



CROWN SURVEYS *in Ontario*



1827-28



1867



1868



1905



1906



1928

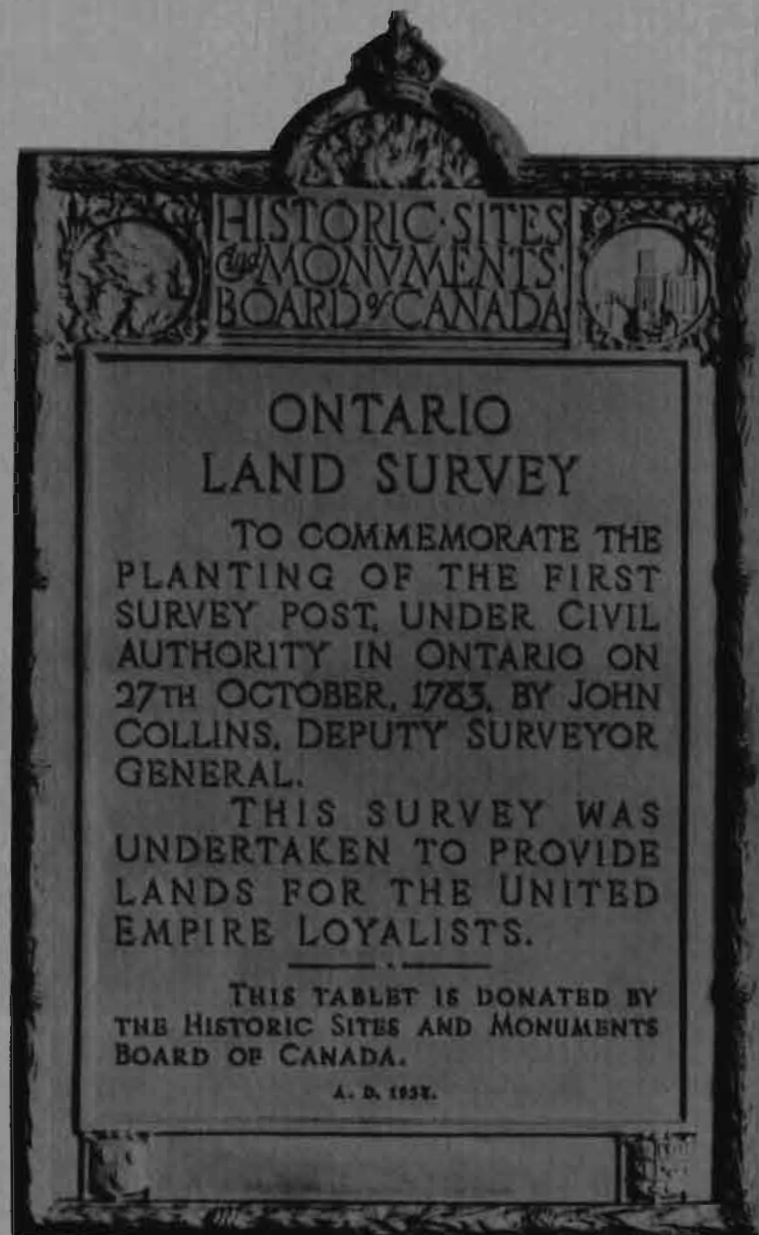


1945

DEPARTMENT OF LANDS AND FORESTS
PROVINCE OF ONTARIO

HON. RENE BRUNELLE
Minister

G. H. U. BAYLY
Deputy Minister



The plaque on the monument (front cover) which was erected in MacDonal Park, Kingston, in 1938 due to the efforts of the late C. Fraser Aylsworth of Madoc, Ontario Land Surveyor. Photo by courtesy of Department of Northern Affairs and National Resources.

CROWN SURVEYS IN ONTARIO

by W. F. WEAVER
O.L.S., P.Eng.

1962
Revised, 1968



ONTARIO

DEPARTMENT OF LANDS AND FORESTS

HON. RENE BRUNELLE
MINISTER

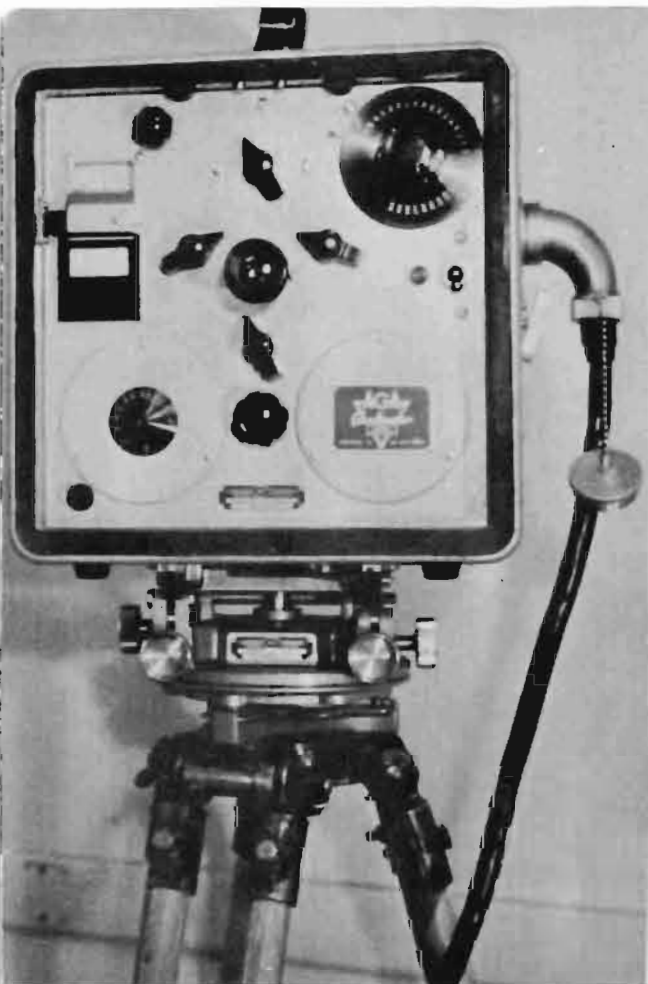
G. H. U. BAYLY
DEPUTY MINISTER

ROBERT G. CODE
SURVEYOR GENERAL

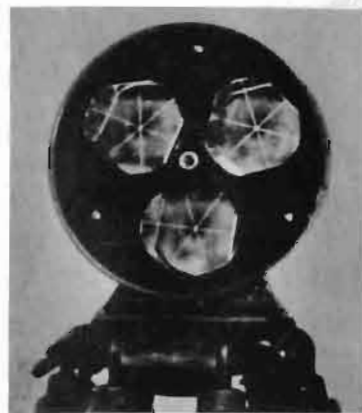


THEN AND NOW: Two old photographs (above) recall the difficulties of early surveyors when supplies and equipment were moved by canoe and pack. Today, left: an entire survey camp is delivered quickly by airplane. Below: a helicopter moves men easily from camp to work on the survey line. The platform prevents pontoons from freezing into snow.





Left:
Geodimeter

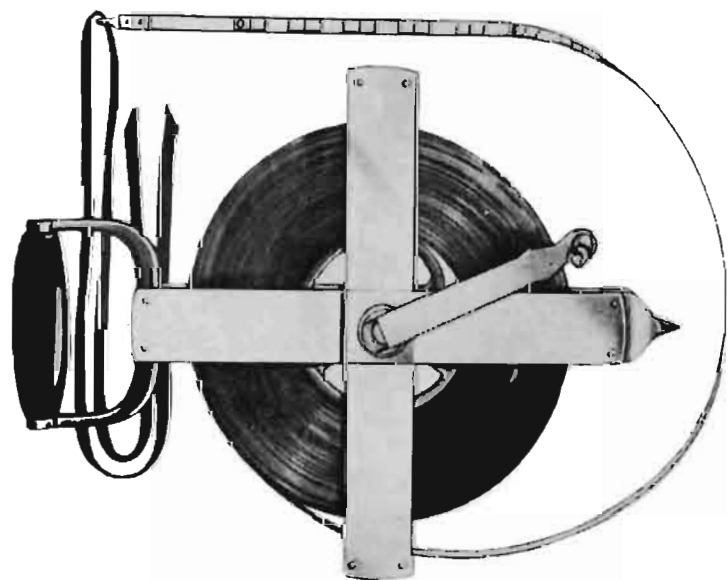


Right:
Reflector

GEODIMETER measures distances with great accuracy by giving the time required by a pulsating light beam to travel from the instrument (left) to the reflector (above) and return. Multiplying the time by the speed of light gives the distance between the two points. Distances of up to half a mile may be measured in daylight; longer distances are measured at night. The geodimeter was invented by Dr. Erik Bergstrand of Sweden. Photo by courtesy of Topographical Survey, Department of Energy, Mines and Resources, Ottawa.



MODERN SURVEY INSTRUMENTS USED IN ONTARIO



TAPE MEASURE, as used today (left), a thin ribbon of steel. This measure first appeared in 1870 but did not come into general use until much later because of its high cost.

TENSION HANDLE (below) is used to obtain a standard tension on a measuring tape of given length, thus increasing the accuracy of land measurements.



TELLUROMETER (above) measures in milli-microseconds the time taken by a radio micro-wave to travel from the master unit to a remote unit and return. Its accuracy has been tested to one part in 100,000 but its operation is simple, requiring no knowledge of electronics. Its best working range is between five and forty miles. The first piece of equipment using electromagnetic waves to be placed in the hands of the surveyor, the tellurometer was invented by T. L. Wadworth of the South African Council for Scientific and Industrial Research. Photo by courtesy of Highway Information Services, Washington, D.C.



SPLIT LINE PICKET (right) is used on long range sights by Surveys Section of the Department of Lands and Forests. It is shown in operation on the Meridian Line Survey in 1954.



MODERN THEODOLITE

Surveyors now use the type of theodolite illustrated here. It provides telescope magnification of 28X and it gives readings of horizontal angles which are accurate to the nearest second.

Above: the same instrument in use on the Meridian Line Survey north of Geraldton in February, 1954. Note the portable two-way radio which allows surveyors to keep in close contact with base camp.

CROWN SURVEYS IN ONTARIO

IN the development of the Province of Ontario with its modern community centres, industries, harnessed natural resources and productive farms — from the days when it was an unexplored, unmapped wilderness — a major role has been played by the land surveyor who, during some 200 years, has formed the vanguard of settlement across the length and breadth of the province. Etched deep in the pages of Ontario's history will be found stirring records of the hardships endured by the surveyor and of the problems he encountered and overcame. Ever since history has been recorded, disputes over land and boundary lines have played a part of paramount importance in the development of practically every country in the world. Ontario has been no exception.

Since ownership of land is the prime requisite for the development of its natural resources, land surveys must come first. In Ontario, exploration surveys and survey control lines (known as base and meridian lines) are required for mapping purposes and to establish the survey fabric from which township and townsite surveys are planned and surveyed to permit the disposition of land in accordance with the requirements of the Statutes of Ontario governing the conveyancing and the transfer of land.

In the early days of Ontario's history, this scientific method of approach was not followed. Townships were surveyed only along communication routes which were the St. Lawrence River, Lake Ontario and Lake Erie. Primitive surveying instruments, compared with the instruments of today, were used by early surveyors. For economic reasons, the compass was used much more extensively than the theodolite.

It is natural for those having a knowledge of surveying to criticize the work of the early township surveys with their crooked lines and inaccurate measurements but, in doing so, they should not forget the primitive tools used to do the job. Land was both plentiful

and cheap. The country was young and sparsely populated, and funds for land surveys were limited. The high costs necessary to obtain the precise surveys of today would have been prohibitive in the early days of land settlement in Ontario.

Unfortunately, the inaccuracies of early surveys have created many problems in dealing with land conveyancing, following the granting of the Crown patents. **Once an original survey is made and is used for the transfer of land, it must be perpetuated unless it can be changed by law.** Original surveys are unlike condemned bridges and buildings which can be destroyed, forgotten or reconstructed. Every legal survey establishes, in effect, a monument to the credit or discredit of the surveyor who performed the survey.

In the Ontario Department of Lands and Forests, the Surveys Section of the Lands and Surveys Branch is responsible for surveying and maintaining the boundaries of the Province; surveying new control lines to establish an accurate survey fabric required for mapping and legal purposes; legal property and retracement surveys required for settlement and recreational purposes on Crown land; the control and use of lakes, rivers and streams; the production of maps of the province; geographical index of nomenclature of topographical features and place names; and the custody of all maps, plans and field notes of surveys made on Crown land.

The plans and field notes of every type of survey made on Crown lands under the authority of the Public Lands Act, the Water Powers Regulation Act and the Highway Improvement Act, are examined, approved and filed. The disposition of Crown lands is big business, particularly for summer resort locations. In the past five years, over 10,000 surveys have been made for this purpose alone, and the public demand is continuing as new highways open up vast new territories which contain a treasure of recreational land.

Crown surveys are undertaken by land surveyors on the staff of the Department and also under departmental instructions and contracts by surveyors engaged throughout the province in the practice of their profession.

Great strides have been made in science over the past twenty-five years, including instruments for measuring the earth's surface. To perform their professional duties, land surveyors now possess instruments with which they can perform surveys of great precision. However, although schooled to modern methods and equipped with the latest and finest instruments, the surveyor still encounters many of the hardships and opportunities for adventure that his predecessors experienced when they surveyed the wilderness which once characterized both southern and northern Ontario.

We must go back to the time when Ontario formed part of the British Province of Quebec — when Canada was ceded by France to the Crown of England in 1763 — to discover the first surveys made under executive and civil authority.

Major Samuel Holland, who fought under Wolfe on the Plains of Abraham, was appointed Surveyor General of Quebec in 1764, and John Collins was appointed his deputy in the same year. Nearly twenty years elapsed before any move was made to colonize the newly acquired territory now known as Ontario. No definite settlement took place west of Montreal (with minor exceptions in the vicinity of Niagara and Detroit) until the end of the revolt of the American Colonies.

With the cessation of hostilities in 1783 and the recognition of the independence of the United States, American colonists who had remained loyal to the British cause sought refuge and a new home on Canadian soil. Active measures were taken to provide settlement for these United Empire Loyalists on suitable Crown lands. We find that General Frederick Haldimand, Governor General of Quebec, sent survey parties to examine the country along the St. Lawrence River west of Montreal and in the neighbourhood of Fort Frontenac (now Kingston) at

Cataraqui. As a result of these explorations, the following survey instructions, dated 11th of September, 1783, were sent by General Haldimand to Deputy Surveyor General John Collins — and, as far as is known, these were the first township survey instructions issued under civil authority in the Province of Ontario.

From General Haldimand to John Collins

Headquarters, Quebec.
11th September, 1783.

John Collins, Esq.:

Sir:- It being my intention to establish settlements for the provision of part of the distressed Loyalists resorting to this Province at and in the neighbourhood of Cataraqui, upon Lake Ontario, you are hereby directed to proceed to that place without loss of time for the purpose of surveying and laying out the several lands in townships and lots agreeably to the following instructions:-

1. You will make an exact survey of the neck intended for the town plot, describing and expressing the nature of the ground and soil, and if Point Frederick is not commanded from Point Henry, on both which places sufficient spaces for fortifications must be reserved.

2. At the west side of Cataraqui Harbour the ground near the fort and within the lines (as marked in the plan A, B, C) must remain to the Crown, for the use of the garrison, and as a place of resort for the Indians, where some of the most noted might be allowed to build, reserving sufficient spaces round the slips (where vessels were formerly constructed) unincumbered with buildings.

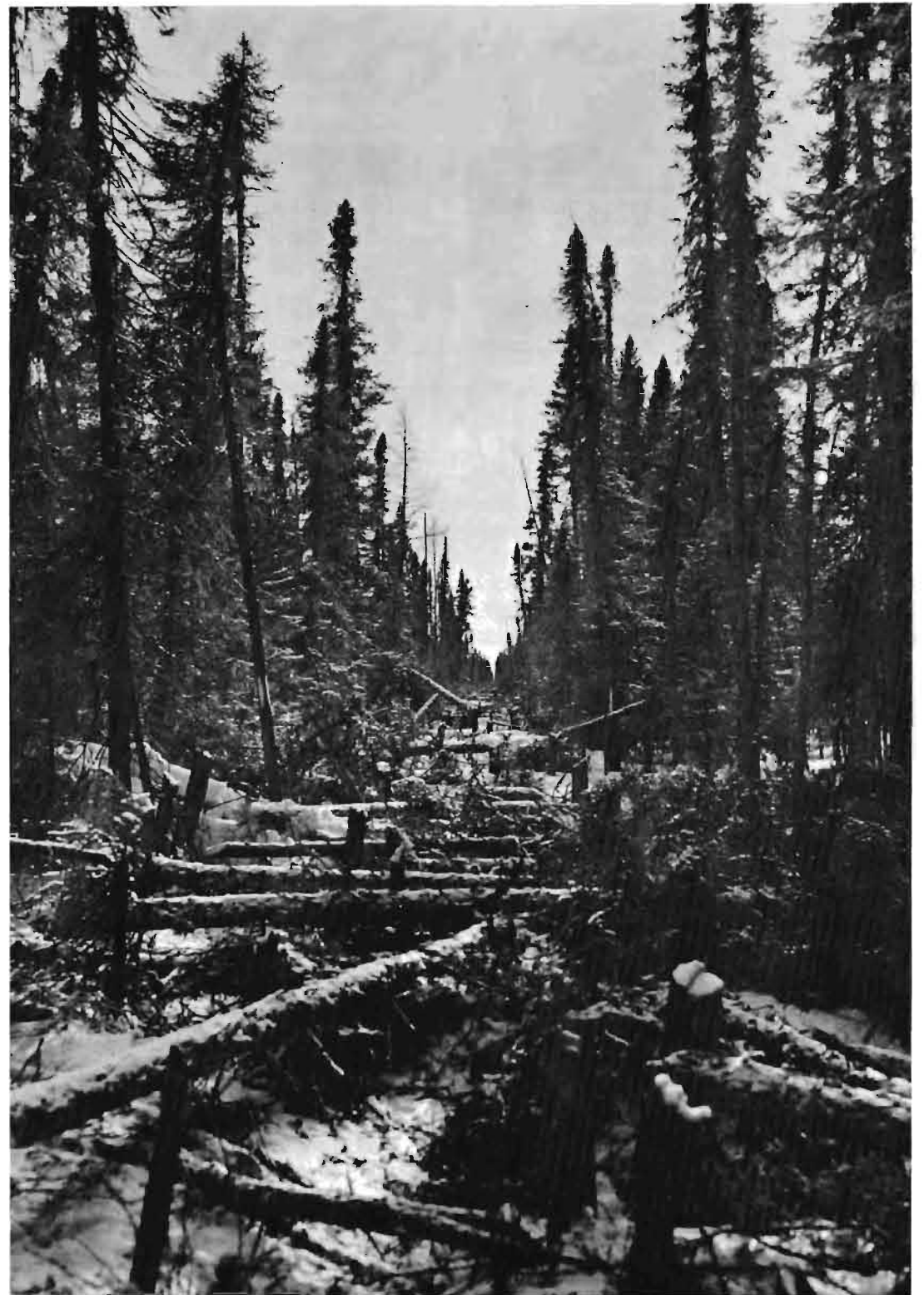
3. Though a common, containing about 400 acres, must be reserved for the use of the town, leases may be given for a term of years, not exceeding thirty years, to settle there as the people for the present will be glad to be as near the town as possible, and the common will be cleared by the time the town will be in want of it.

4. The method of laying out townships of six miles square I consider as the best to be followed, as the people to be settled there are most used to it, and will best answer the proportion of lands I propose to grant to each family, viz.: 120 acres, of which six are to be in front, which will make 19 chains in front and 63 chains 25 links in depth, so that every township will have 25 lots in front and four chains 75 links will remain for roads, with 7 concessions in depth. Fifty-eight links will remain for a road, by which distribution each township will contain 175 lots of 120 acres.

For your assistance in the execution of this business you will be joined at Montreal by Capt. Sherwood and Lieut. Cotte and also by Mr. Grass, captain of one of the companies of militia intended for that settlement, and these gentlemen will be attended with axemen, etc., proper for that occasion.

You will begin your survey by a township on each side of the bay, and transmit it to me, together with your remarks, reporting to me in the like manner from time to time the progress you shall make.

As it is not improbable that in exploring these lands some of the persons employed may make choice of particular situations, and make preparations accordingly, to prevent which you are to signify to them that my intentions are to distribute the lots impartially by drawing for them, and that all timber cut down this



Looking south on the line cut near Mile #105 on the Meridian Line Survey north of Geraldton, February, 1954.

fall, or any log houses they may choose to make and reside in until the settlements shall be regularly granted, will not be considered as any right of such persons, but entered as a temporary beginning, and should any of them prefer remaining there this winter to returning to Sorel, may have lots of four acres marked out for them in the common, which they will enjoy for thirty years, as before mentioned, by which means whatever work is done will forward the clearing of the common and be for the public good. The officers commanding at Carleton Island, Cataraqui, or any post you shall have occasion to call at are hereby directed to afford you every assistance in their power, whether in provisions or otherwise, for the speedy and effectual execution of these instructions.

Wishing you success, etc.,

F. Haldimand.

During the years 1783-84, John Collins and his assistants surveyed the boundaries of five townships and partly subdivided the townships into lots and concessions. These townships, extending west from Cataraqui Bay around the Bay of Quinte, were numbered consecutively 1 to 5 and were later called Kingston, Ernestown, Fredericksburgh, Adolphustown and Marysburgh. Early in January of 1784, the first band of United Empire Loyalists ascended the St. Lawrence River to take possession of the lands which had been surveyed for them. The greater part of Capt. Grass' party settled in Township No. 1 and thus began the first effective settlement made within the boundaries of present-day Ontario under the tenure of free and common socage.

On the 24th of July, 1788, Quebec, which up to that time had been divided into two districts, was further divided into the districts of Lunenburg, Mecklenburg, Nassau, Hesse and Gaspé. The names of the first four districts were changed by statutes passed at the first session of Parliament of the Province of Upper Canada in 1792 to the Eastern, Midland, Home and Western Districts. Land Boards were set up to deal with the disposition of Crown lands, and deputy surveyors, appointed by the Surveyor General, were attached to each district.

This system continued only until shortly after the creation of the Provinces of Upper and Lower Canada on the 18th of November, 1791, for an Order-in-Council was passed on November 6th, 1794, which abolished the Land Boards. It was then directed

that all applications for land should be made to the Lieutenant Governor-in-Council. From that time on, surveys were made under direct instructions from the Surveyor General in pursuance of the proclamation of His Excellency, Lieutenant Governor Simcoe, dated February 7th, 1792, the first clause of which says that the Crown lands "are to be run out and marked by His Majesty's Surveyor or Deputy Surveyor General, or under his sanction and authority".

The appointment of deputy surveyors by the Surveyor General under authority of the Lieutenant Governor-in-Council, and surveying under his direct instructions, continued until 1849 when an act was passed (12 Vic., Cap. 35) entitled "An Act to Repeal Certain Acts mentioned therein and to make Better Provision Respecting the Admission of Land Surveyors and the Survey of Lands in the United Provinces of Upper and Lower Canada". This act repealed all the previous ones and then set out various regulations and enactments which govern the profession of land surveying in both provinces. It provided for the appointing of a Board of Examiners consisting of the Commissioner of Crown Lands and six other competent persons appointed by the Governor. The subjects for examination were geometry, six books of Euclid, plain trigonometry, mensuration, plotting and map drawing, and spherical trigonometry and astronomy (of which the candidate was required to have sufficient knowledge to enable him to ascertain latitudes and draw meridians). Each applicant had to be at least twenty-one years of age and was required to serve under an instrument in writing for three consecutive years as an apprentice to a land surveyor duly admitted and practising as such in Upper or Lower Canada.

The appointment of surveyors remained in the hands of the Lieutenant Governor, recommendations for appointment being made following an examination conducted first by the Surveyor General and, after 1849, by a Board of Examiners. In 1886, the surveyors of Ontario organized as the Association of Provincial Land Surveyors



Left: using a theodolite on the survey of the Ontario-Manitoba boundary, 1947-48. Right: Cook tent at base camp on the Meridian Line Survey, 1954.

and in 1892 were incorporated as the Association of Ontario Land Surveyors. The Government retained the right to appoint two members of the Board of Examiners, and the Minister of Lands and Forests became *ipso facto* a member of the Council of Management. Over a period of about 100 years from the time when the first surveys were made in Ontario to 1886 when the Association of Provincial Land Surveyors was formed, only 697 surveyors received their commissions to practice. Today, there are some 500 land surveyors following their profession in Ontario.

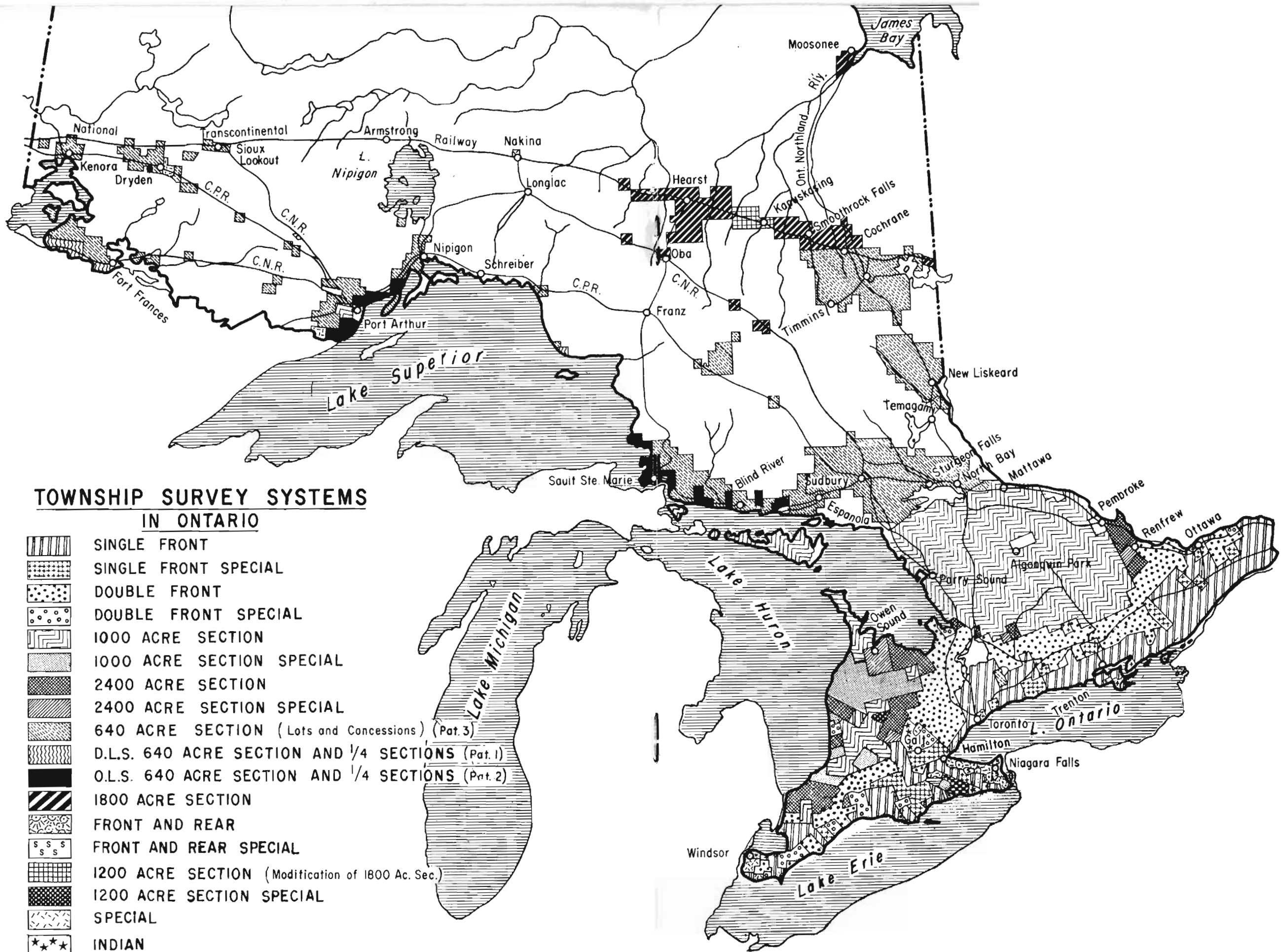
The origin of the various township survey systems prevailing in Ontario was at the eastern end of the province. To provide settlement for the large immigration of United Empire Loyalists and emigrants from the Mother Country, the Surveyor General and his deputies extended the township surveys westwards along Lake Ontario to the Niagara frontier. As the country developed

and as improved methods for land surveys were devised, it was found advisable to revise the township survey systems and the size of townships and township lots from time to time, having regard to new ideas in land-settlement schemes, physical characteristics of the country and municipal organization.



















Township Survey Systems in Ontario

After the first township survey had been made in 1783, the following seven different systems of township surveys were adopted by the executive governments:

- (1) Single-front
- (2) Front-and-rear
- (3) Double-front
- (4) 2,400-acre section
- (5) 1,000-acre section
- (6) 640-acre section
- (7) 1,800-acre section

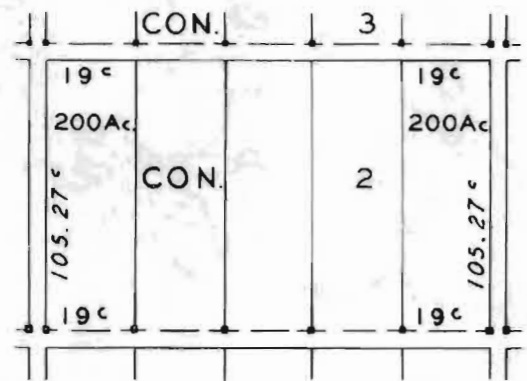


TOWNSHIP SURVEY SYSTEMS IN ONTARIO

-  SINGLE FRONT
-  SINGLE FRONT SPECIAL
-  DOUBLE FRONT
-  DOUBLE FRONT SPECIAL
-  1000 ACRE SECTION
-  1000 ACRE SECTION SPECIAL
-  2400 ACRE SECTION
-  2400 ACRE SECTION SPECIAL
-  640 ACRE SECTION (Lots and Concessions) (Pat. 3)
-  D.L.S. 640 ACRE SECTION AND 1/4 SECTIONS (Pat. 1)
-  O.L.S. 640 ACRE SECTION AND 1/4 SECTIONS (Pat. 2)
-  1800 ACRE SECTION
-  FRONT AND REAR
-  FRONT AND REAR SPECIAL
-  1200 ACRE SECTION (Modification of 1800 Ac. Sec.)
-  1200 ACRE SECTION SPECIAL
-  SPECIAL
-  INDIAN

Typical section of a single-front township,
1783-1818

Original survey lines run on the ground are indicated by broken lines; original survey posts by small squares.



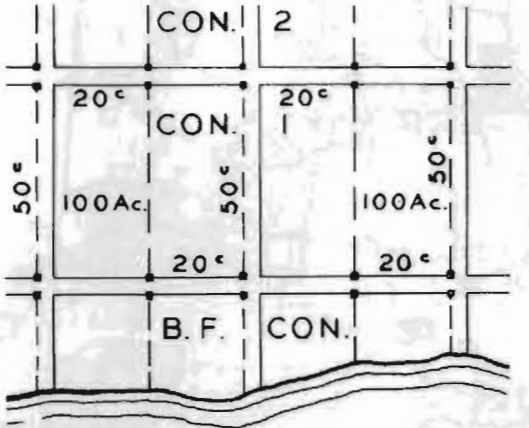
A "single front township" means a township where the usual practice in the original survey was to survey the township boundaries, the proof lines and base lines, if any, and the concession lines for the fronts of the concessions and to establish the lot corners on the front of each concession. The first townships of this kind to be surveyed were intended to be six miles square. The size of the lots and townships, however, varied from time to time, and no standard system appears to have been followed. The following may be noted as typical of several types of the single-front system:

- (1) Township seven concessions in depth and 25 lots in width with an allowance for road 40 feet in width in front of each concession. Lot measured 19.00 by 63.25 chains and contained 120 acres.
- (2) Lot of 200 acres measuring 19.00 by 105.27 chains with an allowance for road 40 feet wide in front of each concession and also every fifth lot.
- (3) Lot of 200 acres measuring 20.00 by 100 chains with an allowance for road one chain in width in front of each concession and also every fifth lot.
- (4) Lot of 200 acres measuring 20.00 by 100 chains with an allowance for road one chain in width in front of each concession and also every second lot.
- (5) In addition to the variations in the single-front townships surveyed during this period, there were a few townships surveyed under special circumstances which do not come under any regular classification. The Township of Sandwich on the Detroit River was laid out to accommodate the French settlers, and some of the townships granted to the Iroquois on the Grand River belong to this class.

The typical lot surveyed according to the single-front system is deep and narrow but, during the latter part of the period in which the system was in vogue, a number of townships were surveyed with lots 30 chains wide by 66.67 chains in depth, each lot containing 200 acres. In the year 1815, this was adopted as a standard lot size for a new type of township called the double-front.

Typical section of front-and-rear system,
1787-1813

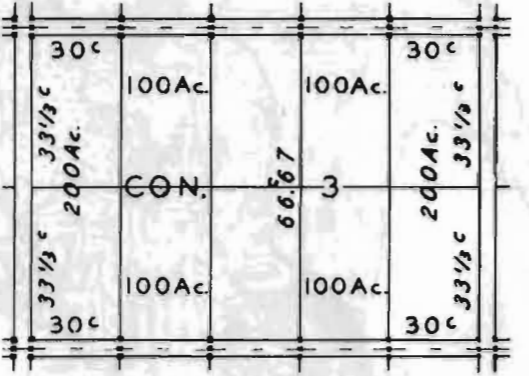
Original survey lines run on the ground are indicated by broken lines; original survey posts by small squares.



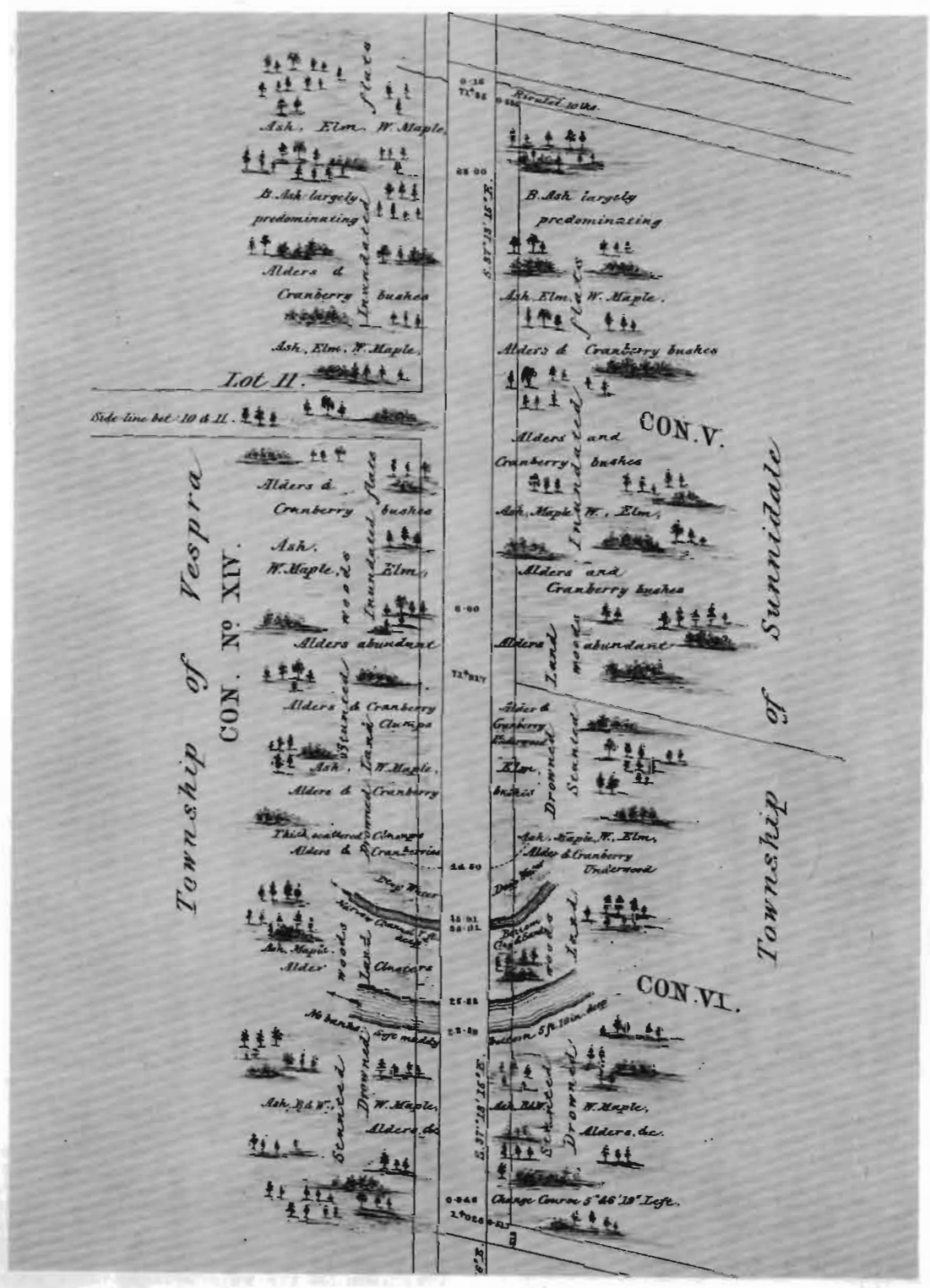
A "front and rear township" means a township where the usual practice in the original survey was to survey the township boundaries, the base lines, if any, and the side lines of the lots and to establish the corners of the lots. The lots contained 100 acres and measured 20.00 by 50.00 chains with an allowance for road one chain in width in front of each concession and between every other lot. This system entailed a tremendous mileage of survey line and, obviously, could not find continued favour with authorities owing to the excessive survey costs. There were only thirteen townships surveyed under this system; they are located in the Niagara Peninsula and comprise Barton, Bertie, Clinton, Crowland, Grantham, Grimsby, Louth, Niagara, Pelham, Saltfleet, Stamford, Thorold and Willoughby.

Typical section of double-front system,
1815-1829

Original survey lines run on the ground are indicated by broken lines; original survey posts by small squares.



A "double front township" means a township where the usual practice in the original survey was to survey the township boundaries, the proof lines and base lines, if any, and the concession lines forming the front



A typical specimen of the split-line method of recording surveyors' field notes. It simplifies and clarifies the work of relating measurements to topographical features. Introduced by Thomas Devine, Surveyor General of Upper Canada, this system was approved by the Government on April 2nd, 1859.

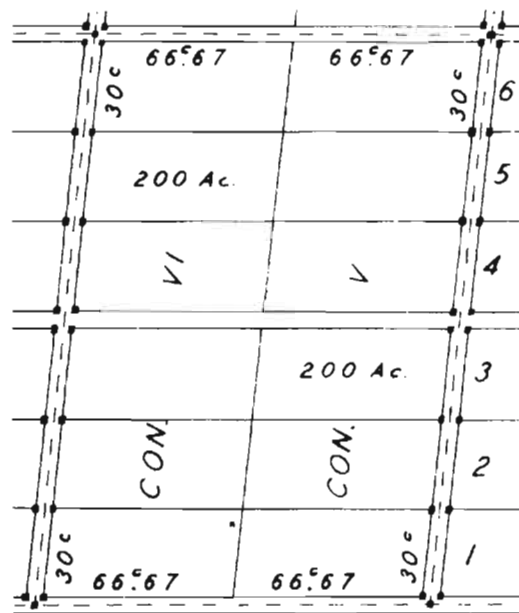
boundaries of the half lots and to establish the front corners of the half lots. Each lot contained 200 acres and measured 30.00 by 66.67 chains with an allowance for road one chain in width in front of each concession and every fifth or sixth lot. Generally, the survey lines were along the centre line of the concession road, which was sometimes posted, in addition, to lot corners; there were, therefore, in this case, three rows of posts. At about this time, 100-acre plots were allocated to settlers, and the Crown grants were generally made in one-half lots. In order that the settlers might locate their property limits for the back 100 acres, this double-front system of posting was introduced.

It will be noted that, in the township systems so far introduced, the actual survey lines extended from one boundary of the township to the other and no check or proof lines, by means of cross lines, were made. Residents in certain parts of Southern Ontario are familiar with the jogs occurring on the concession roads at the intersection of the side roads in single-front townships, or with the jogs which occur in the middle of the concessions in a double-front township. The reason for such jogs was that the side lines were drawn on the same course as the governing line (which is generally the township boundary at the end of the concession from which the lots are numbered) from the lot corner at the front of the concession in a single-front township, or from the lot corners at the front of each half-lot in the case of a double-front township. If there was any error in the measurement of each lot across the township in the original survey, such jogs were inevitable. To provide a check on the accuracy of the survey, an Order-in-Council was passed on March 27th, 1829, providing for the surveying of townships into sections or blocks by running in the original survey certain side lines between lots.

Typical section of 2,400-acre sectional system, 1829-1851

Sectional Township with Double Fronts

Original survey lines run on the ground are indicated by broken lines; original survey posts by small squares.



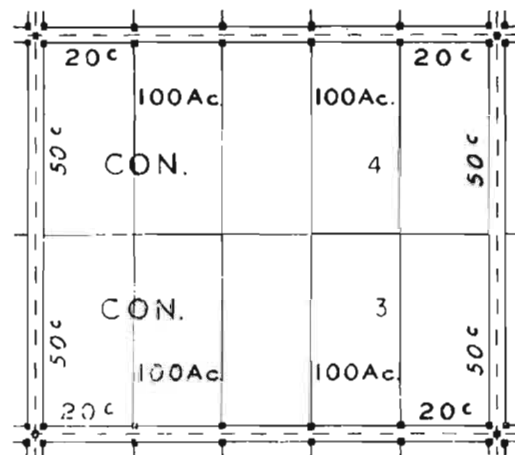
A "sectional township with double fronts" means a township divided into sections and lots where the usual practice in the original survey was to survey the township boundaries, concession and side lines of sections defining section boundaries and to establish the front corners of the lots and section corners.

The 2,400-acre sectional system adopted the same sized lots and the same method of planting survey posts as the double-front township system, with a road allowance one chain in width on every alternate concession line and every third lot line. The lines of survey were run in the centre of the concession road allowances and every other side road allowance, thereby establishing a check on the accuracy of the survey and creating a section of 2,400 acres containing 12 lots of 200 acres each. To compensate for the extra mileage in surveying a township under this system, only alternate concession lines were surveyed in the original survey. A jog would, therefore, exist in the lot corners at the unsurveyed concession line unless the original survey around the section was theoretically perfect. Instructions to survey townships of this type were authorized by an Order-in-Council dated March 27th, 1829.

Typical section of 1,000-acre sectional system, 1835-1906

Sectional Township with Double Fronts

Original survey lines run on the ground are indicated by broken lines; original survey posts by small squares.



Townships were first laid out by the 1,000-acre section system in 1835 by the Canada Company which acquired from the Government, among other lands, one million acres of unsurveyed territory, known as the Huron Tract, purchased from the Six Nation Indians. The lot measured 20.00 x 50.00 chains and contained 100 acres with an allowance for road one chain in width at every alternate concession line and every fifth lot line. The survey lines in the original survey were in the centre of the allowances for roads, thereby creating sections containing 1,000 acres with ten lots of 100 acres each. Survey posts were planted at the front corners of all lots. In or about 1850, this system was adopted for Crown surveys, except that the government introduced the placing of a one-chain allowance for road along the banks of rivers and lakes.

It may be noted here that in all subsequent townships of this and other systems (with a few exceptions, including that type of township where road allowances

were not laid out and 5 per cent was reserved for roads) an allowance for road was made along the banks of rivers and lakes. The 1,000-acre sectional system proved popular and was used in laying out townships extending from Georgian Bay to the Ottawa River. Some 200 townships of this type were surveyed, representing the largest area subdivided, up to that time, according to one pattern. Instructions to survey townships of this type were authorized by the Statutes of Canada, 12 Victoria, Cap. 35, 1849 as amended by 14-15 Victoria, Cap. 4, 1851.

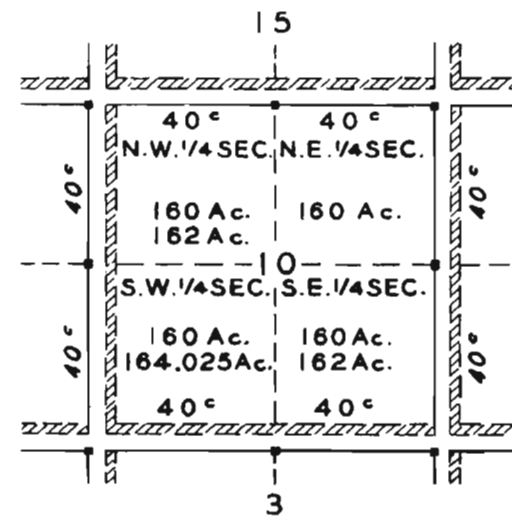
640-acre sectional system, 1859 6-mile square township

The American system of six-mile townships divided into sections and quarter-sections was experimented with by the surveying of a few townships along the north shore of Lake Huron, north of Sault Ste. Marie and also near Fort William. There are three distinct patterns of this type of township.

Typical Section of pattern 1 of 640-acre sectional system

Sectional Township with Sections and Quarter Sections, with Road Allowances

Original survey lines run on the ground are indicated by unbroken lines; original survey posts by small squares.



A township divided into sections and quarter sections with road allowances between sections means where the usual practice in the original survey was to survey the township boundaries and the section lines on the west and south sides of the road allowances and to establish the section corners and the quarter section corners on the surveyed lines.

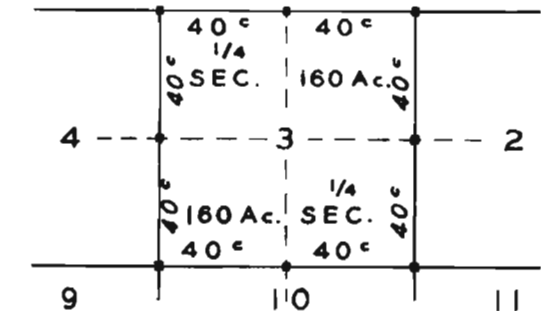
Pattern 1 was applied to those townships now within the province that were laid out by the Dominion Government prior to the settlement of the boundary dispute in 1882. They comprised 36 sections one mile square with an allowance for road one and one-half chains in width around each section. These sections were numbered from 1 to 36, starting from the southeast corner of the township, and were divided for patent purposes into quarter-sections of 160 acres. The survey posts were planted at the section and

quarter-section corners on the lines of survey which were the south and west sides of the allowances for road. The allowance for road was later reduced to one chain in width by legislation.

Typical section of pattern 2 of 640-acre sectional system

Sectional Township with Sections and Quarter Sections, Without Road Allowances

Original survey lines run on the ground are indicated by unbroken lines; original survey posts by small squares.



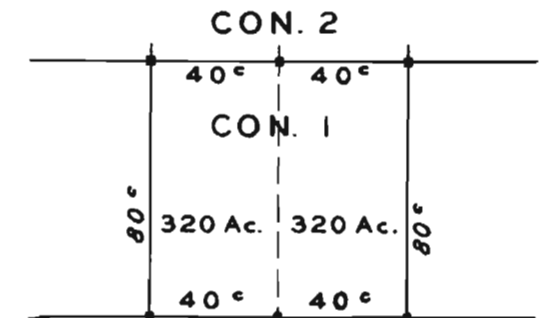
A township divided into sections and quarter sections without road allowances between sections means where the usual practice in the original survey was to survey the township boundaries and section lines and to establish the section corners and quarter section corners.

Pattern 2 includes townships of similar size laid out by the Province, but with no definite allowances for road, 5 per cent being reserved for this purpose. The boundaries of all sections were run in the original survey, posts being planted at the section and quarter-section corners. The sections were numbered from 1 to 36 starting at the northeast angle of the township. Patents were generally issued by the Crown for quarter-sections of 160 acres.

Typical section of pattern 3 of 640-acre sectional system

Sectional Township with Single Fronts

Original survey lines run on the ground are indicated by unbroken lines; original survey posts by small squares.



A "sectional township with single fronts" means a township divided into sections and lots where the usual practice in the original survey was to survey the township boundaries, concession lines and side lines of the

sections and to establish the front corners of the lots and the section corners.

Pattern 3 was applied to townships of similar size divided into concessions one mile deep, each containing twelve lots 40 chains wide by 80 chains in depth, with an area of 320 acres, 5 per cent being reserved for roads.

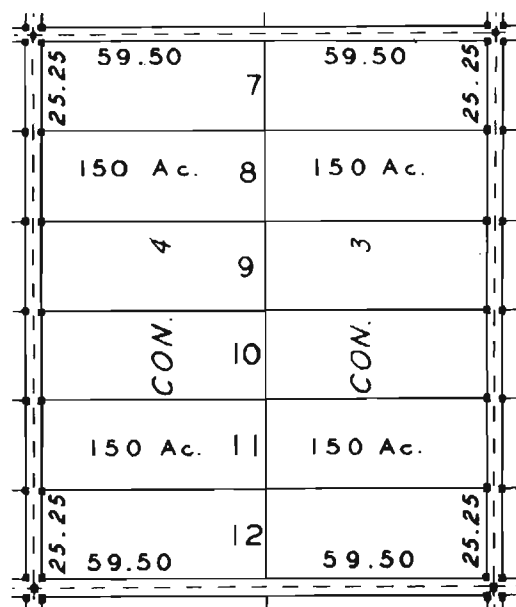
The survey posts were planted at the lot corners on the front of every concession, and each township is, therefore, single-front in principle. Thus, the framework of this type of township corresponds to that used in the western provinces and in the United States, but the essential design is actually a modification of the original single-front township system which was introduced in the first surveys made in the Province. This particular type of the 640-acre section system was used entirely in laying out townships in the northern part of Ontario, until the 1,800-acre section was introduced in the year 1906 for the Clay Belt region of Northern Ontario. The 640-acre section 6-mile township is still used by the government in laying out townships in the northern part of the Province, exclusive of the Clay Belt area. This type of township was intended to cover that part of the country which was generally unsuitable for agricultural purposes.

Typical section of 1,800-acre section, 1906

9-mile Square Township

Sectional Township with Double Fronts

Original survey lines run on the ground are indicated by broken lines; original survey posts by small squares.



Lots surveyed under the 1,800-acre sectional township survey measured 25.25 chains by 59.50 chains in depth. A township contains 12 concessions of 28 lots with an allowance for road one chain in width at each alternate concession line and every sixth side line and along the banks of rivers and lakes, thus creating sections of 1,800 acres each. The lines of survey were in the centre of all road allowances and the posts were

planted at the front corners of all lots and at the intersection of the survey lines. This type of township is a modification of the popular 1,000-acre sectional system laid out in Southern Ontario. Instructions to survey townships of this type were authorized by Order-in-Council, dated April 24th, 1906.

The method for surveying lot and concession boundaries not surveyed in original township surveys, and the method for re-establishing survey lines and lot or section corners surveyed in original township surveys, is governed by legislation under the Surveys Act.

Geographically, Ontario is divided by Lake Nipissing and the French and Mattawa Rivers into what is known today as southern and northern Ontario. In southern Ontario, owing to its irregular boundaries, no standard pattern was followed in the projection and orientation of townships. Many factors governed their orientation and size — such as military and colonization roads, Indian purchase limits, Indian Reserve tracts and the contour of Lake Ontario, Lake Erie and Lake Huron — with the result that we have a complex pattern of townships in old Ontario. North of the French and Mattawa Rivers, a regular, systematized pattern in the orientation of townships was followed, and boundaries were run on the cardinal points following either the 640-acre sectional system, or the 1,800-acre sectional system.

Southern Ontario, with a population of five and one-half million people, representing some 87 per cent of the total population of the province, contains a land area of approximately 49,000 square miles. With the exceptions of the Townships of Sproule and Preston and an area west of Mowat Township, this part of the province was completely surveyed into 588 township subdivisions within a period of about 100 years following the first township survey made in 1783.

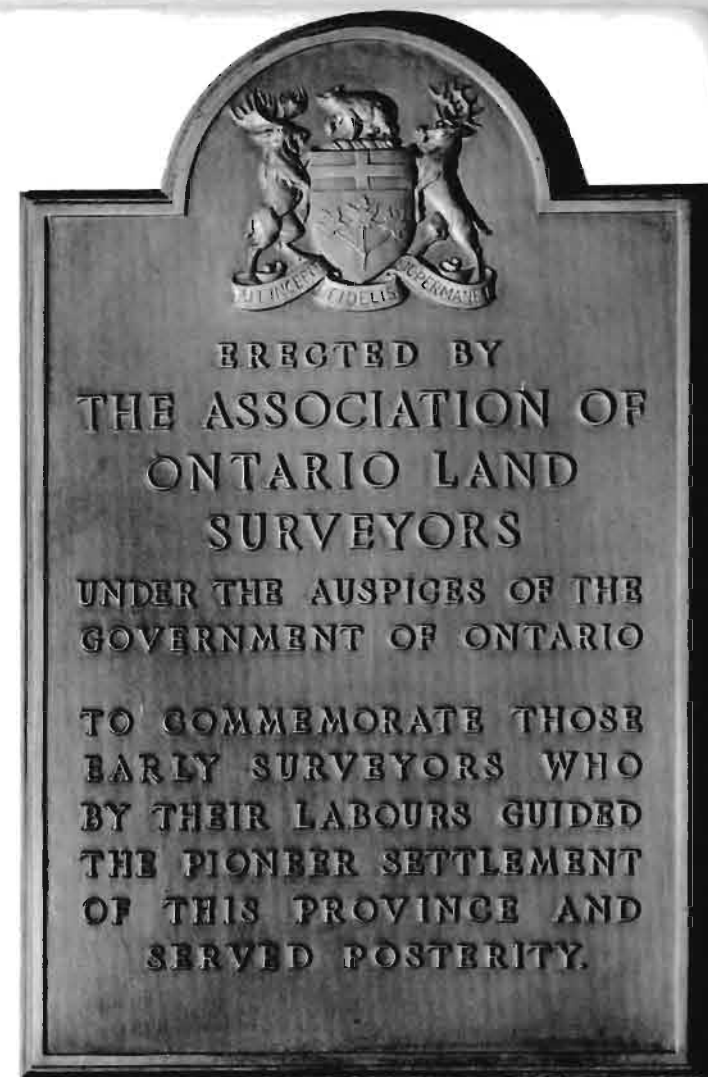
In the vast territory of northern Ontario, with a land area of approximately 296,000 square miles and a population of some three-quarters of a million people, there was little economic development up to seventy-five years ago.

A copper deposit had been worked at Bruce Mines on the north shore of Lake Huron from 1846 to 1876. Spectacular silver ore had been found on Silver Islet close to the north shore of Lake Superior in 1866, and mining was carried on until 1886. In 1885, the Canadian Pacific Railway was completed from Montreal to Vancouver. In 1883, copper-nickel ore was discovered in a rock cut on the railway near Sudbury. Lumbering operations were being carried on only along the north shore of Lake Huron and along the waters of the Ottawa River and its tributaries. A few settlers had made a start on the rich agricultural lands east of Sault Ste. Marie, but northern Ontario was largely unexplored and unknown.

In 1890, after legislation had been passed by the Imperial Parliament establishing the disputed western and northern boundaries of northern Ontario, the government appointed a Royal Commission to inquire into the mineral resources of the province; the tangible and definite knowledge placed before the Commission was limited but the possibilities were tremendous.

In 1900, the land surveyor was destined to play an important part in the development of the north for, in that year, the Ontario Legislature voted the sum of \$40,000 to be spent on exploration of the unmapped and unexplored regions of northern Ontario. Under this programme, ten exploration parties were sent out, each of which was to be in the charge of an Ontario land surveyor and to have a geologist and a land and timber estimator attached. The reports of these exploration parties were published by order of the Ontario Legislature, and the fact that they are still referred to sixty years later is symbolic of their importance. As a result of their publication, the Ontario government decided to build the Temiskaming and Northern Ontario Railway north from North Bay to tap the agricultural lands at the head of Lake Timiskaming.

In the fall of 1903, rumours of a spectacular discovery of silver and other minerals a few miles southwest of Haileybury, along the right-of-way of the new railway, appeared



Memorial tablet unveiled by the Lieutenant Governor of Ontario at the Parliament Buildings in Toronto on February 17th, 1937.

in the press. Prospectors and capitalists flocked in by the thousands, and the wildest era of speculative mining activity in the history of the province was under way. The townsite of Cobalt was surveyed at the scene of the strike which soon became known to the four corners of the earth. This speculative discovery of mineral wealth, which followed construction of the line now known as the Ontario Northland Railway, fired the imagination of the whole country which demanded more surveys and maps of the region for mining, settlement and lumbering purposes.

Today, 553 townships have been surveyed in this part of the province into lots and concessions, together with the boundaries of

1,474 unsubdivided townships, representing about 27 per cent of the area of northern Ontario exclusive of the Great Lakes. Besides these townships, some 4,500 miles of base and meridian lines have been surveyed, and in excess of 15,000 miles of lake and river survey traverses have been completed under the instruction and supervision of the Department of Lands and Forests.

During the years when most of these surveys were undertaken, neither railways nor aeroplanes were available to take the surveyor to and from the job, nor were aerial maps or photographs available to show the type of country ahead and water routes which could be utilized in transporting supplies. It was not considered out of the ordinary to spend one month travelling over land and water routes to get to and from the survey. When it is considered that a survey party of fifteen men needs about 3½ tons of supplies to feed them for 100 days, one begins to realize the physical work attached to this type of surveying.

To commemorate these early surveyors, a bronze tablet was placed in the main-entrance corridor of the Parliament Buildings, Toronto. This was unveiled by His Honour the Lieutenant-Governor on February 17th, 1937, on the occasion of the fiftieth anniversary of the Association of Ontario Land Surveyors.

Unfortunately, over the 120-year period between 1783 and 1903, only wooden survey posts were planted, generally speaking, to mark and perpetuate the position of original survey lines and survey corners. When it is considered that 80 per cent of the township subdivisions in Ontario were made during this period, it can be realized that the majority of the original survey monuments have disappeared.

In 1903, the necessity of planting more permanent monuments was given consideration; the government survey instructions to surveyors stated that wrought-iron posts were to be driven into the ground at each angle of the quarter-sections of a six-mile township, making a total of only nine posts. Proportional numbers of these posts were to be

planted at section corners of townships of other types of the sectional system of subdivision. During the period between 1903 and 1914 when iron posts were thus used, 18 per cent of our townships were surveyed. From 1915 to 1920, the same type of iron post was used, but the number to be planted was increased; generally speaking, they were placed at three-mile intervals on each survey line.

The year 1920 found the Department of Lands and Forests considering more modern methods of perpetuating original Crown surveys from the standpoint of permanency and re-identification on the ground. A new type of monument was adopted. It consisted of a concrete-filled iron post, about one inch in diameter by 30 inches in length. This post is fitted into a circular iron flange at the bottom and a circular bronze plate at the top. Each post, when planted, is identified either by a rock cairn or by pits and mounds. In the case of a survey corner coming on solid rock, a hole is drilled into the rock and a short metal post, with the same circular bronze plate, is cemented or leaded in. These types of survey monuments are being used by the Department at the present time in the surveys of base and meridian lines and township surveys. Survey monuments are now placed on base and meridian lines at one-mile intervals and at lake and river crossings as well as at the top of high rock ridges. In township surveys, such monuments are placed at each township lot corner on the surveyed lines.

Retracement Surveys

All grants of land, deeds, transfers, mortgages, or other instruments relating to real estate in the province, are either directly or indirectly referred to and governed by the position of survey lines and survey monuments as established in the original township surveys under authority of the Crown.

Over the intervening years since the original township surveys were made, no adequate provision has been made for the maintenance of the original township survey fabric, either on a provincial or municipal level. Unlike

roads, highways, bridges and other municipal works where funds are usually provided annually for maintenance and replacement work, the matter of providing annual funds for maintenance of surveys has been sadly neglected. Unfortunately, the majority of people do not appreciate the value of maintaining the boundaries of an original survey because they do not understand the complications which can arise in the future with respect to land boundaries resulting in expensive resurveys and lawsuits.

The effects of time, fires, settlement and lumbering operations have taken their toll. Unless the settler or the land owner has protected and maintained the original survey boundaries of his land, the evidence of the original survey in many of the townships in this province has disappeared.

Retracement surveys to re-establish the boundaries and corners of original surveys are both difficult and expensive. The difficulties encountered in locating evidence of the original survey and the ensuing costs increase in proportion to the elapsed interval of time between the original and retracement surveys. At least one half of the cost of retracement surveys can be attributed to the amount of time spent in an effort to locate evidence of the original survey. Retracement surveys, on a moderate scale, have been made by the Department of Lands and Forests over the years, but much remains to be done to re-establish the boundaries and corners of original surveys made under the authority of the Crown over a period of some 150 years.

The importance of the early surveys made in Ontario is recognized by Section 4 of an Act passed by the Legislature of Upper Canada (38 Geo. III, Cap. I), which reads as follows:

"And be it further enacted by the authority aforesaid. That if any person or persons shall knowingly and wilfully pull down, deface, alter, or remove any such monument so erected as aforesaid, he, she or they, shall be adjudged guilty of felony

and shall suffer death without benefit of clergy."

The death penalty for an offence of this kind was later modified to a prison term, and Sections 383 and 384 of the Criminal Code of Canada quotes the following:

Section 383 "Every one who wilfully pulls down, defaces, alters or removes anything planted or set up as the boundary line or part of the boundary line of land is guilty of an offence punishable on summary conviction."

Section 384 (1) "Every one who wilfully pulls down, defaces, alters or removes

(a) a boundary mark lawfully placed to mark an international, provincial, county or municipal boundary, or

(b) a boundary mark lawfully placed by a land surveyor to mark a limit, boundary or angle of a concession, range, lot or parcel of land, is guilty of an indictable offence and is liable to imprisonment for five years."

(2) "A land surveyor does not commit an offence under subsection

(1) where, in his operations as a land surveyor, he takes up, when necessary, a boundary mark mentioned in paragraph

(b) of subsection (1) and carefully replaces it as it was before he took it up."

It is the common knowledge of surveyors that the average layman does not appreciate the time, effort and cost to establish or re-establish a lawful survey mark and has no knowledge of the penalty imposed by the Criminal Code for the removal of survey monuments. In land development schemes and in land settlement, survey monuments are continually being defaced, altered or removed. From the standpoint of protecting and maintaining the boundaries of land we should recall the Roman God Terminus (the God of Landmarks) and take cognizance of the ancient civilization of Egypt, the ancient culture of the Greeks, and the laws of Rome, all of which recognized the great value and sanctity of the boundary mark.

Historical Surveying Instruments



Elizabethtown.
June 22d, 1814.

Thomas Ridout, Esq.,
Surveyor, General.

Sir:

Please to allow me the pleasure of informing you, that tho, the unhappy and unjust war declared against this country by the United States, which is the source of so many evils, and has likewise presented my being much employed in the Surveying business, yet such Surveys as I have been called on to perform, appear to give general satisfaction, and produce a conviction that the method I pursue, is the only one that has ever been adopted in this part of the Province, that can be depended on. I have been sometimes required, after having run the side lines of a lot, to measure accurately across on the front and on the rear of the lot, and the greatest difference I have yet found, does not exceed eight inches, and from that down to five, three, etc. I confess I have been surprized to find them come out so true, as it would be difficult to determine, whether such small differences, is owing to the unavoidable inaccuracies in measuring, or the want of parallelism in the lines.

I have finished my Theodolite of twenty-five inches in diameter, and have used it occasionally for about a year. I find its utility and accuracy to exceed my utmost expectations. — I

Top: Theodolite, circa 1830, used for sighting lines and measuring horizontal and vertical angles.

Centre: Circumferenter or sighting compass with staff head, used by surveyor in 19th Century.

Left: Transit-compass, circa 1855, used for sighting lines.

PROBLEMS OF A SURVEYOR IN 1814

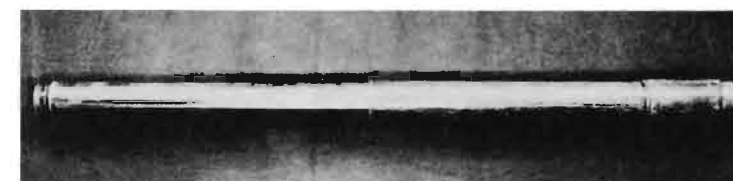
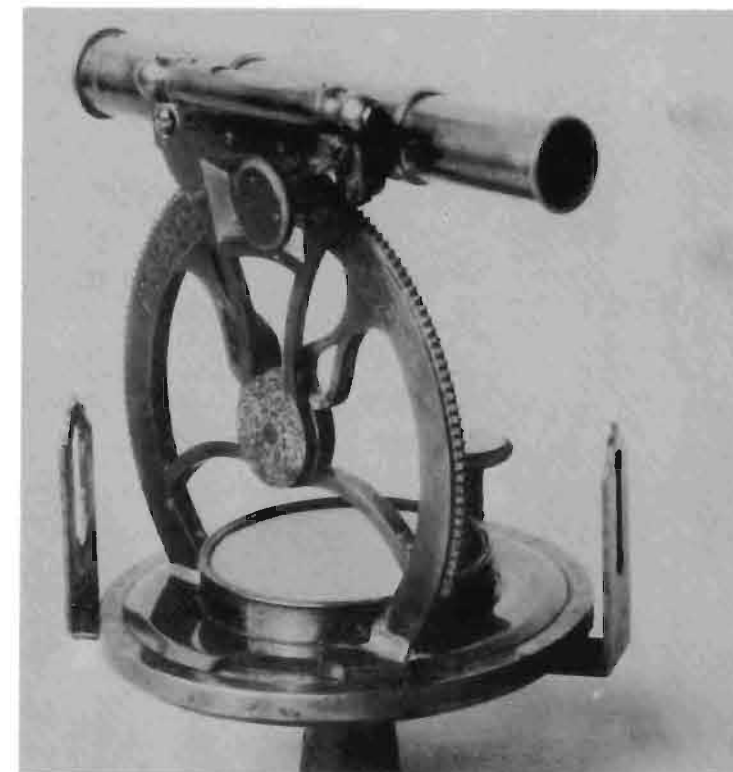
graduated the limb to half degrees, and the Nonius shows half minutes. — Instead of a ball and socket, I constructed rackwork, which proved to be comparably better. — I beg leave to mention one instance as a proof of the accuracy of the workmanship, namely, altho' the instrument is so large and the graduation marks very small indeed, nevertheless, when the line of Collimation on one end of the index is set exactly to any degree on the limb, the line of Collimation on the other end of the index agrees as exactly with the opposite degree on the limb as if it had been set to it, on reversing the index, it is equally exact at both ends — This instrument was my first attempt to work in metal: I never saw anything of the kind done, not so much as the fusing of an ounce of Brass till I did it myself. — The instrument stands me rising of Fifty Pounds.

I am very anxious to obtain a good magnet, or loadstone, but have not been able as yet to procure one. My object is to try an experiment to determine Longitude, without having reference to time, or celestial observations. If it would not be asking too much, I would be highly gratified if you could furnish me with one, and I would with

Top: Theodolite, circa 1780. Photo by courtesy of The Smithsonian Institution.

Centre: Rochon micrometer, a graduated telescope used to measure approximate distances for mapping purposes in 19th Century. Photo by courtesy of Geological Survey of Canada,

Right: Gunter's Chain — 100 iron links which measure 66 feet — invented by Edmund Gunter of England in early 17th Century and used by surveyors until late in the 19th Century.





An original survey-line tree post in Tiny Township, Simcoe County. The "XX" marked on it, probably in 1823, was still distinguishable when it was replaced in 1946 with a Crown Lands Iron Post.

great pleasure, if I should be successful, communicate to you the result. You may perhaps consider me a visionary, and perhaps I am so, but, important discoveries have been made by simple means, and sometimes by accident.

Please to inform me whether as a Deputy Surveyor I am authorized to administer Oaths to chain carriers or to such persons as may be called on to prove where an original monument, or corner post had been placed. I have sometimes seen considerable inconveniences in these respects, not having presumed to assume an authority I was not sure I had a right to, altho' other surveyors have made no scruple to administer such Oaths. It would frequently be of material advantage to the inhabitants if surveyors were invested with such authority, as it would prevent the necessity of sending a number of miles for a Magistrate, while the Surveyor and hands are idle, at the expence of the employer.

The bearer of this Mr. Nehemiah Seaman is a worthy honest respectable and loyal inhabitant of this place. His business at York, is to obtain a deed for his land that he purchased a number of years ago, and has had peaceable possession of, and lived on ever since. He has to apply to the Land Commission under the Devisee Act. — If you should think proper to assist, and direct him how to proceed, you would greatly oblige him, and gratify me, as he is a very deserving man and much esteemed by those who know him. — I hope you will have the goodness to pardon me for trespassing so much on your time and patience. Ever pleased and happy to receive Your Commands, I am

Sir, With the highest Considerations of
Respect, and Esteem,

Your Most Obedient, and
Very Humble Servant.

"Robert McLean"

Depy. Surveyor.



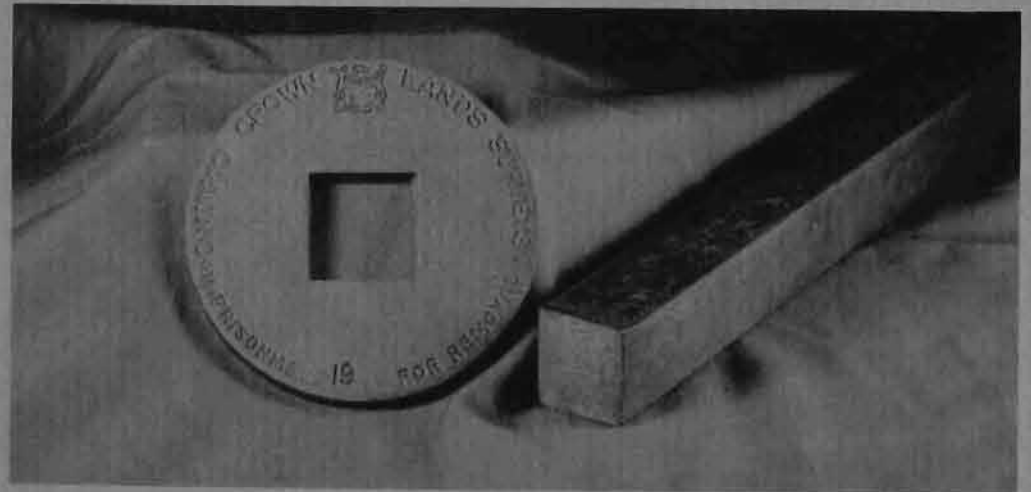
Section of a hemlock bearing tree removed during the resurvey of a township boundary line. In the 40 years since the original survey, the hemlock had grown over the letters, 'BT', carved on a blazed portion by a 'timber scribe' (beside section). Two or more bearing trees, selected for referencing purposes at every survey corner, are invaluable in re-establishing the position of the corner in retracement surveys.

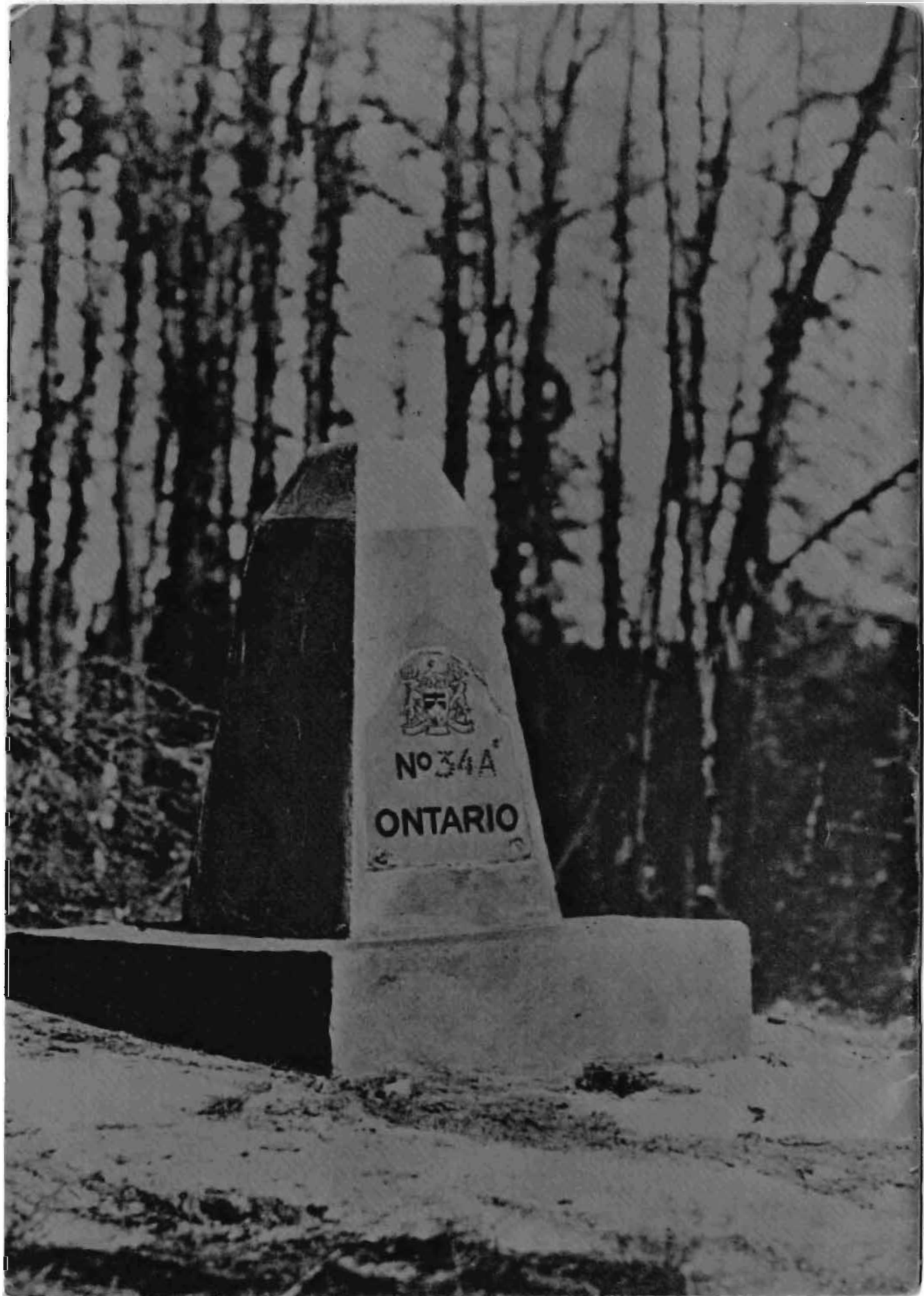
Deputy Surveyor McLean's theodolite may have been the first built in Ontario. He began its construction about one year after his appointment on February 12, 1811, for the given reason that he could not purchase any here that suited him. Robert McLean never attended school, nor could he write his name at 17 years of age.

In February, 1791, John Collins, Deputy Surveyor General, advised the Land Committee that the Government did not possess any good surveying instruments but that he and his deputies had "good, horizontal theodolites". Mr. Collins, himself, owned a Rowley. Six of the best, improved "horizontal theodolites", sent from London, England, in 1785, were acquired by surveyors at Gaspee, Chaleur Bay, St. Thomas, Detroit and Kingston, and by Mr. Collins' son. Three more were received in 1789 and another three in 1791.



Crown Lands Rock Post (left) and Standard Iron Post (right) of the type used in government surveys in Ontario since 1920. The penalty for the removal of the Rock Post or the bronze plate on the Iron Post has been reduced from seven to five years of imprisonment. Below is the Crown Lands Short Standard Iron Bar, one inch square and 24 inches long, with "L&F" stamped on one side at the top to denote a Crown, Lands and Forests Survey. It was introduced in 1960, four years later than the Crown Lands Standard Iron Bar (bottom), one inch square and 48 inches long, which is driven through the bronze cap. BACK COVER: a typical example of the concrete monuments erected on the Ontario-Manitoba and Ontario-Quebec boundary lines.





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