

Surveyors of The Past

—BY CHARLES FAIRHALL—

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CROWN SURVEYS

BY JAMES DICKSON, P.L.S., I.C.L.S.
Fenelon Falls

The subject upon which I have been requested to write a paper, viz., "Crown Surveys," is a somewhat delicate one for an Inspector of Surveys to take up, as it will be necessary not only to remark on the manner in which such surveys ought to be made, but also to mention a few of the inaccuracies and errors I have met with in the field.

It is not my intention to make this paper a long one, but confine myself to a few examples of how some members of our profession do their work, and then, very briefly, point out the manner in which Crown Surveys ought to be made.

I think you will all agree with me that the first object a surveyor should have in view is to keep up the standard of his profession. And no matter whether the commission he may have on hand is great or small, no matter whether the survey is of little or much importance, it should be his ambition to do it as accurately as possible. It should be his ambition to show the public that accuracy is within the compass of possibility. And leave everything behind him done in such a manner that there could be no room for either doubt or trouble in the future. Were this object always held in view there would be no necessity for any government to appoint an Inspector of Surveys.

I believe every person will agree with me that if there is any survey which should be made with perfect accuracy it is that of a new township, for to inaccuracy and ambiguity in original surveys are to be traced the beginning of most of those long and expensive law suits touching the ownership of lots and parts of lots which are almost constantly before our Superior Courts. During my own practice I have been engaged in a good many such cases, and I cannot recall a single instance in which there would have been room for either doubt or dispute had the original survey been correctly made.

Of course it is not to be expected that any surveyor, no matter how careful he may be, or how accurate his instruments, for as much depends on the integrity of his chainmen as on himself, and those he cannot have always under his

eye, can cut up a township into 1,000 acre or 640 acre blocks, and have all his lines intersect at the exact spot, but it is expected that every line will run straight from one intersection to another, and that the dimension of the lots and bearing of the lines in the field will be the same as those returned on the plan and field-notes.

Perfect accuracy is neither expected nor looked for, but perfect truthfulness is.

Some will say, Oh, the land is so poor there is no use in being too particular. To such I would simply reply, the quality of the land is something they have nothing whatever to do with in making the survey. Their duty is to carry out their instructions; that, and that alone, should be the only object in view. They should not lose sight of the fact that, although in many places the land is utterly worthless for agriculture, the recent discovery of valuable minerals has made it more than ever necessary that the surveys should be accurately made. In some of what seemed the most worthless townships has been found the most valuable nickel and copper mines perhaps in the world, and the surveys of some of the townships where those minerals have been discovered — but which were made before the inauguration of the present system of inspection — have been performed in such a loose manner that I predict, at no distant day, to hear of some of our legal friends reaping a rich harvest.

I shall now give a few specimens of what I have met with in the field, which were not laid down either in the field notes or in the plan.

I have found lines run straight to within a short distance of those they were intended to intersect, then suddenly bend either to the right or left, sometimes in the form of a bow, in order to strike the post; when, had they been run out straight, they would have struck from ten links to five chains to one side — lines in which there were scarcely ten consecutive chains straight.

I have found the whole four posts at an intersection made of trees. A man could stand at any one of them, pay out forty links of the chain, and touch the other three. The post on one side of a concession line within twenty links of the guide post, that on the opposite side eighty links distant, the three upwards of ten feet out of a straight line, some posts standing at almost any angle with

the line except the correct one, others tossed off the line, not even set up; bearing trees sketched in the notes for every post, whole blocks without a single bearing tree marked in the field, numbers of the lots not even posted; one line run up to another, end there, and start off on the opposite side at from a few links to several chains to one side, only one of them posted; a post instead of standing at an intersection planted on the concession line as much as two chains from it; in numerous instances, lines only partly run, others not even started; a block, which contained five lots on the plan, with six posted in the field; a side line start at lots 20 and 21 and strike the next concession line, 100 chains distant, at lots 25 and 26; lines start from each end of a block, and miss each other at an intermediate point by from a few links to six chains; beautifully proportioned triangles across and offsets around lakes, in the notes, where it was simply impossible to have got any such in the field at all; lines run from other lines on either side of a lake to the water, which instead of striking at opposite points, would miss each other by as much as seven chains, and the water assumed to contain whatever the two added together lacked of making the full block; a carefully calculated triangle in the notes showing the water fifty chains wide, when by actual measurement it was found to be less than thirty; some lots which were returned twenty chains not eight chains, others as much too large.

I have found three separate lakes with high ridges between in the field which were returned as one, their combined acreage not half what the one was shown to contain; two lakes on the plan which were only one in the field, and a mountain which was returned a lake; a marsh on the plan where I found a mountain of bare rock several hundred feet above the level of the surrounding country.

Streams in the field not on the plan, others on the plan but none in the field; and as many as seven streams all crossing the line at right angles in a distance of half a mile, which turned out to be only one small creek. I have found posts with holes in them a man could run his fist into; others made of poplar, with cedar and spruce trees of the proper size standing as near as the tree from which they had been cut. In some cases not a lake traversed in a whole township, their outlets not even shown; in others, while there had been a rough traverse made of the largest, the smaller not even sketched, no attempt whatever made to show either their size or shape.

I have found a whole township of 50,000 acres divided into 100 acre lots, each lot returned exactly twenty chains

by fifty, and not three trees the size of a man's thigh cut in the whole township; where one could only follow the lines by keeping his eye constantly fixed on the blazes, and those small, few, and far between, the hands almost constantly occupied in separating the brush in order to force the body through.

Need I ask any practical surveyor if such a survey could be even approximately correct? What chainmen could make correct measurements under such circumstances? Am I using too strong language when I say that a man who does his work in this manner is a disgrace to the profession?

In a good many townships, which are otherwise well surveyed, I find the line across the block next the boundary, on the side towards which the lines have been run, a mere trail; why is this? Why should not this line be as well opened as any of the others?

In most cases where I have found angles in the lines they were very poorly opened, while in others there had been a good deal of work done. In the latter case, I attribute the errors to placing too much dependence on the magnetic needle, and not being sufficiently careful in taking back-sights, especially in thick swamps and going over knolls. In others which have been run by theodolite, to the instrument not being standing solid while crossing soft ground. In every case where the instrument cannot be made solid, posts should be driven into the ground, and the instrument set on them, then the surveyor can move around it without any danger of throwing it out of line.

In still other instances the errors are undoubtedly traceable to unskilled assistants and insufficient instruments. Some men even go so far as to use a small compass without a ball and socket attachment.

I would now briefly point out a few of the most important points to be observed by a surveyor in making a Crown Survey.

His instruments should be of the very best to be had, and both them and the chain kept in proper adjustment. If at all possible, an astronomical observation should be taken before commencing the survey, and check observations taken as frequently as circumstances will permit during its progress.

He should not hang his work on any other man's, assuming it correct, but should depend entirely on himself. By doing this, each man's work is a check on the other; if they are both correct they must agree, if not, and he knows he has done his correctly, he will then be in a

position to confidently invite inspection without any fear of the result.

If he is running two parties, one of them at least should constantly use a theodolite, and too much care cannot be taken in back-sights. It is well to, at least, start all lines with the theodolite, and then, if proper care is observed in the back-sights and trees cut where a good back-sight cannot otherwise be had, local attraction will be a matter of secondary importance.

All triangulations should be made either with the theodolite or a box sextant. The compass should never be used to make a triangulation. The angles cannot be read close enough with the magnetic needle. Where the concession lines have been accurately established, a lake or river, crossed by a side-line, may be measured by micrometer, but I do not think that a sufficiently accurate instrument with which to measure lakes on a concession line where the size of lots may be affected.

All streams, however small, should be carefully noted; their width and apparent average depth. Their points of convergence or where they empty into lakes approximately shown on the plan by full lines where they intersect open lines, in other places by dotted lines. All springs should also be noted, also marshes and swamps laid down in their proper places, and the hills sketched in.

If one line does not intersect another at the expected point, if it is not over two chains out, leave it there, but return everything exactly as you find it, and change the bearing in order to have the error corrected at the next intersection. If it is over two chains out I think the line ought to run over again, but under no circumstances should an angle be made in a line in order to have it strike a given point.

Every lake of over two or three acres area should be traversed, and its outlet and connection with another lake or river shown, if possible. It is not enough to simply show a body of water at a given point; its shape and size should be accurately laid down. It is a great injustice to a settler to find that what he supposed was a one hundred acre lot has a number of acres of water, which he must either pay for or have a survey and plan of it made at his own expense, when such an outlay would have been avoided had the man who made the original survey simply done his duty.

All lines should be so opened out that an open line can be plainly seen at any point, no matter whether the bush is close or scattering, and every tree within a foot of it marked by three blazes — not a small piece of bark knocked off by one

stroke of the axe, but a good, deep, broad blaze cut well into the timber at least nine inches long, which can be seen at a considerable distance. If the timber is scattering it is necessary to blaze trees at a greater distance. If this is adhered to there will be no danger of persons complaining that they cannot find lines while any of the timber near them remains standing.

The posts should be of the most durable timber to be had, not less than four inches square and three feet long, neatly made and marked — a ragged, ill-made or ill-marked post always looks bad — and firmly planted in the ground. A bearing tree, taken wherever obtainable, with a good-sized, smooth blaze on the side next to the post, not at right angles to the line of the post, as I sometimes find them, and the letters "B. T." neatly cut thereon.

Wherever a live tree of six inches or more in diameter is standing within one foot of where a post is to be planted, I should say take it for one by all means. Cut neat blazes on it sufficiently large to hold the figures, but be very careful not to make them so large as to run any risk of killing the tree. Leave as much bark as possible untouched between the blazes. Do not cut the tree down and then dress the stump into a small post, as I have sometimes found. In one instance I found a poplar tree about ten inches in diameter taken for a post. It had been cut off three feet from the ground and the stump squared into a four inch post. Could anything be more absurd?

In conclusion I would simply add that a very little additional outlay and a little more care exercised by the surveyor and his assistants in the field will make all the difference between a good survey and a bad one, and very materially tend to raise the standard of the profession in the estimation of the public. ●

SEMINAR

A seminar, sponsored by Ontario's Interministerial Committee on Geographical Referencing, chairman - Robert G. Code, O.L.S., was held at Queen's Park, on March 10 and 11 last.

Over two hundred and fifty invited delegates represented 21 Ontario government agencies, 27 different municipal governments, 7 Federal government agencies, 5 provinces other than Ontario, and 9 universities. 31 delegates were from private industry.

On the first day, the meeting, chaired by Laura Ives of Ontario Hydro, heard reports on the Ontario Basic Mapping Program, the activities of the National Digital Mapping Standards Committee,