

# MAPPING IN ONTARIO

## — A Projection

### REMARKS BY

*The Honourable Frank S. Miller, the Minister of Natural Resources to members of The Canadian Institute of Surveying at seminar on Aerial Photography and Photogrammetric Surveying, conducted in co-operation with Erindale College, University of Toronto, Erindale College (South Building), Mississauga, Ont. Thursday, May 11, 1978.*

Since I became Ontario Minister of Natural Resources about 15 months ago, it has often been brought home to me quite forcefully that the advantages won by pioneers sometimes have repercussions. Later generations can find themselves at a disadvantage simply because their predecessors were among the first in the field.

Let me give you an illustration. The wide responsibilities accepted by my ministry include Ontario's Mines and Forests. This brings me into frequent contact with our mining, our lumber, and our pulp and paper industries. In all of them, I have seen that the scale on which they all are now having to renovate antiquated machinery, and modernize many traditional, but now inefficient, practices, is considerably more extensive than in other provinces where those industries don't have such deep historical roots.

Naturally, this is the way economic evolution works, and is nothing to feel bitter about. The only answer is for our industries to bring themselves up to date — which they are doing. The longer conversion is delayed, the bigger the task becomes, and the more waste is incurred in the meantime.

The parallel is worth noting, because I find it interesting to observe how similarly history has dealt with the art of mapping in this province.

Commerce and industry were already so diversified in Canada west at the time of confederation, and cartography so advanced by the standards of the day, that maps were available for just about every purpose, whether industrial, commercial, provincial or municipal. Every need was likely to differ in some major or minor respect from the next, so no common standards were observed, and everything was done independently.

I haven't any doubt that the initiative those independent map makers showed made a very positive contribution to the development of Ontario, and the same spirit was in evidence in our provincial government agencies. And what was in existence then has gone on growing and multiplying through the years, with considerable diversity.

As it happens, my personal beliefs and philosophies make me one of the most vigorous advocates of the free enterprise system. But I can only hold to that belief with the knowledge that, when an entire industry, or a commercial craft or art, will benefit by co-operating to secure the adoption of basic standardization, free enterprise will willingly forfeit some of its individuality for the cause.

This is what occurred in North America with electrical and plumbing fixtures, and in the printing trade, and in the automobile industry. Centuries ago, of course, cartographers showed the same good sense in accepting the arbitrary decisions of the royal observatory at Greenwich laying down the almost universally observed system of longitudinal measurement, and in the 19th century, the nations of the world were pleased to adopt the proposals made by Canada's own Sir Sanford Fleming for international time zones.

As a matter of fact — though I'm aware I may be allowing my personal bias to colour my thoughts at this point — I'm inclined to think that the explanation why Ontario has lagged behind most of the rest of the world in adopting a common reference grid for all mapping was not because of a lack of imagination on the part of private industry.

I suspect it is more likely that as the world advanced into the 20th century, the funding for most large-scale mapping projects had moved into the hands of a number of government departments and government agencies, all with somewhat different needs, and inclined to think of themselves as self-contained empires, undisturbed by thoughts of profit and loss statements.

I know I am speaking to a professionally knowledgeable audience this evening. Many of you, I expect, have to deal frequently with problems arising out of this lack of uniformity, and are

fully familiar with the background to what I'm talking about.

Others may not be brought face to face with it so often. But I expect you all know that, as a result of the study of this situation which was authorized by the Ontario government's cabinet committee on resources development almost exactly five years ago, an entirely new provincial basic mapping policy has been developed for universal application in Ontario, and has been given approval. It has, in fact, actually been tested successfully under real-life conditions in northern Ontario.

So this evening I shall first talk briefly on the reasons which make such a program a necessity. Then I shall try to amplify what you may already know by giving some details of the policy that's been adopted; explain how it is to be implemented and what it is expected to achieve; discuss the time elements we visualize; tell you what it's expected to cost, and how much it should save. And, most importantly, to what extent private enterprise will be involved, and what effect it is expected to have on the mapping industry in Ontario. This, by the way, isn't something dreamed up in one of our own Ivory Castles around Queen's Park; it is what has emerged from long, realistic conversations with hardnosed members of the industry.

As a start, I'll define the field of discussion as basic topographical mapping primarily intended for provincial and municipal use, which can be taken as being on scales of 1 to 25,000 or larger for provincial purposes, and 1 to 5,000 or larger for municipal purposes. According to figures compiled by the United Nations economic and social council for its study on the status of world cartography in 1976, more than 66 per cent of all Europe has been covered with topographic mapping on scales of 1 to 25,000 or larger. North America, as a whole, has nearly 26 per cent, and South America almost 8 and a half per cent.

The U.N. Economic and Social Council was either too busy or too tactful to break down the North America percentage of 25.9 into separate jurisdictions, but one calculation made within my own ministry arrived at the conclusion that, taken by itself, not more than 4 per cent of our own province has been adequately mapped topographically within the scales defined . . . which would put Ontario's cartographic status considerably below South America, and just a jump ahead of Africa!

But, paradoxically, the chief justification for the new basic mapping policy is not because insufficient large-scale mapping exists. It's because there is far more than necessary. And all too much

of it a jumble of different bases and different scales. And it's not because grids aren't provided on those maps; Ontario has lots of grids, some theoretically suitable, and some less so. But without uniformity, with one grid as the prime positional reference, it is virtually impossible to reconcile information contained in one map precisely with information on another of the same area.

I don't want to turn my talk into a horror story, but it was recently found that in an area north and west of Sudbury, maps produced by the Federal Government differed in position from provincial maps by 1,200 feet east-west, and by 300 feet north-south. And at this point, no one knows which position is correct . . . or if either is correct.

In another area, we have found vertical differences of 100 feet between the elevation of the same spot as shown on federal and provincial maps. That area happens to be the particularly ecologically sensitive area of Elliot Lake. I leave it to you to imagine what confusion this creates in the planning of drainage systems, or in the correlation of geological data.

Obviously, many government agencies at all levels must make and use their own thematic maps. Equally obviously, though, all must employ the same standard base, to allow the data to be correlated without difficulty when the need arises. And there has to be general acceptance of the scales to be standardized.

And thirdly, to translate the policy into action, one agency must be given responsibility for this basic mapping, and for the choice of the standard grid.

In practice, neither of these two latter points has proved particularly controversial. Although quite a few Ontario Ministries initiate mapping programs each year, the two most heavily committed are our own, and the ministry of Northern Affairs for whom we act as the production agents. Taken together, this represents more than 49 per cent of the whole lot — far more than any other single agency.

In addition, of course, since the Ministry of Natural Resources manages all crown lands in the province, it contains the office of the Surveyor General with its two-hundred-year-old traditional responsibility for land records. So, since there's obviously a job to be done, we have willingly offered to take the initiative, and our offer has been accepted.

As to the selection of a standard grid, there's no dispute. The U.T.M. — the universal transverse mercator grid system . . . used by the Federal Government for more than 20 years, standard-

ized in Britain for twice as long, and now working well in more than 50 other countries — is the obvious choice. The U.T.M. is already used by four other provinces; the Federal Government confirms it will remain the official grid for federal mapping; 19 Ontario Ministries have expressed approval; policy makers, planners, engineers, scientists and land managers like it; and a number of local authorities in Ontario have already adopted it. I only wish all decisions were received with as much understanding and co-operation.

With the question of the grid settled, the next question was the choice of scales to be standardized. Several factors had to be taken into account. First, responsibility for mapping on scales of one-to-50,000 and smaller is the traditional responsibility of the federal government. Second, what we want to have is a standardized, system for basic topographical mapping likely to cover all reasonable present and future needs for provincial and municipal purposes, as well as for other local authorities, and for the use of the general public, commerce and industry.

Third, all scales should be directly compatible with standard metric units . . . and fourth, of course, while the system should be designed to cover the whole gamut of needs, it will be necessary, both in the interests of economy and efficiency, to concentrate the main production effort on mapping using scales that will have the greatest usefulness, and provide the widest coverage in a reasonable time span.

This required more thought than the choice of grid presented, and a good deal of consultation. The outcome is adoption of just six recognized scales having the following ratios: one-to-20,000; one-to-10,000; one-to-5,000; one-to-2,000; one-to-1,000; and one-to-500.

In practice, three of these have been picked to provide the basis for province-wide mapping, which are these (and I'll give them slowly, if any of you want to take notes): all of southern Ontario will be mapped on the scale of one-to-10,000; with five-metre contours; all of northern Ontario will be mapped on the scale of one-to-20,000, with 10-metre contours; and the scale of one-to-2,000 will be employed for urban, fringe area, and special-purpose areas.

For the northern lowlands, where terrain is difficult to depict satisfactorily by conventional means, photographic imagery will be used to provide ortho-photo maps; in other words, they will have the appearance of aerial photographs, but the accuracy of conventional maps. Elsewhere, regular line-mapping

will be used. These basic maps will be in black-and-white, or some equivalent monochrome contrast. This is not just because it will save money — which it will — but to allow other users to adapt them easily for special purposes, applying their own colour overlays without running into problems of conflict, or confusion, with existing colouration.

I expect there are some municipal planners, and others, here this evening who would like to hear something about the principle on which the costs of this programming will be borne. It's proposed that the cost of all the mapping undertaken on the scale of one-to-20,000, and one-to-10,000 should be met by the province. It's also proposed that in cases where mapping on the one-to-2,000 scale has a joint usefulness both to the province and to the municipality, the cost should be met on a cost-sharing basis negotiated with the municipalities.

If any mapping on the one-to-2,000 scale happens to be wanted by a municipality, or by a local authority, but which serves no provincial purpose, it would be provided on a "user pays" basis.

Two further points I should add about the basic mapping program standards are that a standard sheet format of 50 centimetres by 50 centimetres will be used throughout, and indexing will be based on the grid coordinates of the southwest corner of the sheet.

The system I have outlined doesn't represent a series of arbitrary decisions arrived at within my ministry, of course, or by the inter-ministry study group that has been assisting us since last September. As part of our studies, we developed some trial maps which were shown to local authorities in the areas covered for their comments, and they were discussed with a number of outside parties who were currently consulting us on specific mapping problems. I'm pleased to say we found a strongly favorable consensus on all sides.

But a good deal more groundwork has to be laid before we can be in a position to start up an all-out production program on an orderly basis.

In the preliminary phase, after the introduction of the system has been officially announced, and the standards defined, the next step will be identification of the mapping to be undertaken to provincial standards, and some priorities of urgency established. Then arrangements must be made for monitoring mapping for which provincial funding has been supplied, to make sure the new standards are being properly observed.

We will also have to take the neces-

sary steps to bring the production of these new base maps up from their present experimental level to around 650 new sheets annually.

Simultaneously, we need to investigate the extent to which the program can be benefitted by using automated cartographic technology, while also making sure adequate industrial capacity, and effective purchasing and distribution systems, will be available.

All told, we expect this phase would occupy some three years from the starting date. And on its conclusion, we should be ready to embark on full production, at an annual rate peaking at 4,000 sheets, and levelling off, after about ten years, to a steady annual figure of around 3,500 new sheets a year.

It is our intention that the one-to-2,000 scale mapping should be revised every five years; the one-to-10,000 scale mapping every seven years; and the one-to-20,000 scale every ten years. Work would accordingly be scheduled on a virtually non-stop basis.

In round figures, and expressed in constant-value dollars, the amount laid out in the preliminary three-year phase would be about \$1.8 million annually.

For the next ten years, going into full production, this would rise to about six million dollars annually, after which — when the program had become one mainly of revision — the annual expenditure would be about four million dollars. Taken over the first 21 years, the total expenditure might amount to about \$100 million — but against this, we would be carrying a current inventory of maps at any given time worth more than \$40 million. So the true annual cost would average perhaps less than \$3 million over the period which, as it happens, is just about the amount now being spent provincially on base mapping that, in the fullest sense of the word, is uncoordinated, and may be duplicating work undertaken elsewhere.

Apart from this, and apart from the obvious saving in time provided for map users in both the public and the private sector, an even greater benefit we foresee will be in the form of the additional stability, and consequently the additional employment opportunities, that will be derived by the mapping industry in the province.

I'm well aware that three-quarters of the entire Canadian mapping industry is based in Ontario. That's something we can be proud about. I'm also aware that in recent years its total public sector business from Canadian sources has not only been diminishing, but has been

sporadic — which is something to be a good deal less happy about.

It's thanks to the industry's own technical excellence, competitiveness and salesmanship that for every two dollars' worth of business it has been getting from Canadian purchasers, it has been earning another three dollars' worth of business from non-Canadian buyers.

So if I have not already done so, I want to make it fully clear that it is our intention that the major share of the work involved in the Ontario base mapping program should be undertaken in the private sector. We see our own activities as being restricted to commissioning the work, monitoring production, providing storage for artwork, photography and the maps themselves, and ensuring adequate distribution. It will fall to the private sector to make and revise the actual mapping.

A continuing program of the kind I have outlined would, of course, provide our mapping industry with a stability it has not previously experienced, and the additional property mapping and local control will provide opportunities for local surveyors. We also believe, from discussions with several industry sources, that long-range programming may encourage the establishment of branch plants to serve regional priorities, and that, with the steady loading the program will provide, it would be possible to attract enough extra business from outside Canada to maintain the present 60/40 ratio of export business.

Our mapping industry is a comparatively small, but — technologically — exceptionally sophisticated, and highly labor-intensive, component of our free enterprise sector. It is important that its leadership should be maintained. Those who will help in ensuring this will be the photogrammetric and cartographic technicians graduated from our communities, together with the nucleus of engineers, surveyors and cartographers, who will be needed.

I think a number of you have probably already heard a lot about this program in conversations with members of my staff in our surveys and mapping branch, but I expect there are others who are wondering why they haven't seen or heard any official announcement about it yet.

I should explain that at this time we are in the final stages of negotiating the funding of the program; approval of the policy itself was secured some time ago. Accordingly, you won't see any official announcement as to the program until those negotiations for funding are completed. However, the policy is official and you can quote me. But, as I indicated earlier, the funding negotiation process hasn't brought us to a standstill, since

our sister ministry, the Ministry of Northern Affairs, was able to provide two million dollars for us to undertake a three-year trial run in northern Ontario which has already been under way long enough to confirm many of our hopes and expectations.

We chose northeastern Ontario for this bulk test for several reasons. There is enough control in much of the area to make the work practical; indications of serious errors in existing mapping had been observed; and the terrain was sufficiently varied to give us the measure of what could be expected in the more isolated areas of the province. Several of the projects have already been completed by the contractors, others are now in progress, and some recent applications are still awaiting action.

Just as a matter of interest, the municipality's share of the cost of some parcel mapping that was undertaken on one of the very first projects in Opaatika, was almost immediately recovered, since it removed the need for separate mapping by the town's sewer contractors for a contract just placed.

Several years as a cabinet minister have left me in little doubt that in political life — just as in the business life I had just left — there's seldom much hope of pleasing everybody, and that satisfying the majority is a more realistic target most of the time. But I have to say that I feel as good about the prospects of the Ontario Base Mapping Program as I have about anything. It fulfills a public need. It is going to save, not spend, public funds. And it is going to assist one of our most highly skilled industries and professions, at a time when assistance is both needed and deserved.

I think the only concluding remark I need add to that is one of sincere appreciation addressed to the members of the ministry's staff who have put so much time and enthusiasm into originating this project; and to all the other ministries — in particular, of course, the Ministry of Northern Affairs — whose co-operation was, and continues to be invaluable; and to the many members of the private sector who generously let us pick their brains from time to time!

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## AUNT JANE

(When the mood is on her, Aunt Jane favours us with household hints for bachelor surveyors).

We hear a lot about micro-wave ovens these days. Some nuts claim that they caused psychological problems, such as paranoia, and loss of memory.

To check this out I bombarded myself with one for several days. It hasn't affected me in the least. This report is just a plot by pinko lackey running dogs. Er—— what was I talking about?