

SURVEYS

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When I was a very young surveyor, I attended a luncheon of our Association at which the late Mr. Justice Riddell was the guest speaker. In his talk, the judge congratulated the surveyors on the fact that our work was based on the trustworthy foundation of mathematics and that we had, as tools, instruments of the precision of transits, levels and steel tapes. He contrasted our position with his, where it is necessary to assess the integrity of men and to try to follow the convolutions of the human mind. The judge spoke the truth. He told nothing but the truth. The whole truth is not quite so simple, however, and I have enough respect for the acuteness of Judge Riddell's mind to be certain that he was perfectly aware of this.

I know that you are here to find something of immediate practical use in your day to day problems. So, before we pursue Judge Riddell's thought further, let us review some of the questions most frequently asked of surveyors by their legal friends.

One of the most frequent is, "How much does 'more or less' cover?" My answer always is, "From the surveyor's standpoint, if found in a description, it must cover enough to reach from the fixed point at one end to a specific point or line at the other end." If the two ends are not firmly fixed or identifiable "more or less" should not appear at all. "One hundred feet more or less to a point" is worthless. Where the ends of the line are identified, a court may hold that the discrepancy between the nominal distance and the actual distance is so great as to strike at the validity of the whole transaction. A surveyor has no such option, he must read the phrase literally.

A more difficult question concerns use of the phrase in the preparation of a description because, in one sense, even the most precise of survey measurements are approximations.

We say the distance between two lot corners is 40 feet. Suppose we discover and pin-point the lot corners to the thousandth of an inch. We still have the problems of actual measurement. Let us say that we can measure the distance with infinite accuracy, which is absurd, the result is still only correct to the order of one thousandth of an inch. A

scientist who requires the distance to ten thousandths of an inch considers that for his purpose the distance is still 40 feet more or less in spite of all our efforts and so on *ad infinitum*. In practise, however, we don't show "more or less" on a plan unless we believe that the error is more than considered probable by good practice. Obviously, consideration must be given to circumstances. I might show a distance of ten feet from a stake to the crest of a hill but unless the break is sharply defined, I should not be greatly disturbed if another surveyor reported the distance to be eight feet or even less. That is true even if neither surveyor noted the distance as "more or less".

On the other hand, if one surveyor shows a measurement of five feet from a building to a lot line and another shows four feet at the same location, either there is a difference of opinion as to the true position of the lot line or at least one of the plans should have shown the distance as "more or less".

The latitude given by more or less should normally bear some relation to the value of the last significant figure in the measurement. Two hundred feet more or less suggests much less in the way of accuracy than two hundred feet, three and one half inches more or less. Sometimes, however, it is difficult to avoid a misleading appearance of accuracy. For instance, a plan shows 1106' 3" from a road to an iron bar near a river and then 90' more or less from the bar to the centre of the river. The total distance road to centre of a river is probably going to appear as "one thousand, one hundred and ninety-six feet three, more or less" in a surveyor's description. This, in spite of the fact that no attempt has been made to locate the centre line to an inch.

"Opposite"—"Parallel"—"Production"—"Centre line"—are four words which often cause trouble.

Take the phrase used to locate a point of commencement—"opposite the centre line of wall". Should we fix the point of commencement by:—

- (a) producing the centre of wall to the street line?
- (b) intersecting the street line by a line drawn parallel to a lot line through the near end of the wall?
- (c) proceeding to the street line on a line at right angles to the street?

(d) reaching the street on a line at right angles to the front of the building? (In this connection consider the case of a curved street line).

Any word that is capable of four interpretations is surely out of place in a description. Yet cases occur in which supplementary information indicates that any one of these interpretations was intended.

In plane geometry, we are all familiar with Euclid's definition of parallel straight lines. The ancient mathematician says nothing about how we may discover if non-straight lines are parallel. Let us draw a circle. Do we obtain a parallel line by increasing the radius and drawing another line outside the first? Or do we hold fast to our radius and merely shift the centre? The former method at first blush may seem the answer but as much logic lies behind the second solution. Where the first principle is intended we can, however, in the case of circular curves speak of concentric lines and avoid any ambiguity.

The use of the word parallel is avoided and the required result was obtained in the following description of an irregular line:

"Commencing at the point where the production easterly of the southerly limit of Block A would intersect a line drawn so that each point therein is distant 300 feet from the nearest point in the high water mark of Lake Superior.

THENCE in a general northerly direction following the windings and turnings of the said line, etc."

If you want to test your ability to write plain and unambiguous English try writing a foolproof description other than by metes and bounds of a strip of land 20 feet in width bounded by a series of straight lines on each side. It sounds simple, but it is really very baffling.

Apparently in many minds the production of a line means only the extension of the line in the same general direction as that taken by the line itself. Hundreds of descriptions have expressions such as "Thence westerly along the production of the said centre line of wall parallel to the north limit of the lot." If the centre line of wall is straight there can only be one true production. The clause "parallel to the north limit of the lot" introduces an entirely foreign factor

which may, and probably will, conflict with the production. To further complicate matters such a description frequently terminates the course at a fixed point in the rear of the lot. It is a happy coincidence if either the production of the centre line of wall or a line parallel to the north limit of the lot actually strikes the designated point in rear. The surveyor has no judicial functions and in case of such conflict, he can only plant his post in accordance with what he conceives to be the true intent of the parties and report the contradictions in the description to his principals. The established occupation along the boundary, however, very often gives guidance, and it is reasonable to bear in mind that if we adhere to the described point at the end of the course then no other course need be modified.

Still keeping to problems arising from attempting to produce centres of walls, the wall may have a bend or a jog in it. Generally speaking it appears logical to produce the last part of it rather than to produce the straight line joining the two ends, but if the jog or bend is small or hidden the production of the straight line joining the ends is usually intended.

The Territorial Division Act, R.S.O. 1950, c. 388, introduces a slightly different problem in productions. It states that the boundaries between townships extend into the Great Lakes on the productions of the lines dividing the townships. A number of years ago, the owners of the Palace Pier in the Township of Etobicoke near the mouth of the Humber applied for a water lot extending a considerable distance into Lake Ontario. The whole boundary between the Townships of York and Etobicoke (exclusive of the part in Lake Ontario) is defined by the River Humber and of course the boundary is quite irregular. It was at once apparent that, because of the direction of the lake bank at the pier site, a water lot running out normal to the bank of the lake for the proposed distance would cross the extended township boundary; a matter of some importance for policing and assessment. Old plans were consulted to fix the original mouth of the Humber and the mile to the inch government map was used to determine the direction of the straight line joining the Humber mouth with the north end of the boundary between the townships. This line was then projected into the lake and the intersections with the proposed water lot calculated.

Because of the fact that the whole boundary between York and Etobicoke, north of Lake Ontario is defined by the River Humber, there was no hesitation in choosing a procedure. But suppose the south half mile had been defined by a survey line. The problem would be, should the straight line joining the township corners be produced or should the bit of survey line be used as the basis for the production? I still do not know the answer to that one.

Determining the centre line of a symmetrical structure as a rule presents problems of a mechanical nature only, but take the case of a wall originally constructed as an outside wall with the outside wall with the outside face running straight up. The wall starts with a 24 inch foundation width and narrows successively at each floor above to 18 inches, 13 inches and 9 inches. If this becomes a party wall with the property boundary described as the centre line of wall then a problem does arise. Granted that the surveyor is dealing with a portion of the earth's surface and the rights in the upper part of the wall are not his concern. Where should he make the division? It can be argued that if the foundation wall extends above the normal ground level, then the division line should run through the centre of the foundation wall. There is another way of looking at it. From the building standpoint, the basement is a sub-surface part of the structure and the division wall in the main floor is the essential division between the holdings. This is the viewpoint we take and I do not recall it ever being challenged.

Recently we were instructed to survey a building in West Toronto which had been divided into two stores. The titles were to be separated. The basements were divided by a brick wall. The main floors were separated by a six inch frame wall, which was about ten inches west of the brick wall. The second storey was divided by another frame wall but this wall had a jog of about two feet in it. One part was on one side and the other part was on the other side of the wall below. When the conditions had been pointed out to the owner, he instructed us through his solicitor to divide the fee at the centre of the ground floor wall and to provide the appropriate easements in the basement and second storey. We wrote a description which we think adequately described the physical extent of the easements but we feel in such cases any expressions used by the surveyor to describe the nature of the easements should be reviewed by the solicitor.

Bearings are a useful tool in descriptions of land. The conventional way of expressing them provides a difficulty for many people, however. Take N.48°W. The direction north claims attention first, then a figure representing an angle and finally another direction. If there are any here who find that the usual expression is slow to register, I suggest that they try the effect of a re-arrangement. Remove "north" from the beginning and put it at the end behind the preposition "of" so that we have 48°W. of N. To me, the figure 48 then assumes its proper importance and the two directions act as a team instead of fighting one another.

Unfortunately, while a foot is always a foot and a yard is always a yard, N.48°E. may mean different things in different circumstances. For example, the directions N.16°W. and N. 74°E. are very familiar to all who deal with titles in the Toronto area. They are the directions in which the boundaries of the township lots were intended to run. In the seventeen nineties when the townships in this area were surveyed, the surveyors ran all their lines by compass, an instrument lacking extreme precision. The compasses were supposed to be adjusted so that they pointed to the true north instead of the magnetic north but there were local variations in the pull of the compass and other hazards of which proper account was not or could not be taken. It is merely coincidental if, judged by modern standards, one of these lot boundaries runs in precisely the direction called for in the patent. Suppose then, we have a description "commencing at a point in the west limit of a lot 300' from the southwest angle: Thence N.74°E. 100'; Thence N.16°W. 200'; Thence S.74°W. 100' to the west limit of the lot; Thence S.16°E. 200' to the point of commencement". We know that the west boundary of the parcel must follow the lot line regardless of the stated bearing. We can deduce from the measurements that the east boundary is parallel to the west boundary. When it comes to the north and south boundaries the surveyor is at a loss. Should he run the lines parallel to the north boundary of the lot or parallel to the south boundary of the lot or should he run them at right angles to the west boundary? Perhaps they should be run on the true astronomic bearings of N.74°E. and S.74°W. There are court precedents for the last alternative, though there is generally some clue pointing to one of the other solutions.

The use of a governing line for bearings avoids such

uncertainty. This means that some line at or near the parcel is assumed to have a particular bearing and the bearings of the courses of the parcel boundary are obtained by measuring or computing the angle they make with the governing line. The governing line is generally, though by no means always, one of the boundaries of the parcel and should be a line of permanent nature. The assumed bearing of the governing line may be arbitrary or it may be based on old records or upon astronomical observation or even upon magnetic readings. An astronomical basis has two great advantages:

- (1) If the governing line is lost, the parcel boundaries can be re-established provided any one point on the boundary can be identified.
- (2) The bearings of the boundary lines conform with those of any adjoining parcels which also have an astronomical basis.

Obviously the governing line must be identified on the plan or description.

Technically there is no reason why we should not speak of a bearing as E.30°N. instead of N.60°E. and in rare occasions we find it is designated in registered documents. The use is so unusual that, when it is encountered, one instinctively wonders if a mistake has occurred.

Another method of recording direction is to state the angle the line makes with the north point measuring the angle clockwise for the full 360 degrees, if necessary. Some of the subdivision plans laid out by the Toronto Harbour Commissioners are marked in this way. The system is simple and possesses some decided advantages over the one usually used but it has never caught fire in this area.

For small parcels of land having a limited width east and west, we can use the expression "All bearings hereon are astronomic". If the width is not greater than say half a mile, any uncertainty will, in most cases be within the precision of commercial surveys. Plans of highway, railway, transmission lines and pipe lines, surveys of townships, etc., however, often extend for considerable distances. This introduces a factor we call convergence of meridians. I may stand under a signal tower and find that another tower some miles away is due east of me but if I go to the second

tower and look back at the first, I shall find by my instruments that it is appreciably north of west. Simply, this is because, in each case, we have obtained the direction of the line between towers by measuring the angle to the other tower from a true north and south line passing through the observer. These north and south lines (meridians) are not parallel but all meet at the pole. Look at a map of Canada. The Alberta-Saskatchewan boundary and the northerly part of the Ontario-Quebec boundary are both meridians but they are evidently not parallel. Obviously, the highway or pipe line survey plan cannot show more than one bearing for the same line so we see on the plan a notation "Bearings hereon are referred to the meridian through the south-west angle of Lot 6, Conc. 3 etc."

At the latitude of Toronto, if the reference meridian were through the first tower and the towers were eight miles apart then a true north line through the second tower would be shown on the plan as N.0° 06'-30" W.

One of your members asked me to comment on the growing trend to use only figures in description instead of writing out the dimensions in full and in particular he asked whether I thought the use of the common symbols for feet and inches instead of the words themselves or recognized abbreviations was justified. I suppose we all tend to become conservative as we grow older but I have to admit that survey plans now seldom or never show anything but the figures followed by the appropriate symbols for feet and inches. Perhaps experience will show that any dangers in the use of the shorter forms are largely imaginary. I can recall no instance where confusion has arisen because of the use of symbols for feet and inches on plans. The use of the same forms in descriptions as on plans would appear logical and the use elsewhere is so general and notorious that no ambiguity would seem to be involved.

We sometimes encounter the admonition that a survey shall be done in accordance with the provisions of *The Surveys Act*. Many have the mistaken idea that *The Surveys Act* covers the whole field of land surveys. The Act specifies certain equipment the surveyor must have. It tells him, he must preserve a record of what he has done. It supplies him with the power of legal entry in the course of his duties including entry into buildings. He can administer the oath to anyone testifying regarding a boundary. He is supplied

with machinery to obtain evidence by subpoena. When it comes to telling him how he is to make his survey however, it confines itself to specific fields. It is true the surveyor will seldom make a survey which is entirely clear of one of the fields covered by the Act. Nevertheless, there is this definite limitation in the Act.

What fields then, does the Act cover?

- (1) It confirms the township and other surveys made for the Crown declaring that the lines run and posts planted define the true and unalterable boundaries of the several parcels laid out.
- (2) It provides rules for completing such Crown Surveys. (Many lot boundaries were not run in the original survey.)
- (3) It instructs surveyors how to repair such surveys in case original marks are destroyed or lost.
- (4) It provides rules for making certain divisions of township lots.
- (5) It validates the first survey of lands sold in bulk by the Crown.
- (6) It confirms the surveys of plans of subdivision filed under *The Registry Act* or *The Land Titles Act* and declares that the actual work done in the field overrides plan dimensions.
- (7) It instructs surveyors how to repair or complete such subdivision surveys (general rules only).
- (8) It provides machinery for official re-surveys of lines originally established under the Act. These are known as Municipal surveys.
- (9) It declares that unless otherwise provided the fractional part of a parcel is the fractional part of the area.

The last item is the only one that is given a universal application. All the other instructions cover lots or other parcels shown on Crown surveys or on plans filed under *The Registry Act* or *The Land Titles Act* or cover lines which are related to them in specific fashion.

The Act says nothing about the broad field of metes and bounds descriptions or of how boundaries defined in that way are to be established. Probably any attempt to do so would be futile. We have already looked at a number of problems which the surveyors may encounter when tracing

out a metes and bounds description. How about general legal principles for his guidance? No doubt, as part of a contract, the description is subject to the same rules of interpretation as any other part of the contract, and you are the specialists in that. During the course of years, suggestions have been made to me by members of your profession.

If in doubt, the description should be construed against the vendor.

In general, a metes and bounds description is ineffective where it goes beyond the lots mentioned in the preamble.

In case of contradictory clauses, the first clause governs.

These are principles that I have had quoted to me but I suspect there must be a latin maxim to the effect that circumstances alter cases and the surveyor in a typical case will concern himself primarily with trying to discover what the parties really meant.

For engineering and mathematical purposes, it is better to divide the foot into decimals than to divide it into inches and fractions and all of you have become familiar with plans of the Department of Highways and plans of other organizations prepared on the decimal system. In some parts of the province, indeed, most survey plans are prepared in this way. An attempt was made by Toronto surveyors about the beginning of the century to introduce such plans into general use here but it met with so much opposition from architects, builders and the general public (perhaps even lawyers) that it was abandoned and so far has not been revived locally on any widespread scale other than in organizations where the engineering use is important.

Town and country indulge in a constant battle over the use of feet on the one hand and chains, rods and links on the other. Each system has very real advantages in its own sphere but with the decline in proportion of the population properly classed as rural, the city cousin is expanding the use of his system into the back concessions. Summer cottage lots, for example, are almost always dimensioned in feet, and most farm surveys are reported in the same way. One of the obvious advantages of measurements in chains was that if we multiplied the length by the breadth we obtained the area in acres simply by dividing by ten. It is not so generally known that multiplying the square foot area by 23 and

dividing by 1,000,000 gives the area in acres correct to within less than 2/10ths of 1%. This provides a quick check for computations made by precise methods.

Many of the most difficult survey problems are inherent in the very basis of *The Surveys Act*. Perhaps I should say that they are inherent in every idea of permanent division of land, in a dynamic economy.

Let me illustrate. During the summer of 1793, Governor Simcoe sailed from his headquarters at Niagara-on-the-Lake and set up his famous tent home on the shore of Toronto Bay. He brought with him soldiers to create a defensive position and civilian artisans who in the next few years built houses, mills, wharves, warehouses, even a jail. He also brought with him Alexander Aitken, land surveyor. Simcoe instructed Aitken to lay out a small townsite on the north shore of the bay at what is now the foot of Sherbourne Street. This was done and we have the beginnings of the Town Plan of York.

Simcoe's fort, all those first houses, mills, wharves, warehouses have long since disappeared but the posts planted and the lines run through the forest by Alexander Aitken are still the foundation of land ownership in the ancient townsite. This is no isolated instance. The posts planted and landmarks established in the original surveys of all the townships of the province as well as in the original surveys for all our registered plans mark the true and unalterable corners of the lots involved.

I am not criticizing the principle. No alternative would escape other difficulties at least as formidable but I would point out that the surveyor, even with the best will in the world, can only establish a limited number of points on the ground. These landmarks are exposed and vulnerable. It seems inevitable that a large proportion of them will shortly disappear. A comprehensive programme of continued maintenance and repair, while relatively not expensive, seems to have been beyond the vision of public authority and only limited and spasmodic efforts to save the survey fabric have ever been made, by province or municipalities.

Equally grave is the problem of obsolescence. I have no reason to suppose that Aitken used anything less effective than the normal equipment and skills of his day. At the best

his equipment and methods gave results appropriate to the standards of the place and times. To have looked for quarter inches or even inches would have been economically out of reach even if it had been feasible otherwise. How could Aitken have justified to the governor and council money spent for that purpose?

Yet today, in these same blocks, owners do expect to be told their boundaries to the quarter inch. The most expensive real estate in the City of Toronto is in the Plan of the Town of York. The plan shows not a single measurement, and if the site of even one of the original posts can be re-established by a direct chain of evidence down to the present, it is beyond my knowledge.

The Town of York Plan is not an isolated instance of lost landmarks. The majority of original town plans in the early settled parts of the province suffer in the same way.

The Surveys Act provides for the Municipal Survey which is an official re-survey upon petition of the Municipality and, upon confirmation of such survey, lines surveyed become "true and unalterable boundaries". So far only street lines for two blocks on King St., two blocks on Bay St. and four blocks on Simcoe St. have been so established in the Town of York.

In the meantime, surveyors have used "conventional street lines" for the other streets on the plan. The history of most of these goes back fifty to one hundred years. Confronted by demands for surveys the surveyors had to make bricks with the straw that they had. Some lines are undoubtedly based on information now lost. Some had tradition of very early use behind them and some were fixed from the measurements and judgment of the surveyors practicing at the turn of the century or thereabouts. Nobody would be happier than the surveyor of today if each of these conventional lines had a certified pedigree to show the world. The uncertainties and huge gaps in the record make that forever impossible. Nevertheless the life of the community depends to at least some degree on the acceptance and use of lines from which property can be defined. Time lends a strengthening hand and lines which were originally determined with trepidation are gradually accorded respect and force without which surveys in many areas would be impossible. Even a Municipal Survey (not to be confused

with a survey by a municipality) can often only formally and legally adopt the best documented candidate as successor to the lost corner.

The Plan of the Town of York is at one end of a scale. Modern plans in which surveyors have made large numbers of accurate measurements from the original posts to substantial landmarks such as buildings lie at the other end. In these, the surveyor can say with assurance that a lot line is here or a lot line is there to a very small margin of error. That perhaps brings a smile. You say "why should there be a margin of error at all?" One of your committee has asked me to explain why surveyors so often disagree. I still do not know whether he was taking a sly, or not so sly, dig at surveyors or whether he was humbly seeking for information.

In any case, it is a legitimate question. There are many causes. We have discussed one cause at some length. Plans are laid out and become the foundation of title. In this sense there is no forty year root and long, long after the physical boundaries set by the surveyor have disappeared his successors are called upon to report the position of the lines which the monuments governed. We have considered, too, the change in standards brought about by the years and by economic changes. Surveys made when the compass and link chain were the surveyor's tools and whole lots were worth less than an inch of land is worth today have to be retraced in these days of the transit and steel tape. The surveyor seeks a refinement that never existed.

Nor is the surveyor's source material found neatly indexed and preserved, particularly preserved, in a registry office. He has to look for much of it with a shovel and what one surveyor finds today may be absolutely unfindable tomorrow. Then, too, he must guard his own work from the effects on the tape of temperature, tension, sag and slope. For instance, his steel tape used on a nice smooth bit of pavement on a sunny summer day may be an inch longer per hundred feet than the same tape on the same pavement on a winter morning. Lines may be measured today through or around obstacles of all kinds, up and down abrupt slopes, under adverse weather conditions and under pressure of closing dates. Tomorrow the obstacles may be cleared away, the hills graded off, the weather may be perfect and the time element less important. There are hazards in identifying

old land marks, in accepting the testimony of old residents or evaluating the importance of old occupation, and a personal equation enters into such matters.

On top of all this is the fact that surveying requires a dogged determination to get at the root of things and the patience to do work a little better than seems warranted at the time. Even a surveyor may slip a little in these qualities on occasion. If he does, some surveyor coming after will get a different answer.

High priced farm lands have brought about a demand for a type of detailed survey seldom called for before. If a syndicate is paying several thousand dollars an acre for a farm, its members are going to want to know exactly how many acres it is getting. They are going to be curious about the precise boundaries and be most critical if any question arises as to title around the limits.

Let us then see what the surveyor has to work with. Beginning in the seventeen eighties after the close of the American War of Independence, the Crown has gradually divided the greater portion of the province into townships and the townships into farm lots. Does the Crown sell the settler a lot with all four corners neatly marked with good substantial monuments? Not at all. It tells him that it has surveyed the front of the farm and marked the two front corners of his lot. Depending on the type of township, the farm will either run back to the next surveyed line or stop half way, but as for defining the boundaries, he is strictly on his own. He or his surveyor is given the rule book, *i.e.*, *The Surveys Act*, and they must carry on from there.

In the older Townships such as those around Toronto the side limits of the farms were run many years ago. Most of them were run so long ago that no record of the survey exists nor of who did the work. Fences have been built on these lines and have been the recognized farm boundaries for a hundred years. Few of the fences are straight and there may be other evidence that the rules have not been exactly followed. Today, the original survey points are practically all gone and if we attempt to resurvey the side lines according to the *Surveys Act* we have two strikes against us before we start. We will probably not be able to find such conclusive evidence of the original survey that we can apply the rules with assurance and if we do the fences are still

going to divide the farms. The result is the "Existing Lot Line". The old line of occupation is accepted as the best evidence of the lot line. There is authority for this. I would hesitate to make an estimate of how many times my old senior partner, Col. A. J. vanNostrand, quoted *Home Bank v. Might Directories* (1914), 31 O.L.R. 340; 20 D.L.R. 977 (C.A.) in reports involving this principle.

Mr. Magwood, the Director of Titles, finds his basis in a section that appeared in *The Surveys Act* for many years prior to the 1958 Act. The former Act said:

"Where a township, tract or block of land, the whole or any part of which has not been surveyed, has been or is granted by the Crown, the first survey made under the authority of the owner of any unsurveyed part thereof shall have the same force and effect as if made under the authority of the Crown."

I had always been taught to believe that this referred to tracts of unsubdivided land sold to companies such as the Canada Company and then subdivided by them but during my life as a surveyor I have twice seen important sections of the Act that meant one thing to the vast majority of surveyors interpreted in a different way by the courts.

For myself, I have felt that it is improper to apply to the examination of these lines skills, techniques and tools which were not available to the owners at the time the lines were originally run, and that boundaries of such ancient origin should be held, if at all possible, to have been established in accordance with the Act and to represent the actual boundaries of the lot.

This situation has not been satisfactory. The provisions in *The Surveys Act* for official resurveys of parts of townships or of plans filed under *The Registry Act* or *Land Tiles Act*, commonly called Municipal Surveys, serve a most useful purpose but they are best adapted for conditions where considerable public interest is involved and are limited to determining lot lines. They cannot deal with boundaries between owners established by ancient usage, consent or by prescription. Other provinces have had legislation by which claim could be made to land actually occupied and shown on a survey and by which after the adjoining owners were notified and a hearing held, title would be confirmed if justified. *The Boundaries Act, 1959*

ably sponsored by Mr. Magwood introduces such legislation into this province. It provides for a survey to be made under proper precautions and for a hearing at a minimum of expense. This is followed by an award confirming title or amending the survey. So far as I have seen it in operation it avoids red tape, as far as is possible, if the rights of others are to be protected.

This paper has been designed to consider, so far as is possible in a short time, some of the non-mechanical aspects of surveying. After all, it is this side of the work that makes surveying more than a trade. The result may be that the paper has left you with the impression that survey lines are pretty fluid things. This is far from the case. In the vast majority of surveys careful research and precise field work results in accurate determination of boundaries in spite of the difficulties.

To return for a moment to Judge Riddell. Mathematics have been singularly lacking in our examination of survey problems. As a matter of fact, while advanced mathematics practically never enter into the type of survey we have discussed, it is important that the surveyor should really understand, not blindly use, this tool in its simpler forms. Computing machines have taken much of the drudgery out of mathematical analysis of survey results and it is now routine to make checks of the field work which would not have been considered feasible even a few years ago. Proficiency in the use of these mathematical aids and in the use of the mechanical tools such as transits, levels and steel tapes can be acquired in relatively few years but that is only a beginning. The ability to weigh all the factors which enter into fixing a survey line comes much more slowly. That is why we must conclude that Judge Riddell's congratulations were deliberately superficial.

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