

SOME PRACTICAL EXAMPLES OF PROVINCIAL LAND SURVEYING

TYPICAL INSTANCES IN THE RE-SURVEY OF OLD LINES, WHERE THE SURVEYOR MUST ARBITRATE — REMARKABLE ACCURACY OF OLD COMPASS LINES, THOUGH LITTLE USED FOR THAT PURPOSE IN PRESENT PRACTICE

By J. A. MACDONALD,
Ottawa, Ont.

NEARLY all of the lands in the older provinces of Canada have been surveyed by the magnetic needle or surveyor's compass; so that all lines, division and otherwise, roads, township lines, etc., are based on the magnetic meridian and not the astronomical or due north and south, east or west. These old lines, said to run north, are not due north, but ten to twenty degrees west of north, and the same proportion of error east and west. This does not matter much, but it would matter a good deal if all those compass-run lines were re-run by the astronomical meridian. It is only a few years ago that the land lines began to be run astronomically. The Dominion Government was the first to begin this innovation in dividing up the lands of the North-West Territories, where all lines are now run astronomically and where lines run with the surveyor's compass are not allowed. In the maritime provinces of Nova Scotia, New Brunswick and Prince Edward Island; in Quebec and old Ontario; all land lines were run by the magnetic meridian and any correction, re-tracement or resurvey work, in these provinces must be done with the compass. As all transits are provided with a compass the lines may of course be run with the transit. But the transit-compass is usually small, usually sluggish, and therefore not usually reliable; so that the regular surveyor's compass with $4\frac{1}{2}$ -inch needle is the proper instrument to use in this work.

Old Compass Surveys Wonderfully Accurate.—It is a matter of wonderment to engineers and surveyors, whose only experience is with the transit, how fairly accurate those old compass lines really are. These veteran surveyors are deserving of the greatest credit for the wonderful accuracy of their lines. No modern surveyor could duplicate such work with the magnetic needle. In fact, the modern surveyor has little respect for the compass as an instrument for running lines and courses. The minute accuracy of the modern transit, and the refinement of the courses, down to 30 seconds, causes men to marvel how correct bearings could possibly be run with the compass, when such refinement as seconds or even minutes are out of the question.

The compass, at best, especially in the hands of inexperienced instrument men, is not considered accurate up to 10 or 15 minutes. In fact, the old traverse tables used for calculating compass bearings, were only given to 15 minutes, that being considered the limit of compass accuracy. With the old compass surveyors, however, the limit of accuracy was by no means confined to 15 minutes or the quarter of a degree. With the sensitive needles and perfect order in which the compass was usually kept, and frequent tests made with a standard meridian, the accuracy was refined to 5 minutes and seldom more than 10 minutes. Old surveyors have told the writer—men who were familiar with the use of the modern transit—

that they could, and usually did, run their lines within 5 minutes of the accurate direction given of the course. The state lines of the older states of the Union, and of the older provinces of Canada were run with the compass. The line between Pennsylvania and Maryland, run with the compass, is the marvel of modern surveyors for its wonderful accuracy.

Very Little New Work Now for the Compass.—There is practically no new work done now with the compass. By this I mean new work undertaken by the governments of the several provinces. For instance, in New Ontario all lands are now surveyed astronomically with the transit and the direction of the needle ignored, though the isogenic line is noted for reference. In railway surveys the compass is used throughout unless the country is full of mineral, as a check on the transit bearings. Were it not for the possibility of being able to run lines independent of the compass a good deal of territory could not be surveyed at all. In a large portion of northwestern Ontario the compass is of no use on account of the large amount of mineral in the ground beneath. The writer found, while railway surveying in Northern Ontario, between Winnipeg and Lake Abitibi, that the compass was of no use as a check on the transit bearings on account of the prevalence of various minerals. The present prevalence of wire fences bounding farm and lot lines is a great stumbling block to using the compass on those lines. The proximity of railway tracks is another. In fact, wire of any form in close proximity to the compass makes its readings negligible.

The professional surveyor in the older provinces of Canada must, therefore, use great discretion in the pursuit of his work.

The Professional Land Surveyor Must be a Diplomat.

—Of all professions, not excepting that of the doctor, the land surveyor must be a diplomat. In doing correction work, as resurveys and retracements, for the public, the greatest delicacy must sometimes, if not generally, be used in dealing with the interested parties. For instance, in re-surveying a division line between two owners on either side of the line, the task is a most difficult one to adjust fairly and satisfactory to both parties. All traces probably of the old line have been obliterated by time, fires, etc., the existing lines are far from being in correct position, and this incorrect position of the division line may be long-standing, through one and two generations, it may be. The father recognized these old lines during his life time, possibly aware that the division line was not in the right place. But the son who inherits the property will not stand for the crooked, sidling division line, and gets a surveyor to run the line correctly. Then trouble commences, as the man on the other side of the line, when he sees himself losing slices of his land, attempts to stop the survey.