

THE MARK FOUR GEODIMETER FOR SMALL SURVEYS

by Andrew Gibson

Electronic distance-measuring equipment - Loran, Shoran, Tellurometer, Geodimeter, and possibly others - are generally associated, in Canada at least, with long range geodetic or national mapping projects with single measurements of 25 - 80 miles. Coupled with aerial photography, this type of work has effected a quiet revolution in the mapping of Canada. It is doubtful whether without this equipment, the country would have ever been properly mapped - at least not until some Malthusian nightmare of population filled the tundra.

All this equipment is for surveyors, fascinating, exciting - but to those of us who spend a great deal of time driving stakes, marking out buildings, writing descriptions and sending repeat bills, it is hardly of immediate interest. Because, after all, the great bulk of our work involves measurements of not more than a few hundred feet - a graph of the lengths of individual measurements made in the course of private surveys in Ontario would show an inverted logarithmic proportion. For every one at 10,000' there would be a hundred at 1000' and thousands at 100'. As Samuel Johnson might have (but didn't) say, "There's a deal of surveying in a six-foot rule, Sir". Electronics or no, we can certainly conclude that in private surveying, almost all measurements are going to be chained.

There are occasions when highly precise measurements are not only desirable from the point of view of accuracy but also from a commercial standpoint as well. It will save money, not only in the future, but right now, to have a rigid control. It must be borne in mind, however, that accuracy per se, without the need for it, if it takes longer, is poor surveying practice, almost as bad as sloppiness. In fact, each is the reaction to the other. Therefore, the accuracy to which I shall be referring is not the sterile variety. It is the kind that is justified, because it will save money now, or in the future, or both.

First, let us consider an industrial or commercial development of a couple of hundred acres, with dimensions of 2000' or upwards. This area is to be interlaced with curving road patterns, cul de sacs, on a topography which has large, fairly flat areas and a good deal of wooded and steep ground. A boundary survey is required (as it almost always is, in spite of the fact the area has been shown on surveys before). The intention is that the boundaries will close to 1/10000, the blocks 1/5000 and the lots 1/3000.

Now there are several assumptions we can make about the progress of the survey - ruling out the one that everything will fit first time.

1. The boundaries, blocks and lots are closed mathematically as the survey progresses. The field work and the calculations are checked. The errors are found and corrected.
2. The closures are not completely satisfactory. The source of the errors cannot be located, being a small and gradual accumulation. So a great deal of time is spent checking. Future resurveys will be held up, too, as the chickens come home to roost.
3. Errors are found, but it is difficult to correct them completely, as the corrections will interact on other satisfactory closures. The field work is partially corrected and a great deal of calculations are adjusted.

4. There used to be cases (to be very circumspect about it) when the information on the plan and the measurements in the field, were different enough to warrant the conclusion that some pressure cooking had been done. However, it is not necessary to dwell on this variety of counterfeiting, since it is no longer tolerated by the profession (nor by such authorities as the Office of Land Titles).

Now in cases 1, 2 and 3 the job is, as usual, conscientiously done by skilled people with good instruments. Yet all of us who have had the frustrating job of pulling and replanting stakes two or three inches away know that this is not always enough. The difficulty is, that there is not the necessary PROGRESSION of accuracy. It is to be sure, normal survey practice to be very careful with the framework of a development. It is almost impossible, by normal survey methods, to have this framework sufficiently precise to obviate later discrepancies. It is more difficult than ever in wooded or hilly country. What is needed in the case of a sizeable development is a framework done to an accuracy of, as a rule of thumb, 1/40,000. An extreme analogy would be the base-line of a geodetic net done to one part in several hundred thousand in order that the final check will be 1/10000. This is not necessary, of course, but a progression of accuracy is surely desirable.

The above requirement can be easily and economically attained with the initial use of the Geodimeter and the T2, in the following sequence; (1) after the exterior angles of the parcel are found or replaced, a Geodimeter-T2 boundary survey is made, using a closed interior traverse, (2) this traverse is reduced to co-ordinates and the boundary and street system are plotted on a 1/40 or 1/50 scale. Then the co-ordinates of control points, about 1000' apart are scaled off - these would ideally be points of tangency or block corners. Next, these are run in by Geodimeter and T2, using the former traverse points and substantially marked.

This is all the precise framework required. From then on, the development can be staked, and if an error develops, it won't go past the nearest control point. The precise field work for a development with dimensions of say, 3000' x 4000' could be done by one party in two to three days. The proportionate survey cost would be small.

In a development such as the above, it might be 2%. This would be recovered several times over in the progress of the survey, with the prevention of repeated field work and calculations. What is equally important, the lot corners, when re-established by evidence or by calculation, would be practically identical and will afford a continuing saving to the surveyor in re-survey costs.

THE MAIL BAG

Facilities for 1962 Annual Meeting "Best Yet"

The Editor,

On behalf of the Entertainment Committee for the Annual Meeting to be held next February, I would like to report that a very profitable meeting was held in London on May 3. It was the opinion of all present that the facilities offered by the Hotel London were the best ever seen for our purpose, and that from the standpoint of accommodations the 1962 meeting promises to be one of the best. The manager of the hotel was most co-operative, and there will certainly be no cause for complaint from that quarter.

C. B. Chapman, London, Ont.