MAC MAPPING IN THE MAP LIBRARY

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For about a year or so I have been dabbling with computer mapping software on the Macintosh. My purpose was not to invent a sophisticated retrieval system such as CartoNet(at least not yet!), or to produce the perfect road map but to determine whether the computer could be used for its graphic capabilities to make Map Library operations easier, more accommodating, and user friendly. And my conclusion is an exciting...yes, it can! The purpose of this paper is to share some of the things I have learned about computer mapping on the Macintosh, and how we can use these techniques in the everyday operation of a map collection.

The Map Library at Brock University has found computer maps especially useful for three purposes: outline map creation; map collection maintenance; and statistical mapping. The equipment used is a Macintosh SE with 20 meg hard drive and 4 meg internal memory, ImageWriter LQ printer with colour ribbon, Apple Scanner and LaserWriter printer. The software includes AppleScan, SuperPaint, UltraPaint, HyperCard and MacAtlas. I must admit that I am by no means fluent with any of these programs. However, I am familiar with their basic capabilities and how they can be useful in a Map Library.

This paper consists of two parts: 1) a description of the basic process of creating a computer map; and 2) a discussion of applications of computer mapping in the Map Library.

THE COMPUTER MAPPING PROCESS

The first requirement in computer cartography is a digital base map. Sets of digital base maps can be purchased on disk or they can be created using either a scanner or a digitizer. I have created most of my digital base maps by scanning with the Apple Scanner. This process, controlled by the AppleScan program, is very easy. A black and white original(usually pen and ink) is placed on the scanner glass and is converted into a bitmap in a matter of minutes(a process that superficially resembles photocopying). This bit map is made up of individual pixels or bits. The scanning process permits reducing and enlarging during scanning as well as other options such as contrast and brightness adjustments. The scanned bitmap is very rough looking and requires a great deal of editing to delete unnecessary detail and to improve the linework. However, various graphics programs provide quick and effective editing methods. There are two ways of doing this: 1) editing the bitmap itself or; 2) tracing the bitmap to produce an object-oriented base map.

Creating Bitmapped Basemaps

Editing bitmaps has to be done pixel-by-pixel and can be a very time consuming process. However, a program such as SuperPaint speeds up the process greatly by providing tools such as erasers that delete lines quickly, or line tools that add straight or curved lines of any width.

SuperPaint allows editing at different resolutions depending on the printer being used. The maps of the Regional Municipality of Niagara showing municipal boundaries *(Figure 1)* illustrate the original scanned image and the quality produced at different resolutions. Those produced on a basic dot matrix printer are edited at 72 dots per inch(dpi) and reveal rather coarse linework. Editing at greater resolutions can be achieved using a function within the SuperPaint program called "Superbits". This allows one to refine the linework to 216 dpi(for printing on an ImageWriter LQ), or 300 dpi(LaserWriter), but the editing process is much more time consuming. Obviously the greater the editing resolution the better the quality of the linework produced, and the laserprinted method certainly creates production quality maps.

Creating Object Oriented Basemaps

These maps are created using the scanned image as a template for tracing. Again, the scanner is used to convert a pen and ink base map into a bitmap. The UltraPaint program allows this image to be displayed in a light grey tone. Using the freehand line tool a base map is constructed easily as a separate layer by tracing over the greyed scanned image. The result is referred to as object-oriented since every line that is drawn is recognized by the computer as a single object. Unlike the scanned image, it is not a bitmap composed of individual pixels. Therefore, changing features on the map, such as the thickness or curvature of a road, can be done very quickly by selecting the object and applying other design options. The quality of the linework using this technique is similar to a map which has been edited by the Superbits function in SuperPaint.

Completing The Map

Once the base map is created, whether it be a bitmap or object-oriented, the mapping programs are further used for adding information with various design options such as proportional circles, shadings or text. SuperPaint allows the construction of a map in two layers: the paint layer which is used for boundaries and shadings, and a draw layer used for other symbols and text. UltraPaint permits the construction of maps using up to eight different layers. By deleting or adding layers to user specifications custom-made computer maps can be produced. The maps I have created using this technique are a series of overlays comprising a simple outline map of the Niagara Region *(Figure 2)* with individual layers showing boundaries and roads; a text layer of place names; and shaded urban area designations. An additional layer showing drainage was also prepared. It should be mentioned that other more powerful programs allow for the creation of numerous layers. Aldus Freehand for example is certainly a necessity for commercial map producers or professional cartographers. However, accompanying this power is a much higher price tag which many Map Libraries may find excessive, or, I have realized, unnecessary.

APPLICATIONS IN THE MAP LIBRARY

Computer maps produced by SuperPaint and UltraPaint have found a number of applications in our Map Library.

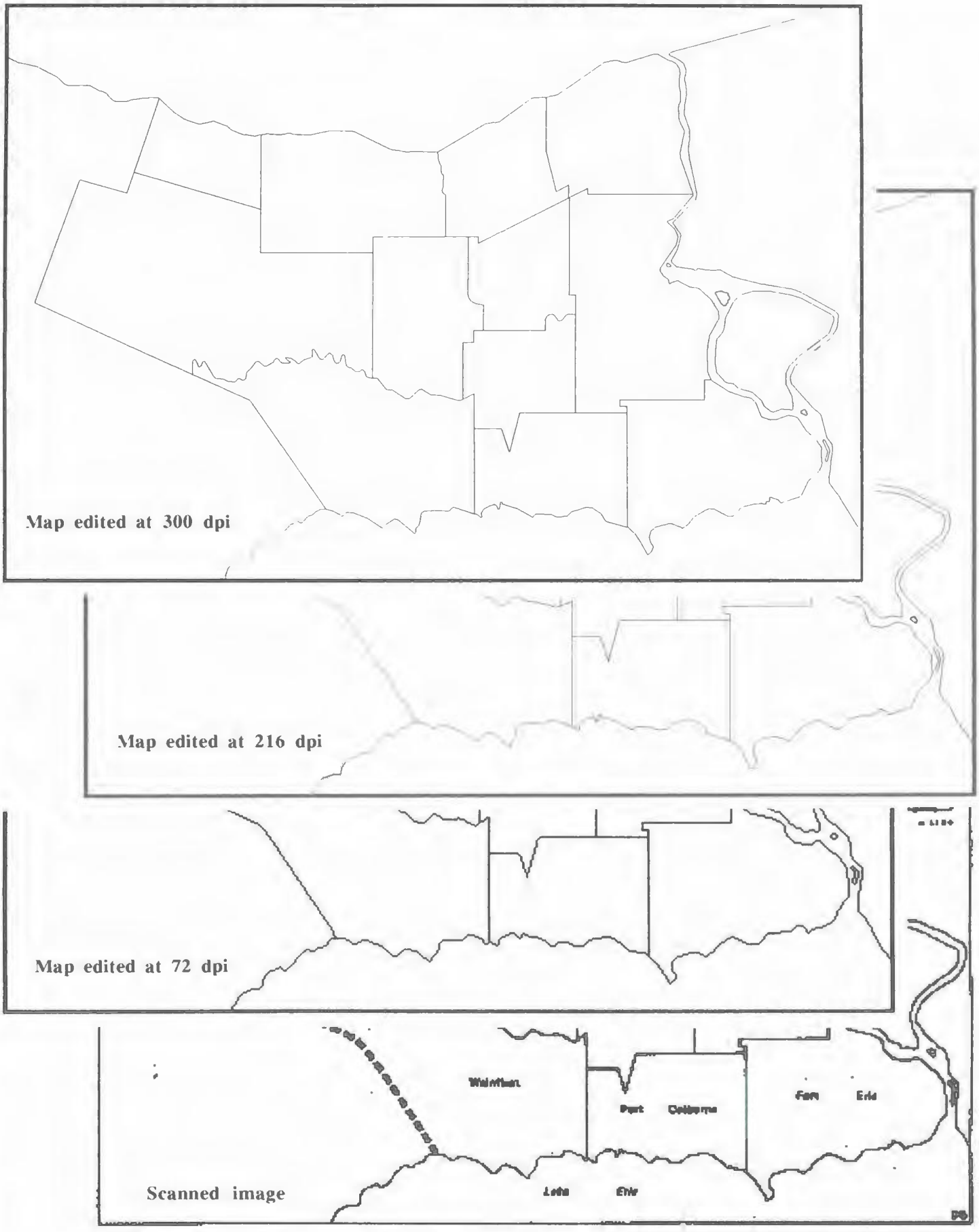

Figure 1: Bitmaps produced at different resolutions using SuperPaint

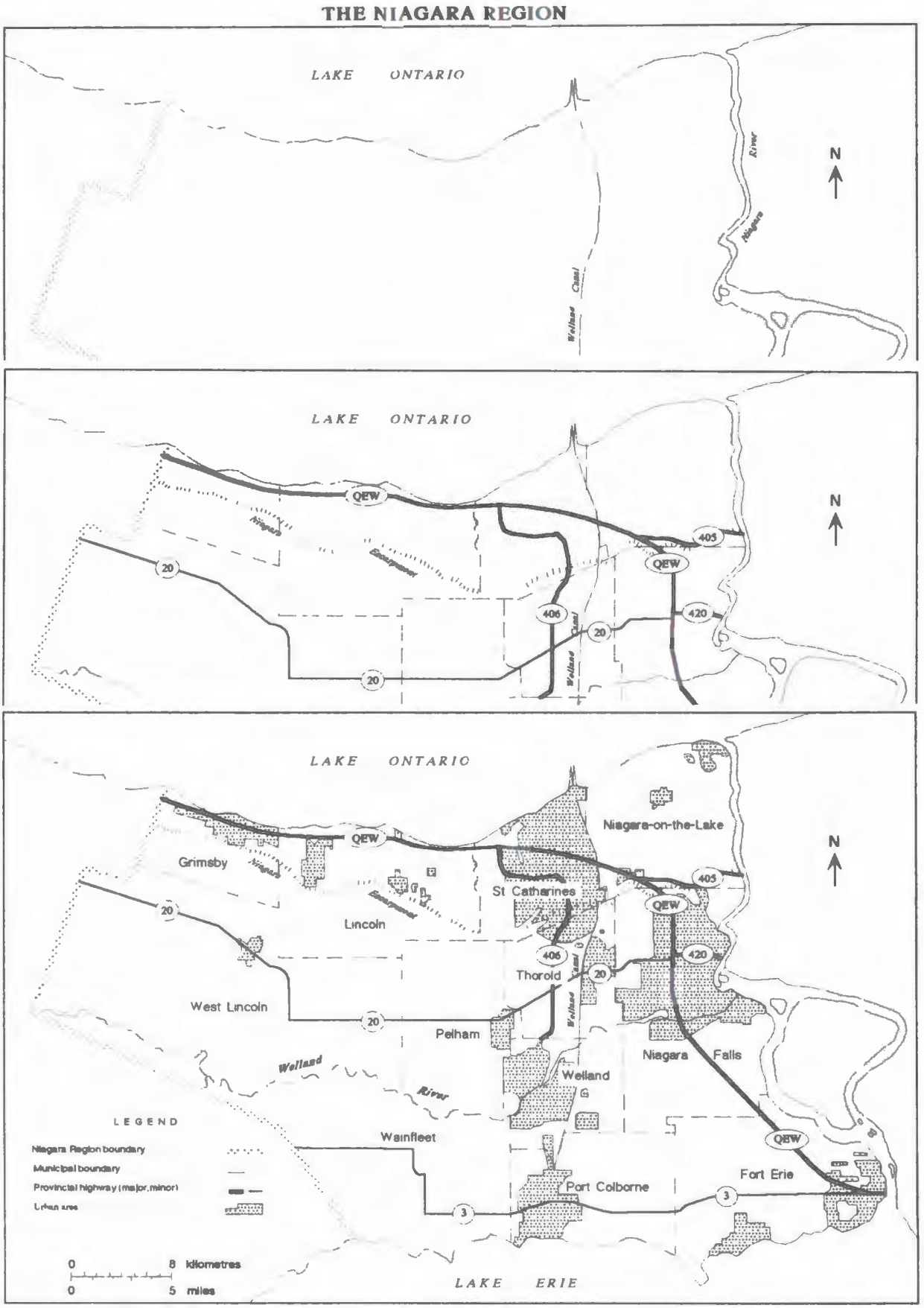

Figure 2: Object oriented maps produced using UltraPaint

(*Top*): Base layer; (*Middle*): Two layers - base; and roads & boundaries; (*Bottom*): Four layers - base; roads & boundaries; urban areas; and place names.

These fall under three headings: Outline Map Creation; Map Library Maintenance and Statistical Mapping.

Outline Map Creation

One of the more useful applications of computer mapping in the Map Library is to provide digital outline maps for the use of students and others. A collection of hand-drawn outline maps is already available and the provision of maps on disk is an extension of this. This is already an active service of the Map Library and is increasing in demand. Requests for specific types of maps, such as location maps for conferences taking place on campus, or local base maps in support of research projects are two examples. Providing a digital map which can be easily modified to the user's demands is a valuable service, though it should be stressed that the function of the Map Library is to provide the outline map only - not create the final map. As students become more familiar with computers, they are able to use basic

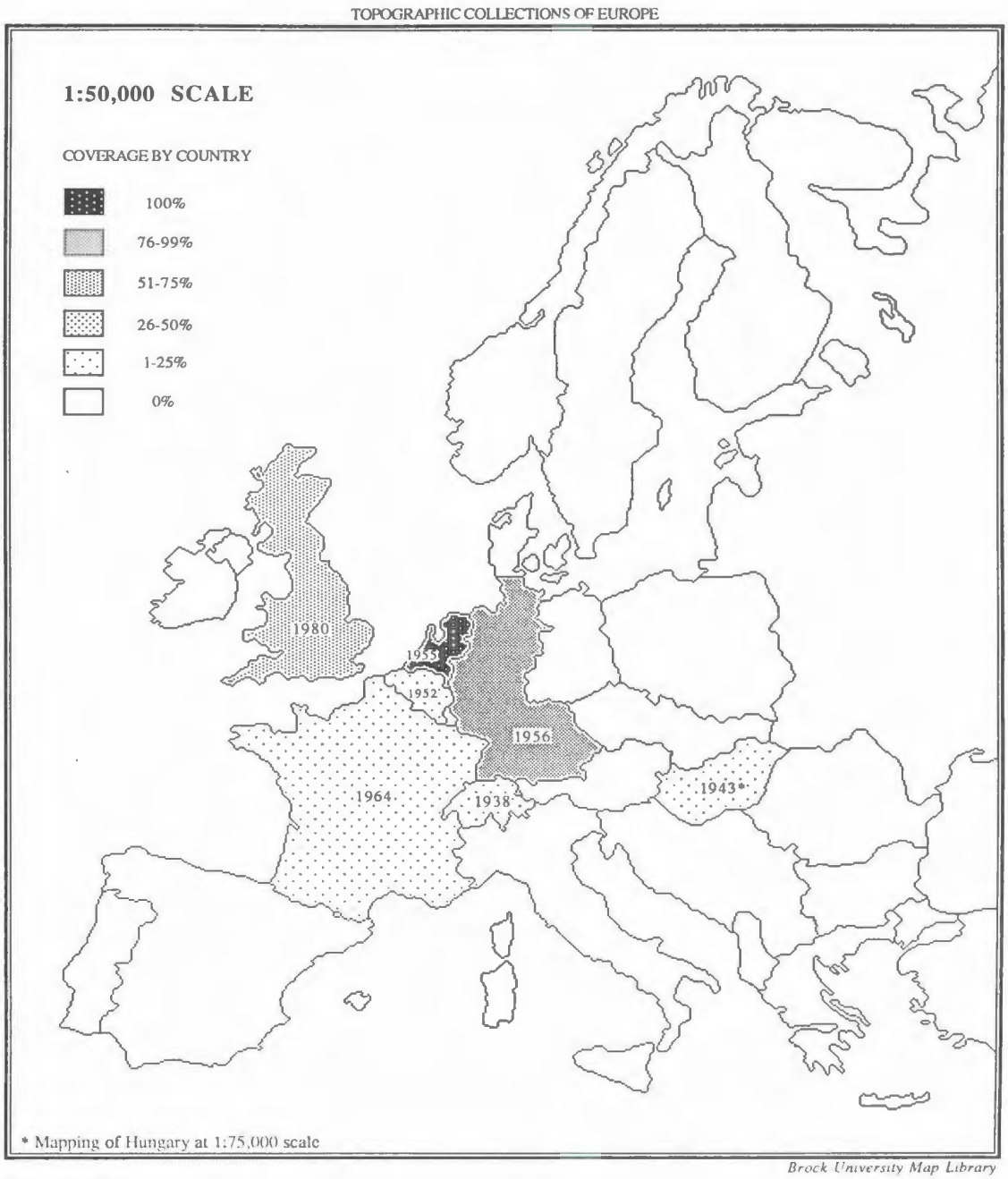

Figure 3

mapping programs to construct and modify their own maps very easily.

Map Library Maintenance

Digital base maps have been used to create map indexes for map retrieval and collection development, and for map collection inventory. The number of potential uses is unlimited, and it is possible here to discuss only a few examples.

Foreign Topographic Collections

The OCUL (Ontario Council of University Libraries) Map Group has recently completed an inventory of foreign topographic series held in Ontario University Map Libraries. As an adjunct to this project we have produced maps to illustrate the status of foreign topographic collections in the Brock Map Library. *Figure 3* illustrates our topographic collections of Europe. The base maps were taken from MacAtlas, a series of digital maps showing major regions of the world. The maps were edited at 72 dpi and completed using the SuperPaint program. Maps have been produced for each major geographical area and for each

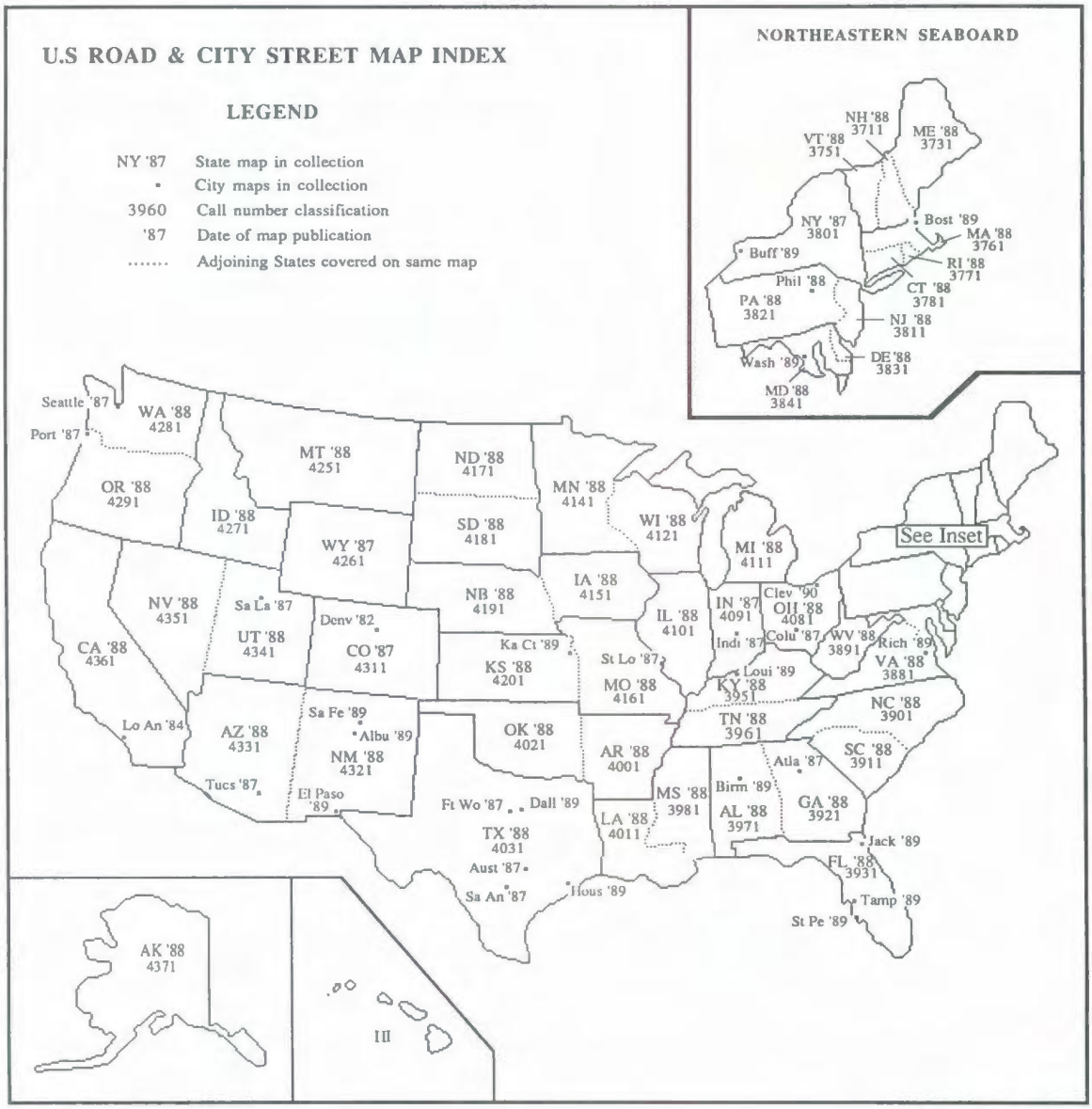

Figure 4 *Brock University Map Library*

mapping scale(1:25,000, 1:50,000, 1:100,000, and 1:250,000). The information shown on the maps includes the percentage of topographic coverage for each country and the date of the map series, with a location map accompanying each geographic section. Information can be added, deleted or changed very easily.

Further experimentation with this type of application using the HyperCard program will provide greater detail of map coverage by clicking on an area of interest, ie. Great Britain, and the Landranger 1:50,000 series index will appear with information about map holdings.

United States Road and City Street Map Index

The base map for the U.S. map index*(Figure 4)* was also derived from MacAtlas and modified using SuperPaint. Although this index looks very simple it offers a lot of useful information at a glance and has provided easy and practical guidance for road map users. This index shows the coverage of states and cities in the road map collection and the date of publication. The LC classification number for each state was added so users could go directly to the road map file and retrieve maps on their own. It should be mentioned here that all road maps in the collection are also accessible through the on-line catalogue for users searching elsewhere on campus. The index is also useful for collection development purposes.

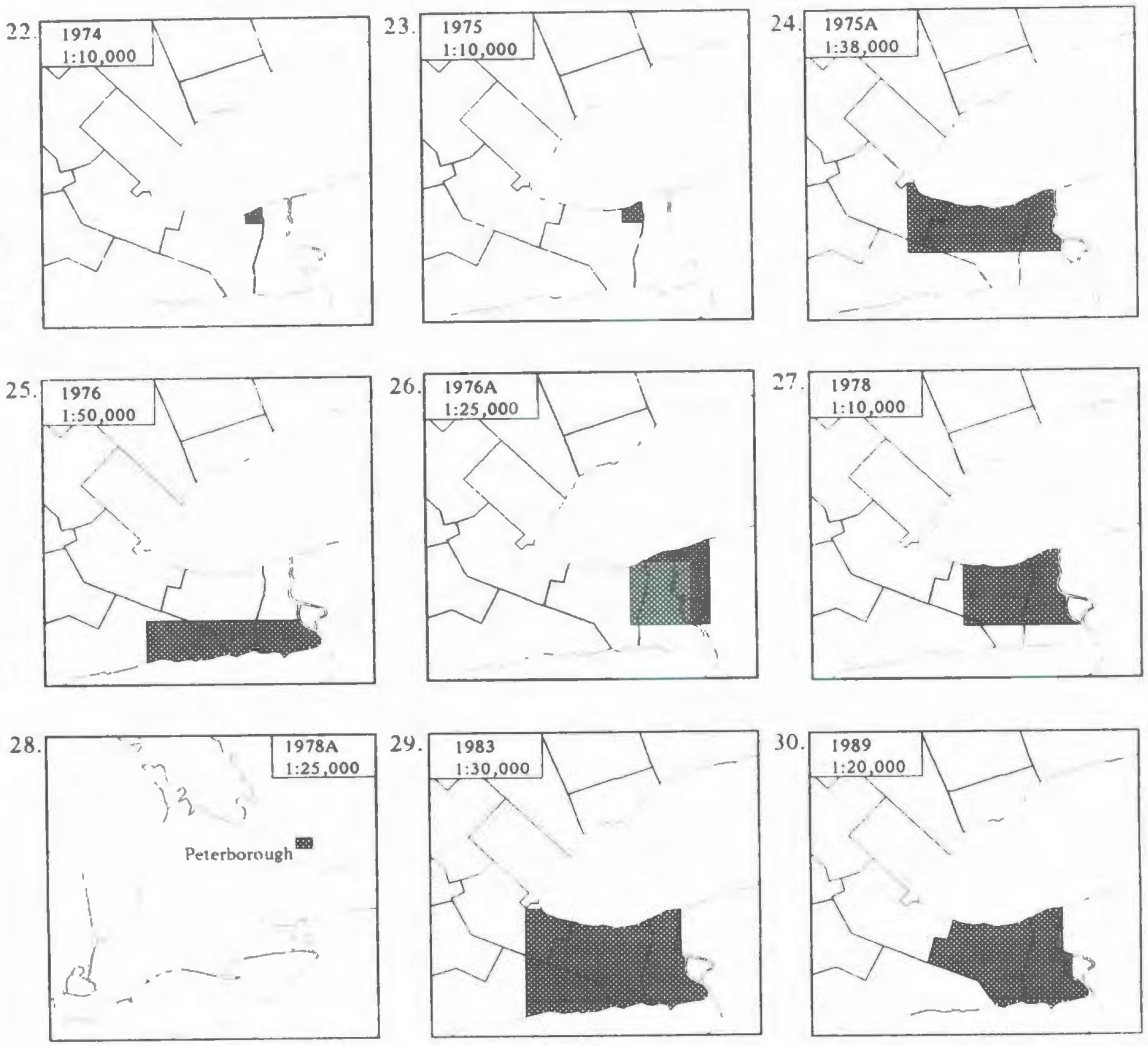

Figure 5: Air Photo Series Index

Air Photo Index

The base maps for this index *(Figure 5)* were prepared from scanned bitmaps and edited at a resolution of 300 dpi using SuperPaint. Although the indexes do not show detailed flight line or individual photo information they do show air photo coverage at a glance. Each series includes the year of photography, scale and area of photo coverage. This index is very useful as a starting point for air photo retrieval, especially for photo coverage over a period of time. It was originally produced in colour with red shaded areas representing photo coverage. The colour was produced by colour coding the shades and using a colour ribbon during the printing process on the ImageWriter LQ.

Statistical Mapping

Statistical mapping is not normally expected of a Map Librarian. However, when all information sources are exhausted and the required maps do not exist there seems to be no alternative but to create the map oneself. Local statistical maps are a frequent request in the Map Library. Since Niagara was not included in the recently published Metropolitan Atlas Series(published by Statistics Canada) statistical maps have been prepared *(Figure 6)* as part of an experimental project using the 1986 Canada Census. The base map was created from a scanned image and edited at a resolution of 300 dpi

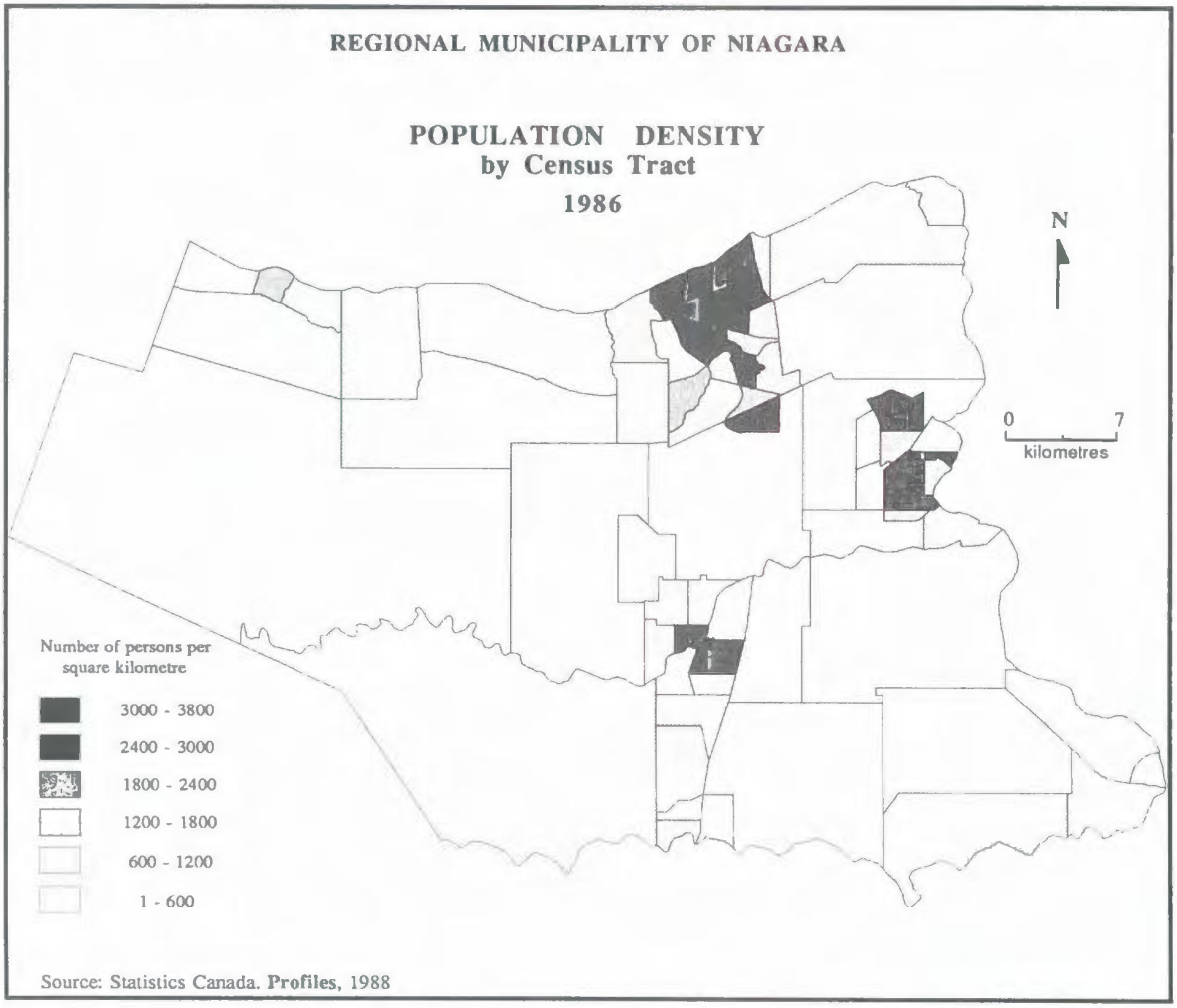

Figure 6

Brock University Map Library

using SuperPaint(the same technique used for preparation of the air photo index). Census tracts were then shaded individually in the paint layer according to statistical value using a paint tool. Colour reproduction can again be achieved by selecting colour during the shading process and using a colour ribbon during printing.

It is possible to take this mapping one step further to produce an enlargement of a selected area. For example, the area of St. Catharines can be copied from this document, modified as desired, and enlarged during the printing process to produce a statistical map showing only the municipality of St. Catharines. Although the resolution is reduced during enlargement it can be restored by editing with the Superbits function.

CONCLUSION

Most of the work described in this paper has been done within the last year or so, and I have been both amazed and exhilarated by what I have learned. The more one experiments with equipment like the Apple Scanner and works with mapping programs like SuperPaint and UltraPaint, the more possibilities emerge. With the prospect of continuing advances in both hardware and software, the future looks to be an exciting one indeed. The only problem I have encountered with all of this computer mapping business is finding the time to refile maps!!!

ACMLA HONOURS AWARD

The Awards Committee invites nominations for the ACMLA Honours Award. According to the guidelines for the award, the nominee should be a person who has made an outstanding contribution in the field of map librarianship. The contribution may either be for a specific activity or for general services and contributions such as continued membership in the Association with active participation either as an executive officer, committee chairperson, or committee member. Normally, membership in ACMLA is a prerequisite, however that does not preclude considering outstanding non-members.

ACMLA PAPER AWARD

The Awards Committee invites nominations for the ACMLA PAPER AWARD. To be nominated for the Paper Award, which carries a $200.00 monetary prize, a feature article by one or more authors consisting of at least three pages in length, must have appeared in an issue of the ACMLA Bulletin published after the last annual conference. We are looking for articles that make a solid contribution to map librarianship, including cartobibliographies. Originality, uniqueness or subject matter and depth of research will be taken into consideration. (Nominations close March 1, 1991)

Please send your nominations to:
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