:05	4:43
January 5/67	7:20	7:58	4:11	4:49

TABLE D

Mountain Standard Times for Civil Twilight

Saskatoon

	Civil Twilight Begins	Sunrise	Sunset	Civil Twilight Ends
April 30/66	4:00	4:40	7:29	8:09
May 15/66	3:29	4:14	7:54	8:39
May 30/66	3:08	3:55	8:14	9:01
June 19/66	2:55 *	3:46	8:30	9:20 *
June 29/66	2:58 *	3:49	8:31	9:22 *
July 4/66	3:02 *	3:53	8:29	9:20 *
August 18/66	4:14	4:55	7:26	8:07
August 28/66	4:32	5:11	7:04	7:43
September 12/66	4:58	5:36	6:30	7:08
September 27/66	5:23	6:00	5:55	6:32
December 21/66	7:30	8:12	3:57	4:39
December 31/66	7:33	8:15	4:05	4:47
January 5/67	7:33	8:15	4:10	4:52

* Approximate Estimate

Bi[redacted]

[redacted]dard Time and Time Zones in Canada"

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