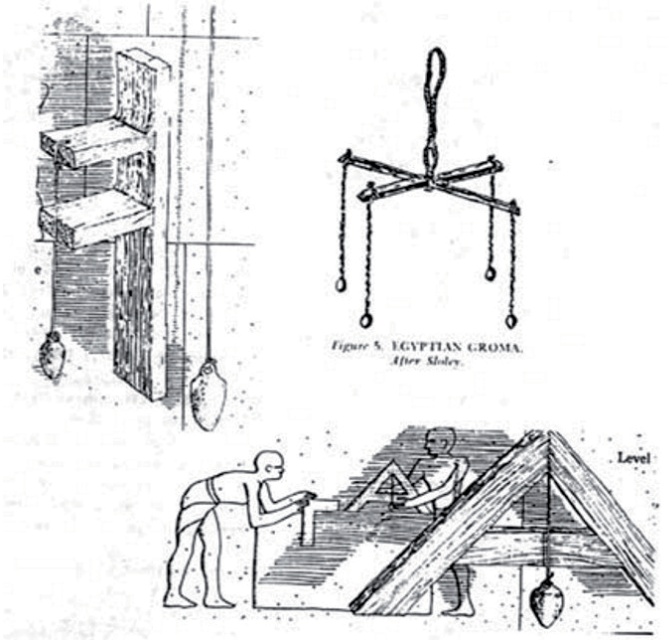
Chapter 1

From Ancient Egypt to the Great Plains

Nobody knows who the first surveyor was; he's lost in the mists of time. That's not too surprising, considering surveying dates back to the beginning of recorded history, some five millennia ago (which is why it's often called "the world's second-oldest profession"). Hunter-gatherers had no concept of owning land, but once hunting and gathering gave way to farming, the fact that the amount of fertile land was limited meant that people needed some way of identifying and marking boundaries between different plots of land.

The ancient Egyptians in particular needed the skills of the surveyor, because all of their agricultural land was located along the Nile River. It was very fertile land because the river inundated it every year, but that annual flood also meant that property boundaries had to be relocated year after year (in part for that most modern of reasons: to determine who owed how much tax). The results of the survey were recorded on the walls of tombs of prominent land owners.

The Greeks and Romans developed land record systems further, a few centuries later. The Romans' record of units of land for taxation purposes was called a "capitastrum." From that word and concept we eventually got the word "cadastre," which can be defined as any system for collecting and utiliz-



Above: An instrument called a "groma" was used by ancient Egyptians to survey property along the Nile River *(From www.surveyhistory.org)*

Left: A picture (*www.civilization.ca/civil/egypt/images/fback3b.jpg*) of Egyptian rope stretchers (the earliest surveyors) in action, found in the tomb of Menna at Luxor (ancient Thebes) on the west bank of the Nile. The date of the building of this tomb is said to have been about 1200 BCE. *(From www.gfisher.org/euclid_and_the_egyptian_rope.htm)*

ing information about "real property"—land, and anything immoveable (such as large buildings) attached to it. (The latter are known as "fixtures.") Over the centuries, the cadastre became the primary method of defining and protecting rights to land, whether the rights of the state or the rights of individuals.

The Romans were also the first to treat land surveying as a profession, and it was a profession they made good use of, as their spectacular cities, roads and aqueducts make clear.

Surveyors in the vanguard

As Europeans began settling in North America, professional land surveyors were in the vanguard, helping lay out new towns and farms. The earliest settlements naturally tended to occupy blocks of land about six miles square, with public buildings (a school, a church, a meeting house) at its centre and farms around that. Within a block that size, you can walk between any two locations in an hour or perhaps a bit more. Many of the early grants of land to individuals or groups by the British Crown were also about this size.

After the American Revolution, the Continental Congress needed a method of allocating lands in the western part of the new country (today's state of Ohio). The Congress adopted a plan that divided the land into townships, each six miles square and consisting of 36 sections. Each section was further divided into individual holdings of 160 acres each. The American Plan, as it came to be known, also called for the land to be surveyed in a grid pattern—and not just agricultural land, but all land. Swamp, mountain, marsh—all of it was to be subdivided and its disposition recorded and tracked in the Land Titles Office.

At the time of Confederation, several different systems of land subdivision were in use in Canada. Starting in the early 1600s, a system of river lots, similar to that used in France, had developed in Quebec. These were narrow strips of land fronting on navigable streams, the highways of the day. Once the river lots were occupied, a second range of lots back from the river was filled, then a third, and so on. In turn these tiers of lots were formed into irregularly-shaped parishes.

Ontario's first method of subdivision was similar, but later townships ranging from six to ten miles on a side were developed.

When the fledgling Dominion of Canada purchased the Hudson's Bay Company's interest in Rupert's Land, which then became the Northwest Territories, one of the first things it did was send Lt. Col. J.S. Dennis to Fort Garry "for the purpose of selecting the most suitable localities for the survey of Townships for immediate settlement." Dennis was also ordered to come up with a recommendation for the best way to survey the enormous new lands coming under Canada's control. They could then be allocated in good order to the settlers Canada wanted to quickly flood the region in order to cement the federal government's control and fulfill Prime Minister John A. McDonald's vision of a country stretching from coast to coast.

Unfortunately, the new government underestimated the task of dealing with the people already living in the region. The arrival of Dennis and his surveyors added fuel to the growing suspicion of the First Nations and Métis that their existing rights to the lands in question were about to be extinguished. That concern was one of the sparks that would ignite the rebellions led by Louis Riel.

Dennis's four-point plan

Dennis was well aware of the hostility his presence had evoked, but he still had a job to do. On August 28, 1869, he mailed William McDougall, the minister of public works, a four-point plan for surveying the Northwest Territories:

1. ***The system to be rectangular; all townships to be east and west or north and south.***
2. ***The townships to number northerly from the 49th parallel of latitude and the ranges of townships to number east and west from a given meridian, this meridian to be drawn from the 49th parallel to a point say ten miles west***

of Pembina, and to be called the Winnipeg Meridian.

3. ***The townships to consist of 64 squares of 800 acres each, and to contain in addition 40 acres, or five percent in area in each section, as an allowance for public highways.***
4. ***The townships on the Red and Assiniboine Rivers where the same had ranges of farm lots laid out by the Hudson Bay Company, to be surveyed, the broken sections abutting against the rear limits of such range, so as to leave the same intact as independent grants.***

Dennis's plan obviously borrowed heavily from the American Plan, with a couple of notable exceptions, most importantly the size of the lots: Dennis recommended 800-acre sections broken into 200-acre lots, rather than the 640-acre sections broken into 160-acre lots of the American plan. McDougall had urged him to do so, noting that:

"the first emigrants, and the most desirable, will probably go [West] from Canada [today's

Above: Captain J. S. Dennis Jr. (left) and the Dominion Land Surveyors Intelligence Corps. Dominion land surveyors were recruited in the effort to quell the Riel Rebellion because of their intimate knowledge of the territory. *(Information Services Corporation file photo)*

> ***"I was then one of the younger surveyors, employed during the winter months in the office of the Surveyor General to examine survey returns. On the morning of April 1st, one of the surveyors in the office, I think it was E. Genest, asked me if I was going to attend the meeting at the Russell House that afternoon. I inquired, "What meeting?", and was told it was for the purpose of organizing a Surveyors' Corps to go to the North-West Rebellion. Being only 25 years old and keen for anything that smacked of adventure, I promptly arranged to attend. We met, and after discussion, it was decided to ask ten Dominion land surveyors who had experience of surveys in the Territories to each furnish four of the best assistants they had had, and thus to form a Corps of fifty to be known as the D.L.S. Intelligence Corp, its official title; such Corps to be used for information purposes as to trails and routes, and generally to act as intelligence men, or as scouts or mounted rifles as might be desired."***

(From "The DLS Intelligence Corps and the Riel Rebellion, 1885" - by Arthur O. Wheeler, D.L.S. - published in The Canadian Surveyor *Vol. II, No. 4, April 1926)*

Ontario and Quebec] and it will, therefore be advisable to offer them lots of a size to which they have been accustomed."

In other words, settlers from Ontario might be disappointed if they discovered their new land in the west came in smaller chunks than the lots in the east.

The federal government approved the plan, but although 200 miles of control lines and township lines were surveyed in Manitoba in 1869, surveying stopped as unrest grew and then blossomed into the Red River Rebellion. (Despite the fourth point of Dennis's plan, which seemed aimed at alleviating the concerns among the Métis and First Nations that the land they were already farming would be taken away from them, one of the first acts of rebellion involved Métis standing on Col. Webb's surveyors' chains so surveying could not proceed.)

After the rebellion, the government reconsidered the original plan and decided to use the American system of 160-acre homesteads after all. One reason: under Dennis's system, the 5,250,000 acres available to grant in Manitoba would have produced 25,000 homesteads. Under the American system, there would be 32,800. More homesteads meant, potentially, more settlers.

Dennis's intention to set aside five percent of each township for road allowances was also altered; instead, all township and section lines were to have road allowances 1.5 chains wide. That differed from the practice further east, where most recent road allowances were one chain.

On May 1, 1871, the Surveyor General signed the *Manual Shewing the System of Survey Adopted for the Public Lands of Canada*, which explained the Dominion Lands Survey System to Dominion lands surveyors, some of whom were subsequently appointed as "deputy surveyors of Dominion lands" under the *Dominion Lands Act* of 1872. (Since 1979, federal land surveyors have been known as Canada Lands Surveyors.) The first Dominion land surveyor commission was issued to Mr. William Crawford.

Early in July of 1871, 13 survey parties, organized by Lindsay A. Russell, first assistant to the Surveyor General, began work in Manitoba, six in settled areas and seven in areas not yet touched.

Numbering the townships

As Dennis had recommended, the 49th parallel—the border between the United States and Canada—was chosen as the base for numbering townships.

Additional township lines were surveyed parallel to it at prescribed intervals going north. Thus, Township 1 is the first six-mile wide band north of the boundary, Township 2 the second, and so on.

East-west numbering is based on meridians. The First Meridian is at 97°27'28.4" (97 degrees, 27 minutes, 28.4 seconds) west longitude. It may seem like a

The Western Canadian difference

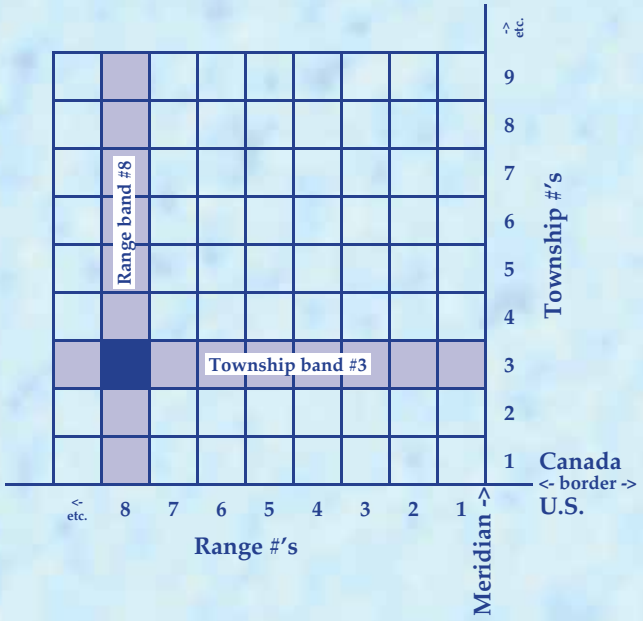
Monroe township in Richland County, Ohio (right) is an example of how the numbering of sections in the U.S. township system differs from that proposed for Western Canada by Lt. Col. J. S. Dennis in 1871. The U.S. numbering system snakes back and forth starting from the top right corner, going left then down. In the Western Township System of Canada, the numbering starts in the lower right corner, going left then up.

Townships and ranges

In general usage, "townships" refer to the six-mile-by-six-mile blocks of land that are further divided into sections and quarter-sections. However, township (abbreviated tp) also refers to the entire six-mile-wide bands of land that run east to west and are numbered from south to north starting at the Canada-US border.

The six-mile-wide bands of land that run north-south between consecutive range lines are called, not surprisingly, ranges, and are numbered from east to west, starting at each principal meridian.

By cross-referencing township and range numbers, you can find any particular 36-square-mile township. Township 3, range 8, west of the 3rd meridian, for instance, would be the area where the third township band north of the border intersects with the eighth range band to the west of the Third Meridian. *(Graphic by A.C. Shiels)*



rather arbitrary choice—why not choose, say, 97° even?—but in fact there was a good reason for it: Pembina, North Dakota (referred to in Dennis's original recommendations) was the end of the telegraph line from Chicago. To determine longitude, you have to have accurate time, and the telegraph allowed surveyors to obtain accurate time from Chicago.

The Second and Third Meridians, both located in Saskatchewan, are approximately at the more straightforward 102° W. and 106° W., respectively. The Fourth, the Alberta-Saskatchewan Border, was intended to be at 110° W. But because of an error in the assumed longitude of the First Meridian and other accumulated errors along the way, the surveyed boundary is actually slightly east of its intended position.

As a glance at a globe makes clear, meridians converge as they approach the North Pole. In practical terms, this means that simply establishing lines that run due north and due south as the eastern and western borders of a township will result in townships shrinking as you move north. (For example, Township 17-19-2, the 17th township north of the border and the 19th west of the Second Meridian, which includes the city of Regina, has a township plan that is 95 feet narrower across the north edge of the township than across the south.)

To adjust for that convergence, the township planners decided to create east-west base lines every four townships north of the U.S.-Canada border. The widths of the townships were adjusted to be the ideal width along those lines. The convergence of the western edge of the townships meant that the two townships to the north of each base line became increasingly narrow while the two townships to the south became in-

creasingly wide. This produced an offset between the townships along a line halfway between the baselines. The lines where these offsets occurred became known as correction lines.

The correction line jogs are small close to a meridian but increase in size as you move west. The first jog west of a meridian is about 225 feet, and if everything had been laid out perfectly on a smooth globe, they'd increase by that same amount for every township you move further west.

In practice, however, small errors crept into the surveyors' work that tended to accumulate over distance. Setting new base lines not only kept townships from shrinking to nothing as you moved further north but also helped to correct those accumulated errors.

Striving for Accuracy

Of course the early surveyors did everything they could to survey the land as accurately as possible, but the land—and the equipment of the time—didn't always cooperate.

When the Dominion land survey began, the main unit of measurement for surveyors was a Gunter's chain: a length of chain 100 links long. Each link of the chain was about ⅔ of a foot, so the chain itself was 66 feet long. Ten chains gave you a furlong and 80 chains a mile. An area of one chain by one furlong—that is, 10 square chains—equalled one acre.

Over time the links of the chain would wear and the chain itself would stretch. To periodically check the accuracy of the chain, surveyors were provided with a wooden yard stick. They'd measure out 22 yards, then compare the length of their chain to that measurement. If their particular chain was a little bit too long or a little bit too short, they'd include that variation in their measurements. But over vast distances, even small errors can add up: a measurement difference of just 1/100th of a foot in laying out the 22 yards would result in an error of 0.4 feet every half-mile.

Heat causes metal to expand and cold causes it to contract, which meant chains could vary slightly in length due to temperature. And, of course, it's a lot easier to measure a distance accurately on flat ground than on uneven ground; among other things, the way a suspended chain sagged had to be considered, as well as its slope. As a result, very few quarter sections are the exact 2,640 feet on a side they are theoretically supposed to be.

Another source of error was simply the fact that the surveyors were under immense pressure to survey the Northwest Territories as quickly as possible. In 1883, the survey's biggest year, 1,221 townships were subdivided and 1,380 outlined.

Conversion Factors

Unit	Chains (ch)	Feet (ft)	Metres (m)
Std. Road Allowance	1	66	20.1168
1/2 Mile	40	2640	804.672
Mile	80	5280	1,609.344
Acre	1 ch x 10 ch	43,560 ft^2	4,046.856 m^2

Organizing the survey

The first task in surveying the Northwest Territories fell to the block surveyor, who surveyed the principal meridians and the baselines that were necessary to form the outlines of blocks. Block surveyors had to work to a very high level of accuracy, which made their work expensive. At first each block contained four townships. This was later increased to 16 townships.

Once the block surveyor had established the outline of each block, a township outline surveyor subdivided the block into townships, surveying lines running both north-south and east-west at six-mile intervals, creating a grid whose squares each contained approximately 36 square miles.

After that, a subdividing surveyor would lay off the township into 36 sections, each containing 640 acres "more-or-less," and further divide each section into quarter sections.

The block surveyors established their meridians and range lines using astronomy. A skilled surveyor of the time could, by a series of star observations, locate his position on the earth's surface within 150 feet north and south and 200 feet east and west of a precise latitude and longitude.

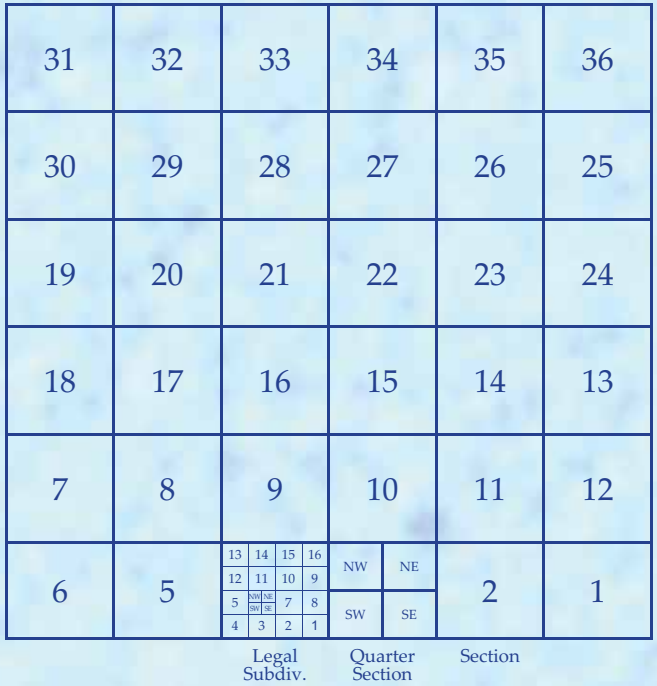
All of this sounds rather cold and clinical when described in purely technical terms. In reality, surveyors were attempting to do their work in country without roads or towns, transporting their equipment on horseback or in Red River carts. They struggled with blizzards and snowdrifts, intense heat, weeks of rain, clouds of mosquitoes, mud and marshes. Many were away from family and friends for months or even years; any opportunity to travel home was a major and joyful event.

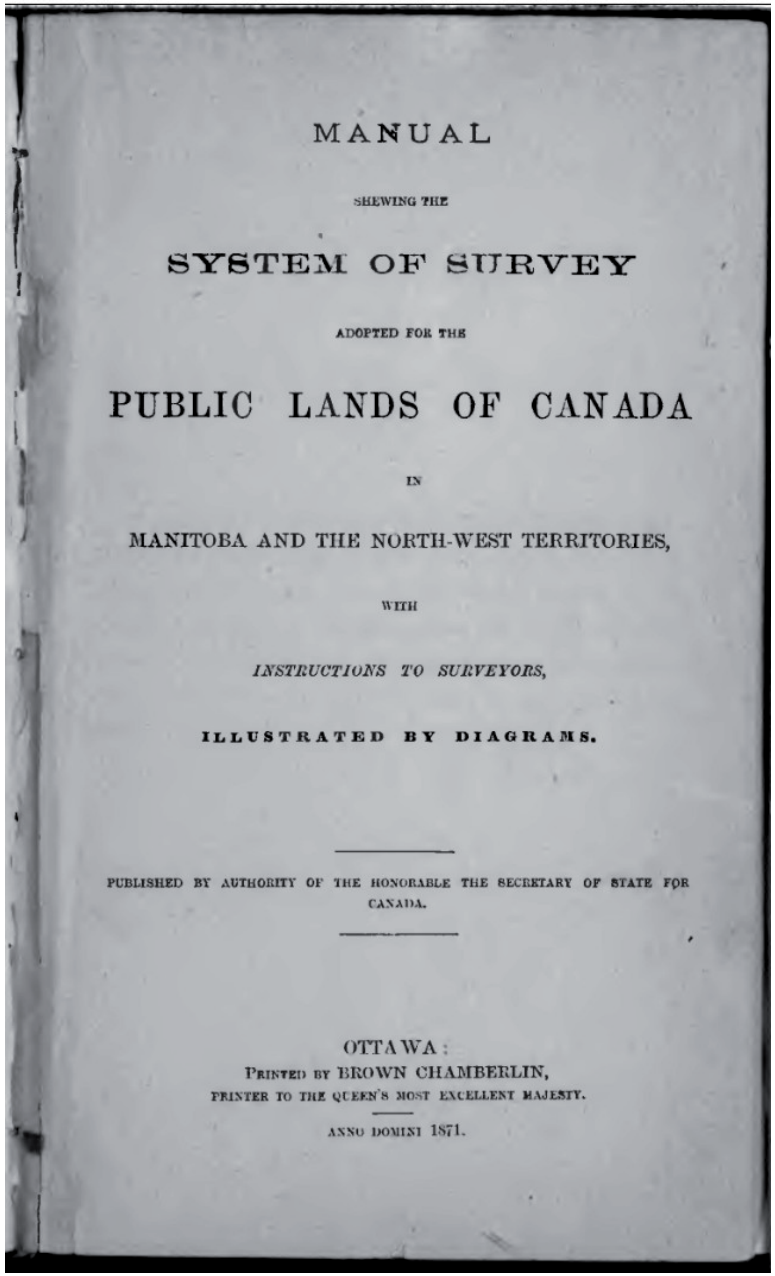
Russell reported that in that first season of 1871, "The surveys during the season were much delayed, owing to extensive fires and the result-

I was born where?

People born on the prairies but unfamiliar with the township system often wonder about the odd sets of numbers that appear on their birth certificates as their place of birth. What those numbers mean is that they were not born in a town or city but at home on a farm. The numbers refer to the legal land location as set out in the Western Township System.

Township sections were numbered 1 to 36, beginning in the south-east corner and continuing east to west (1 to 6), then, in the next row north, west to east (7 to 12), then east to west (13 to 18), and so on. The four quarter-sections of 160 acres each are identified by compass direction (NW, NE, SW or SE). Each section may also be broken down into legal subdivisions (LSDs) (16 in all, each of 40 acres, and numbered like sections). LSDs may also on occasion be further subdivided into 10-acre quarters, again identified by compass direction. So a particular 10-acre patch of ground could be identified as, say, the north-west quarter of legal subdivision 9 of section 15, township 6, range 20, west of the 2nd meridian: NW of LSD 9-15-6-20-W2. Since a quarter-section was the size of most initial homesteads, quarter-sections are more likely to be identified: e.g. NE 15-6-20-W2, meaning the northeast quarter of section 15, township 6, range 20, west of the 2nd meridian. *(Graphic by A.C. Shiels)*





MANUAL

SHEWING THE

SYSTEM OF SURVEY

ADOPTED FOR THE

PUBLIC LANDS OF CANADA

IN

MANITOBA AND THE NORTH-WEST TERRITORIES,

WITH

INSTRUCTIONS TO SURVEYORS,

ILLUSTRATED BY DIAGRAMS.

PUBLISHED BY AUTHORITY OF THE HONORABLE THE SECRETARY OF STATE FOR CANADA.

OTTAWA:
PRINTED BY BROWN CHAMBERLIN,
PRINTER TO THE QUEEN'S MOST EXCELLENT MAJESTY.

ANNO DOMINI 1871.

ing smoke ... Two of the parties, that of Mr. Wagner, and Mr. F.H. Lynch-Staunton, were completely burned out, losing all their provisions, tents, equipage, clothing, some of their instruments and barely escaping with their lives." Even those who weren't caught in fires struggled in their aftermath, trying to keep their pack animals fed: "Very few patches of grass remained, they were often obliged to carry feed long distances."

A long list of duties

Despite difficult conditions, the surveyors had a long list of duties they were expected to perform, beginning with their primary task of marking corners with monuments, in the manner specified by the *Manual Shewing The System of Survey Adopted for the Public Lands of Canada in Manitoba and the North-west Territories, with Instructions to Surveyors, Illustrated by Diagrams*.

Left: The first manual for the survey of public lands of Canada was published in 1871. As the system of survey evolved there were a total of 10 such publications, as well as various supplements and Bulletin 38, which described the boundary monuments erected on surveys of dominion lands between 1871 and 1917. *(Photo by A.C. Shiels)*

Originally, wooden posts about four feet long were used for section corners. (In forest, if a tree happened to be located at just the right place, it could be squared and marked on all four sides to take the place of the post.) The tops were shaped to a three-inch-square cross-section and each side was marked in Roman numerals with the appropriate township and section numbers. From 1871 to 1915 township corners were marked by iron posts five feet long. Typically four square pits 12 inches deep were dug, then the stake or post was planted, often in a small mound of dirt, midway between the four pits. (Over the years the methods of marking corners have changed many times; see Chapter 5 for a detailed look at the history of surveyors' monuments in Saskatchewan.)

When posts couldn't be used (when the corner was in a lake,

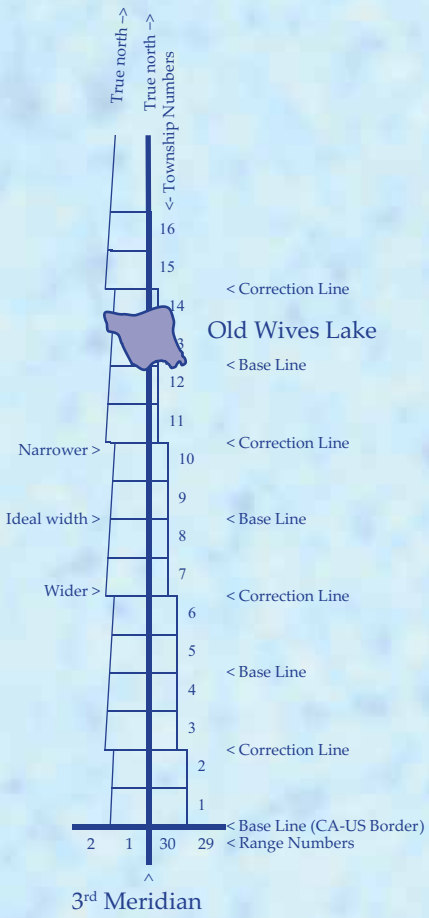
The incredible shrinking townships

The correction line jogs to the west are intended to keep townships from shrinking as you move further north. However, they have the opposite effect for a few townships right along the eastern edge of each meridian west of the First Meridian.

In that range of townships, the further north you go, the closer the first range line east of the meridian gets to the meridian itself. Eventually, the two converge, and that's the end of the townships in that range.

For example, Range 30 west of the second meridian shrinks to nothing just north of Old Wives Lake, southwest of Moose Jaw.

Note: The correction line offsets to the west of the meridian in the adjacent diagram have been grossly exaggerated to make them more apparent. *(Graphic by A.C. Shiels)*



for instance), a "witness monument" could be erected, usually a circular trench, possibly mounded in the middle, with a stake at the centre. A sign on the stake and an entry in the field book would specify the bearing and distance of the true corner from the witness monument.

Normally monuments were placed on the south and west limits of the road allowances. Along correction lines and the boundaries of Indian Reserves, however, corners were typically marked on both sides of the road allowance.

Although it has been illegal from the very beginning to destroy survey monuments, many of the original monuments have been lost over the years due to agricultural and developmental activities in addition to degradation from natural causes. Since the original, undisturbed monument governs the location of the true corner of a piece of land (even if that monument's location is slightly different from that shown on the survey plan), part of a modern surveyor's task is often trying to locate evidence that indicates where those monuments were originally placed.

But surveyors were expected to do much more than just place monuments. They were expected to keep extremely detailed field notes which had to be written down on the spot: nothing could be left to memory.

The field notes included the length and exact bearing of every line run, the course and distance from all witness mounds, what kind of monuments were used, where the line intersected with settlers' claims and various natural features, and the extent and height of all "remarkable hills or ridges."

Surveyors were to note the course, width, depth and current speed of all streams, whether any lakes discovered were fresh or salt (alkaline), whether the country was level or rolling, what the soil was like and how fitted it was to agriculture. They had to describe the kinds and quality of any timber present and any rapids or waterfalls that could power mills, and report deposits of coal and other minerals (specimens were to accompany their report).

They were to make a careful description of, and separate reports on, any improvements made by settlers, including the names of the settlers, the types of improvements, and an estimate of their value.

Everything had to be dated, of course, and at the end of his field notes, the surveyor had to make an affidavit saying that the notes were "correct and true in all their various particulars, to the best of his knowledge and belief."

Far from "just" marking out the locations of future homesteads, surveyors were providing the government of the expanding nation its first detailed record of just what resources its vast new lands contained.

Five Survey Systems in all

As noted earlier, the earliest days of the Dominion Land Survey took place in Manitoba, except for the surveyors who laid out the baselines and meridians. Their vital work was called the Special Survey, but the marking out of townships and quarter sections was carried out over the course of five basic systems of survey, with each new survey system marked by the issuance of a revised survey manual.

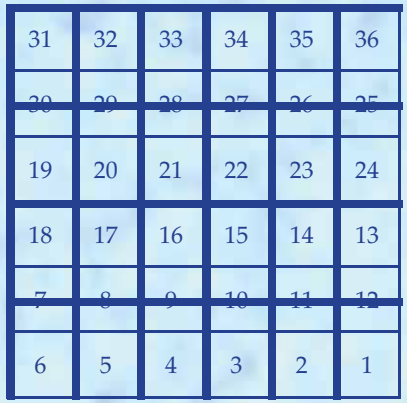
The First System of Survey, from 1871 to 1879, takes in part of southern Manitoba, a thin strip of eastern Saskatchewan, and a couple of locations in central Saskatchewan. In this survey system, surveyors were still providing road allowances 1 1/2 chains (99 feet) wide. There were six north-south and six east-west road allowances in every township.

Another feature of the First System of Survey was that the north-south section lines were made parallel to the range line that marked the eastern boundary of each township. Since the western boundary was also a range line running due north-south, it converged with the section lines that ran parallel with the eastern boundary of the township to the east. As a result, the western-most quarter sections in the First System of Survey become smaller the further north one travels.

The Second System of Survey, conducted in 1880, covered only two areas in Saskatchewan, a strip along the Canada-US border near Estevan and an area in the east central part of the province including the city of Yorkton. The road allowances had the same configuration, but the surveyors made the section lines run true north-south rather than parallel to the eastern boundary. Of course, unavoidably, that made each section very slightly wedge-shaped; still, that method was used in all subsequent surveys.

The most important system of survey from Saskatchewan's point of view was the Third, which covered most of the settled areas of the province.

Road allowances for the Third System of Survey were reduced to one chain (66 feet), and each township contained only three east-west road allowances, located two miles apart, rather than six, though there are still six north-south road allowances spaced one mile apart. With the reduced road allowance, townships also got slightly smaller. In the First and Second Systems of Survey, townships were 489 chains square, while in



For the benefit of veterans

The modifications to the Third System of Survey were made to benefit veterans of the First World War. Settlers were normally given a quarter-section (160 acres). Veterans, however, were allocated an extra 80 acres adjoining their quarter sections, held in reserve until they had developed their homestead quarters. Placing the east-west roads at 1½ mile intervals insured that veterans weren't cut off from their reserved extra land. *(Graphic by A.C. Shiels)*

the Third System of Survey, they were 486 chains east-west and 483 chains north-south.

Although the Third System of Survey methodology is still in use today, from 1919 to 1920, Saskatchewan surveyors used the Modified Third System of Survey for 14 eastern townships, adding an extra east-west road allowance. In townships of the Third System of Survey, east-west roads are spaced every two miles apart, while in the Modified Third System of Survey, they are spaced 1½ miles apart. This created parcels of land that were 240 acres (more-or-less) to fulfill a promise made to returning First World War veterans. By the time of the Modified Third System of Survey, of course, Saskatchewan had been a province for 14 years, coming into being in 1905 along with Alberta.

Defining the Alberta-Saskatchewan border

The Saskatchewan Act and the Alberta Act, both of which received Royal assent in 1905, defined the boundary between the two provinces as "the fourth meridian in the system of Dominion Land Surveys," with the southern terminal point the international boundary (established as the 49th parallel by the Joint British-American Commission in 1872) and the northern terminal point the 60th degree of north latitude.

However, the fourth meridian had not yet been either rigidly defined or surveyed all the way from south to north. The second meridian was approximately at longitude 102° W., and each subsequent meridian was to be "as nearly as possible" four degrees in longitude apart. As mentioned previously, the fourth meridian is not precisely longitude 110° W., but as close to it as was technically possible at the time.

When the two new provinces were born, the fourth meridian had been surveyed (and in places resurveyed) and monumented from the international boundary to Township 61, about ten miles south of Cold Lake. By 1911, it had been run and monumented up to the south shore of Lake Athabasca. Some resurveying was carried out between 1911 and 1918 to deal with suspected errors.

Above: "Pony & flat sleigh - L. Athabaska, Mar. 1938" - Saskatchewan-Alberta boundary survey. *(From a series of slides of the 1938 Saskatchewan-Alberta boundary survey, at the office of the Controller of Surveys)*

All that work was done by the Dominion Government, so everything was monumented in the same way as the rest of the lands being surveyed, with nothing special to mark the provincial boundary.

With the transfer of natural resources from the federal government to the provinces in 1930, and subsequent mineral exploration and development in the area north of Lake Athabasca, the final section of the fourth meridian had to be surveyed so each province knew where its jurisdiction lay. In early 1938 the fourth meridian was surveyed across the ice of Lake Athabasca, and that summer, it was finally run all the way up to the southern boundary of the Northwest Territories, fixing the Alberta-Saskatchewan border once and for all.

The resulting boundary has been called the world's longest surveyed straight line. A casual glance at a map might make you think that the eastern boundary of Saskatchewan would also qualify, but closer inspection reveals that the eastern boundary of the province has a stepped appearance:

Not as simple as it looks

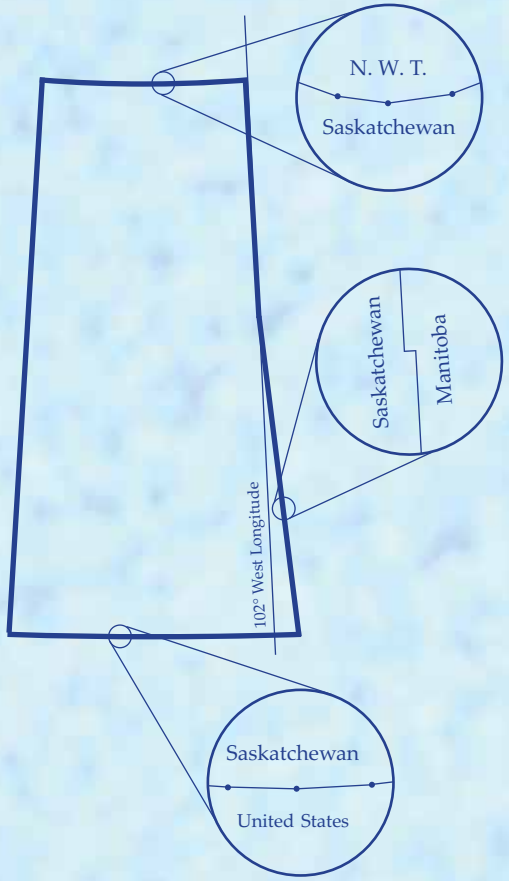
At first glance, Saskatchewan's borders look like two straight lines running north-south and two curved lines following the 49th and 60th parallels. In fact, the eastern border, from the 49th parallel to the top of township 82 where it intersects with 102° west longitude, runs down the centre of the road allowance and includes a number of correction line jogs, making it about 43 km longer than the western border.

The north and south borders are really defined by a number of monuments along the parallels connected by straight lines. The approximately 276 monuments along the Canada-US border are, on average, about 2.3 km apart. Interestingly the average spacing of the monuments along the northern border is about the same even though the spacing between monuments varies in both cases.

Only the western border is, at least theoretically, a straight line. The total length of each border is:

Border	Length (km) (Approx.)
SK-MB	1267
SK-US	632
SK-AB	1224
SK-NWT	446

(Graphic by A.C. Shiels)



(Graphic from http://commons.wikimedia.org/wiki/File:Saskatchewan,_Canada.svg)

Saskatchewan is one of the few states or provinces in the world with no natural boundaries whatsoever. It was literally drawn on the globe through the work of surveyors.

that's because it runs down the centre of the road allowance between ranges 30 and 29 west of the first meridian. That range converges with the second meridian just south of the Churchill River; after that, the boundary is the second meridian [102° west longitude.] The stepped appearance results from the jogs that occur at each point where the range line intersects range 30 west of the 1st meridian.

When the Canada-US boundary was about to be surveyed for the first time in 1875, it was intended to be "the 49th parallel". But the boundary was actually laid out as a series of straight lines representing chords of latitude with the end points of each line on the 49th parallel as determined by astronomic observations.

Similarly, the northern boundary was intended to be the 60th parallel. But when it was first surveyed between 1953 and 1959 a series of 192 monuments were located along the 60th parallel and those too were connected by straight chords.

All of which means that Saskatchewan is one of the few states or provinces in the world with no natural boundaries whatsoever. It was literally drawn on the globe through the work of surveyors. And though most of those surveyors initially worked for the Dominion government, as the province continued to grow, the need for its own professional association of surveyors became apparent.

In 1910, that association would become reality, with the formation of the Saskatchewan Land Surveyors Association.