



cartographic perspectives

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messages

MESSAGE FROM THE EXECUTIVE DIRECTOR

Dear Fellow NACIS Members,

With the memory of our Silver Spring conference still fresh in our minds, we are now preparing for our first full-fledged joint meeting, our first meeting outside of the US, and our first summertime meeting— all at the same time! And I'm happy to report that so far, nothing terrible has happened. The Canadian Cartographic Association (CCA) is proving to be an excellent partner in this event as they are extending every courtesy as host and taking on the bulk of the on-site duties including program preparation and registration.

As would be expected of such a joint meeting, the program is very strong and the greatest problem you will find will be deciding which concurrent sessions to attend. A round of thanks must be extended to Program Chair, Henry Castner and to his CCA counterpart, Christine Earl, for the richness of the program.

During the past year, the Executive Office has continued to



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Editor:

Dr. Sona Karentz Andrews
Department of Geography
208 Sabin Hall
3413 N. Downer Avenue
Univ. of Wisconsin-Milwaukee
Milwaukee, WI 53211
(414) 229-4872
e-mail: sona@csd4.csd.uwm.edu.

Assistant Editor
David W. Tilton

Department of Geography
Univ. of Wisconsin-Milwaukee
Milwaukee, WI 53211
e-mail:
tilton@convex.csd.uwm.edu.

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centralize various routine organizational functions. With the help of Assistant Executive Director, Susan Peschel, the Executive Office now maintains all membership records, prepares mailing labels for *CP*, issues renewal notices for all classes of members, and administers elections (with the aid of other local NACIS members who act as proctors). With the assistance of *CP* Editor, Sona Andrews, we produce and mail calls for papers, and in a normal year, prepare the preliminary and final programs. In a normal year, we are also responsible for conference registration.

There are a couple of other things to report that you might

find of interest. At the request of the editor of the Association of American Geographers Cartography Specialty Group, *CP* editor, Sona Andrews produced an attractive NACIS membership brochure to be included in that organization's publication. In addition to its appearance there, hundreds of other copies have been distributed to various other constituencies. The results have been very gratifying and we have been able to increase our membership and spark a lot of new interest in NACIS. It also shows that NACIS has tremendous growth potential if we properly promote our organization and its considerable assets. The other item is that the Board has assigned me the task of preparing a sort of a manual for the organization's officers which would draw together all of the accumulated wisdom gained through the years and basically provide a checklist of duties and responsibilities of the various offices. I would greatly appreciate any input and assistance in this task. Many of you have invented NACIS wheels or have had experiences as officers which you would like not to see repeated by your successors. Please let me know.

Let's all have a great time in
Ottawa, eh!

Chris Baruth
Executive Director

correction

Daan Strebe, author of *Geocart Software*, has made me aware, in a different context, of an error in my statements concerning Chebyshev's theorem. In my paper *How practical are minimum-*

error map projections? (*Cartographic Perspectives*, Winter 1994, p. 5) the Chebyshev theorem is said to state that if a line of constant scale bounds a region on a conformal map, the region will be mapped with minimum error in a least-squares sense. Actually, the region is mapped with a minimum range of scale, which does not always result in minimum least-squares error. My paper mentions several true least-squares projections, and this does not change the analysis and conclusions, but I regret misleading any readers.

John P. Snyder

about the cover



A map of southwest Wisconsin was scanned at 300 dpi and imported into Photoshop as a TIFF file. The *CP* logo was imported, placed over the map and pasted using Photoshop's composite controls. Map edges were softened using the airbrush tool and noise was added using a Gaussian setting of 20. Contrast was then reduced 20% for the entire composited image and the Aldus Gallery Effects Note Paper filter applied. Contrast on the filtered image was further reduced 50% and brightness was boosted 35%. The shadowed text was created in Photoshop using alpha channel masks. The color was picked by throwing a dart at a Munsell chart from a distance of 10 yards.

Aldus Gallery Effects is a trademark of Aldus Corp. Photoshop is a trademark of Adobe Corp.

feature articles

THEMATIC MAPPING WITH ILLUSTRATION SOFTWARE: UNRAVELING THE MYSTERY OF GRAPHIC FILE FORMATS

This paper focuses on using a popular microcomputer graphic design package (CorelDRAW 4.0) in conjunction with a variety of GIS/mapping software to test their capacity to transfer map images. Emphasis is placed on the advantages and disadvantages of transferring different bitmap and vector formats, rather than on the nature of the formats themselves. All of the cartographic packages tested had some capacity to export thematic maps to CorelDRAW, although some file formats provided greater flexibility than others. Generally, it appears that simpler thematic maps transfer easily, while more complex types require considerably more effort to transfer successfully. Both Windows Metafiles and Computer Graphics Metafiles proved to be efficient file formats for exporting most types of map images to CorelDRAW.

*Brian Morber and
Janet E. Mersey*

*Brian Morber is a Research Assistant
and Janet E. Mersey is an Assistant
Professor in the Department of
Geography, University of Guelph
Guelph, Ontario Canada N1G 2W1*

Anyone using a microcomputer to analyze and map spatial data has undoubtedly developed their own repertoire of preferred software tools, each of which provides some functionality not shared by the others. Geographic Information System (GIS) software for example, focuses on analytical procedures for querying, manipulating, and overlaying multiple sets of spatial data. While the result of these analyses is often a map, most microcomputer-based GIS packages have rather limited capabilities for graphic layout and map design. Even programs which focus primarily on the cartographic display of information may lack the flexibility to control such design elements as type placement along curves or color selection according to Pantone designations. If a map is to be produced for presentation or publication, more control over the map design process can be gained by employing specialized graphic illustration software to create and print the final version of the map.

The coupling of a graphic design package (such as CorelDRAW, Adobe Illustrator, Aldus Freehand, or Micrographix Designer) with a statistical, mapping, or GIS program (such as Freelance, Atlas*GIS, or IDRISI) can be a powerful combination which exploits the strengths of both. The success with which such programs can be integrated for the same cartographic project depends largely upon the ease with which digital image files can be transferred from one program to the other. Unfortunately, the same proliferation of software programs that enticed us toward the microcomputer environment in the first place have also generated a great assortment of digital file formats for storing graphic images. Because most illustration programs can import a variety of both vector (object-oriented) and raster (bitmapped) file formats, importing graphic images from a mapping or GIS program might be expected to be a smooth and seamless function. In reality, however, the process is frequently problematic, particularly when vector-based graphics are being transferred. This paper focuses on using CorelDRAW 4.0 (a popular microcomputer graphic

INTRODUCTION

design package) in conjunction with a variety of GIS/mapping software, most of which utilize vector based graphic files. Emphasis is placed on the advantages and disadvantages of file formats for transferring cartographic images, rather than on the nature of the formats themselves.

CHARACTERISTICS OF CORELDRAW

CorelDRAW is a very versatile graphics illustration program which has been widely adopted by PC users. The program was developed by Corel Corporation in Ottawa, Canada, and currently retails for about \$400 (US). The company provides frequent updates (CorelDRAW 5 is scheduled for release in the summer of 1995) and telephone technical support. Recommended minimum system requirements for Version 4.0 include a 386 CPU, Windows 3.1, 4 Mb of memory, a VGA monitor, and a Microsoft supported mouse. A full installation of the program may take up to 34 Mb of hard disk space. A CD-ROM player or drive is required if the user wishes to access the huge library of fonts and clipart images that accompany the program.

The real power of CorelDRAW for cartography lies in its capability to graphically enhance and print maps imported from other mapping or GIS programs.

It is important to recognize that CorelDRAW is a general illustration package which was not specifically designed for cartographic production. It does not support digitizing, nor can it handle geographical coordinate systems or map projections. It does not link objects to a database, so any thematic map based on classifying or sizing symbols according to data values must be accomplished with a more specialized GIS/mapping package. The real power of CorelDRAW for cartography lies in its capability to graphically enhance and print maps imported from other mapping or GIS programs.

Both vector and bitmapped graphics can be imported into CorelDRAW and mixed in a display, but only vector files can be interactively edited. Once a vector image has been successfully imported into CorelDRAW it can be manipulated in a variety of ways. Type can be added to the image from a selection of over 750 fonts. Map lettering can be easily sized and curved to fit irregular areas, or stretched and shadowed to produce special effects. CorelDRAW provides an extensive library of shapes and symbols, many of which are ideally suited to cartographic applications (weather symbols, highway shields, etc.). Over 18,000 clipart images, which are illustrated in a separate reference manual, can be accessed from an accompanying CD-ROM. Map symbols and text can be individually sized and filled with a color or pattern. Colors can be specified in one of six ways: as a Pantone color, % CMYBk (Cyan, Yellow, Magenta, and Black), % HSB (Hue, Saturation, and Brightness), % RGB (Red, Green, and Blue), from a default or custom palette, and from a list of names. Colors can also be made to blend gradually from one hue to another.

Once the symbolization and text for a map has been selected, different design and layout arrangements can be assessed. The interactive process of sizing and positioning map elements allows tremendous flexibility for experimentation before final design decisions are made. One of the most powerful functions of illustration programs is the capability for printing the color separations required for lithographic reproduction of the map. CorelDRAW handles this task nicely. Files can be printed as either negatives or positives with crosshairs and/or crop marks. Tint screen angles and lines per inch can be specified for each printed color. Trapping or overlapping one color with another is accommodated to reduce gaps that may occur due to minor registration problems.

Two supplemental programs which accompany CorelDRAW, CorelPHOTO-PAINT and CorelTRACE, provide a range of functions for modifying imported bitmap images. Although intended primarily for

retouching scanned photographs, CorelPHOTO-PAINT can be used to adjust the contrast or add special effects to raster maps such as satellite images. CorelTRACE is an autotrace program for converting bitmap (raster) images to vector format. Both programs are useful for manipulating image files prior to their importation into CorelDRAW. As such, the Corel software package essentially comprises much of the capability of a combination of other specialized graphics programs that are otherwise necessary to produce finished maps (Byrne 1993).

Clearly, illustration programs like CorelDRAW provide the cartographer with substantial capabilities for map design and printing, making them a valuable companion to more specialized GIS or mapping packages. To take advantage of these tools, it is important to be familiar with different digital image file formats which allow maps produced in PC-based GIS/mapping programs to be transferred to CorelDRAW.

Map images may be imported into CorelDRAW from various mapping programs using several different vector or bitmap export file types. Table 1 lists the export file types produced by some of the more popular PC-based computer mapping programs. The wide variety of import formats for CorelDRAW (Table 2, page 6) allows the importation of peripheral graphics from many separate software packages. Figures 1 through 8 (placed throughout the article) illustrate maps that have been produced in various GIS/mapping programs and then enhanced in CorelDRAW 4.0. These maps were imported into CorelDRAW using several file formats through steps and procedures outlined in the figure captions.

Ideally, enhancing map images in CorelDRAW should involve a minimum level of manipulation once the file has been imported. Alterations of polygon pattern and color, line widths, and thematic symbol types should be accomplished easily and quickly. This ideal necessitates importing map images comprised of closed polygons for those maps requiring polygon or symbol shading. Closed polygons are those in which the feature consists of one continuous line segment and in which beginning and end points share the same location. Of the software packages covered here, Atlas*GIS/PRO, MapMaker, Surfer, and IDRISI all create this type of closed polygon. In contrast, SPANS GIS creates polygons as a collection of line segments that are held together by topological identification rather than as one entire entity in which the starting and end points of the single line segment share a common node. Closed polygons, however, may still be possible within SPANS if the polygons are imported into the program from a digitizing package that creates common boundaries between adjacent polygons, rather than from TYDIG (the SPANS digitizing package). The World Projection program can export both open and closed polygons depending on the data set used; the larger, more detailed data sets available with the package (including the CIA World Databank I) will

IMPORTING MAP FILES INTO CORELDRAW

SYSTEM and VERSION NUMBER	FILE TYPE • = Format available				
	HPGL	Metafile	CAD	EPS	Bitmap
SPANS GIS 5.2	•		•		•
Atlas*GIS/PRO 2.1	•	•		•	
Atlas MapMaker 1.0	•	•			•
IDRISI 4.1	•		•	•	•
World Map Proj. 4.05	•			•	
Surfer 4.15	•		•	•	
Freelance 2.0	•	•			

Table 1. Available Export File Types. SPANS GIS 5.2 is running in OS/2 1.3; Atlas*GIS/PRO 2.1, IDRISI 4.1, World Map Proj. 4.05, and Surfer 4.15 are running in DOS 5.0; and Atlas MapMaker 1.0 and Freelance 2.0 are running in Windows 3.1.

FILE NAME	FILE EXTENSION	FILE NAME	FILE EXTENSION
CorelTRACE	.EPS	Micrografx	.DRW
CorelPHOTO-PAINT	.PCX	Targa Bitmap	.TGA
Windows Bitmap	.BMP	TIFF Bitmap	.TIF
Windows Metafile	.WMF	WordPerfect Graphic	.WPG
Adobe Illustrator	.AI	Ami Professional	.SAM
AutoCAD	.DXF	Excel for Windows	.XLS
CompuServe Bitmap	.GIF	Lotus 123	.WK?
Computer Graphics Metafile	.CGM	Lotus for Windows	.WK?
Encapsulated Postscript	.EPS	MacWrite II	*
GEM	.GEM	Microsoft Rich Text Format	.RTF
HPGL	.PLT	Microsoft Word	*
IBM PIF	.PIF	Microsoft Word for Windows	*
JPEG Bitmap	.JPG	Microsoft Word Mac	*
Kodak Photo CD Image	.PCD	Text	.TXT
Lotus PIC	.PIC	WordPerfect	*
MAC PICT	.PCT	WordPerfect for Windows	*

Table 2. File Types Imported by CorelDRAW 4.0

* Any file extension accepted

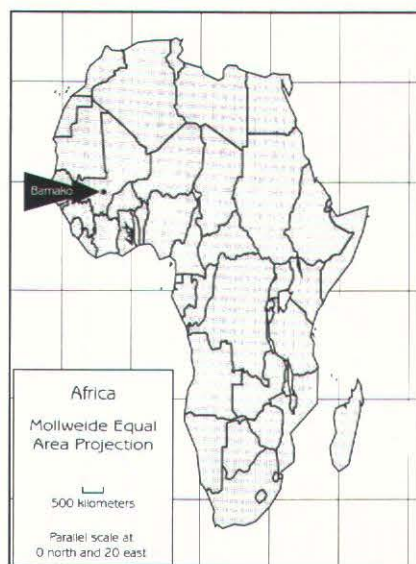
produce closed polygons, whereas the smaller, less detailed files such as the Dahlgren data set will not.

The implication of open polygons for map image manipulation in CorelDRAW is that polygons will not be shaded, making choropleth, dasymetric, or even figure-ground representations difficult to achieve. Line work, consisting of open-ended vectors used to represent roads or rivers (and the component vectors comprising the open polygons), may still be altered in terms of line width and color. The whole or parts of the map image may also be re-sized, skewed or mirrored, regardless of whether polygons are open or closed. However, the use of open polygons must be seen as providing limited flexibility for manipulation once imported into CorelDRAW. Although it is possible within CorelDRAW to close open polygons, this is a tedious process at best (even for a small number of polygons) and defeats the purpose of having the computer do much of the work involved in producing a map.

PLOT FILES

HPGL is currently the most familiar and popular export format available among GISs (Strand 1992). HPGL plot files translate to CorelDRAW in the same manner as they are drawn onto hard copy with a pen plotter. The vector structure of the image is preserved, although polygon fills are represented by a dense pattern of lines. Problems occur upon importing these fills into CorelDRAW, as each component vector of the fill is treated as a separate entity, creating a large file that is time consuming to process. Furthermore, it is not possible to select the vector fill of the polygon in order to manipulate characteristics such as polygon color or pattern. Most line work (e.g. polygon or point symbol outlines, roads, etc.) will be satisfactorily

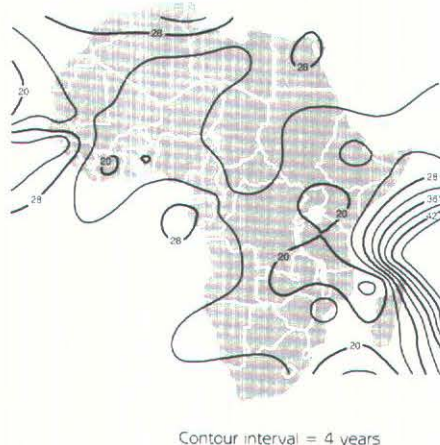
Figure 1. The Mollweide projection for this map was assigned in the World Projection program. The map image, the graticule, city location dot, scale, and scale caption were exported as an HPGL plot file. The map title, city name and locator arrow, and polygon fill were added in CorelDRAW. The map polygons were grouped and placed in front of the graticule to produce the final map.



reproduced from a plot file, although vectors must be represented by solid lines when exporting, as dashed or dotted lines are disassembled by CorelDRAW into an excessive number of objects which can no longer be manipulated as a single entity. Relative line widths will be preserved on importing into CorelDRAW.

The preparation required to successfully transfer a map to CorelDRAW depends upon the success with which various cartographic elements are translated into CorelDRAW. For example, not all mapping programs will export text recognizable as such by CorelDRAW. Text characters not recognized by the program will translate as curves that cannot be manipulated with a text editor. In such a case text may be omitted from the source map to reduce file size and processing time once in CorelDRAW. Table 3 lists those map elements that transfer successfully to CorelDRAW for each of the mapping programs that produce plot files for export. It should be noted that the classification represented in this and following tables is based on the capability to manipulate map elements in CorelDRAW. For example, imported text must be alterable in terms of textual content, font, size, and color. Vectors are expected to be manipulated in terms of line width, color, and style. Polygon fill must allow flexibility in terms of changing color and/or pattern, while point symbols, whether thematic (houses, proportional symbols) or positional (dots, crosshairs) must be alterable in terms of color and/or size. Repetitive dots require little transformation when in CorelDRAW, except perhaps for color, although any method of successfully importing repetitive dots was accepted for inclusion in the tables. As a guide, those elements that do not transfer

Population Doubling Time in Africa



Contour interval = 4 years

Elevation Model of Africa

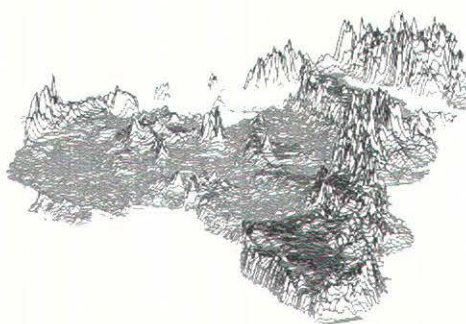


Figure 2. The isolines for population doubling time were interpolated and derived from Surfer, then exported as an HPGL plot file. Although the outline of Africa was also exported with the plot file, a Windows metafile was clipped into CorelDRAW from Atlas*MapMaker to provide a background with polygon fill. This procedure required that the same map projection be used on both maps so that they could be registered properly in CorelDRAW. The final text and isoline labels were added in CorelDRAW.

Figure 3. The elevation model was created in IDRISI, saved as a screen dump image, and exported as a TIFF file with a color palette. The TIFF was brought into PHOTO-PAINT, converted to a grey-scale and sharpened prior to importing into CorelDRAW, where the title text was added.

Table 3. Transfer Capability of Plot Files

SYSTEM	MAP ELEMENTS				
	Text	Vector/ Polygon outline	Polygon fill	Point symbols	Repetitive dots
SPANS GIS	Yes (1)	Yes	No	No	(NA)
Atlas*GIS/ PRO	No	Yes	No	Yes	Yes
Atlas MapMaker	No	Yes	No	Yes	Yes
IDRISI	(NA)	Yes	(NA)	Yes (3)	(NA)
World Map Proj.	Yes (1)	Yes (2)	No	Yes	(NA)
Surfer	No	Yes	(NA)	(NA)	(NA)

(1) Text strings will be broken up into component words.

(2) Requires World Databank I & II data and creation of a World area file (.ARE extension).

(3) Only positional point symbols available.

The advantages of using plot files for export vary with the mapping program.

should be deleted from the original source map file when possible, and added individually in CorelDRAW.

Once in CorelDRAW, objects without fill must be selected by clicking on the wireframe outline; if the object represents a closed figure, color or gray shades may be applied. Different line styles may be applied to line work once the image is in the CorelDRAW environment. The advantages of using plot files for export vary with the mapping program. In general, they include the easy transfer of solid line work and text to CorelDRAW, as well as a manageable file size. In addition, the transfer of sectored circle symbol outlines from MapMaker to CorelDRAW is possible and more than one map layer can be transferred simultaneously from MapMaker and Atlas*GIS/PRO.

Some of the problems of using plot files for export to CorelDRAW include the inability to export polygon fills and the potential that polygons or symbols may not always be closed upon transfer. Another disadvantage is that proportional circles exported from MapMaker to CorelDRAW will be transformed to large, meaningless ellipses in CorelDRAW. Circles from Atlas*GIS/PRO will export successfully as plot files because Atlas*GIS/PRO actually draws circles as many-sided polygons. The color fill, however, should be omitted in Atlas by selecting "open circle" as the proportional symbol. Dot density maps raise other issues. They will transfer from Atlas*GIS/PRO and MapMaker, however, they result in a large number of objects in CorelDRAW, increasing processing time and file size and reducing the flexibility to make adjustments to the image. Finally, some programs are not able to satisfactorily transfer text to CorelDRAW using plot files.

METAFILES

Metafiles are commonly produced in both the Computer Graphic Metafile standard (CGM), and in the Windows Metafile standard (WMF). Unlike plot files, metafiles can support the export of both bitmap fill and vector components of an image (Strand 1992). However, problems in color compatibility may exist between metafiles produced by different graphics programs (Will-Harris 1992). As a result, particular hues specified in the originating mapping program may not translate well into CorelDRAW, and may have to be reassigned within CorelDRAW. Both CGM and WMF formats can be imported into CorelDRAW and appear to differ only in terms of the operating system in which they are produced. Atlas*GIS/PRO will produce a CGM, while Windows based Atlas MapMaker will produce a WMF. SPANS GIS will also produce a metafile with a .MET file extension. This metafile, however, is produced through the OS/2 system, and our attempts to import the SPANS-produced files into any other DOS or Windows software have been unsuccessful. It is important to note that Atlas MapMaker does not export to a WMF explicitly, but can generate temporary metafiles through the Windows Clipboard utility,¹ whereas Atlas*GIS/PRO can be directed to print to a CGM file for export.

Should it be necessary to transport a temporary Clipboard metafile on floppy disk, the task may be accomplished by: a) accessing the Clipboard utility in Windows, at which point the cut or copied image should appear on the Clipboard; b) saving the Clipboard file using the **File - Save** command within the Clipboard utility; c) recalling the Clipboard file into

¹ Atlas MapMaker can produce a WMF transparently when the map image is cut or copied to the Windows Clipboard. The Clipboard output format must be set to "Picture" (use the Edit - Clipboard - Formats command), which specifies Clipboard output to be in WMF format. The image is stored temporarily within the operating system until it can be transferred into CorelDRAW using the Edit - Paste command.

the Clipboard utility when ready to proceed, and; d) pasting the Clipboard file into the current software application (using **Edit - Paste** for CorelDRAW). In step "b" it should be noted that, although the image is saved to the Clipboard as a WMF, it will have a .CLP file extension, which enables its identification and recall back into the Clipboard for subsequent pasting (this file extension should not be altered). The Windows, CorelDRAW and MapMaker manuals contain more information on cutting, copying, saving, and pasting files to and from the Windows Clipboard, and instructions for switching between applications within the Windows operating system.

Table 4 lists those map elements that transfer successfully to CorelDRAW from Atlas*GIS and Atlas MapMaker using the metafile export format. As with plot files, line work exported through metafiles should be represented by solid lines only. Color fill should be added to both polygons and map symbols, while polygon or symbol outlines should be deleted when possible. CorelDRAW will import a polygon outline and fill as two separate entities, leading to duplication of map elements within the CorelDRAW file. If only the fill of objects is exported it will be much easier to select and manipulate polygons and symbols within CorelDRAW. Also, if polygon or symbol outlines are required on the map they may be added easily in CorelDRAW. Once imported into CorelDRAW, polygons and symbols may be selected and manipulated by clicking on the fill itself, which proves to be much quicker than having to click on narrow wireframe outlines. It is also recommended that polygons be exported from their originating programs with full polygon fill, as opposed, for example, to 50% or

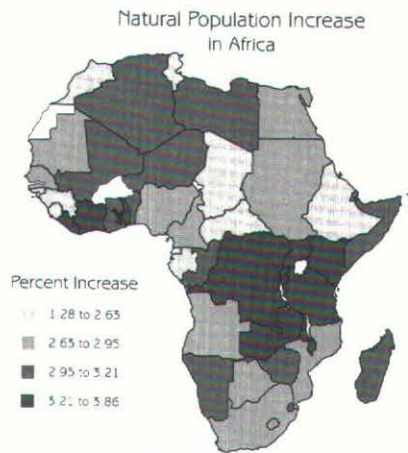


Figure 4. The choropleth classification for population increase was created in Atlas*GIS/PRO and exported as a CGM file. Polygons of similar classes were grouped and assigned associated grey shades in CorelDRAW. The legend and final text were also added in CorelDRAW.

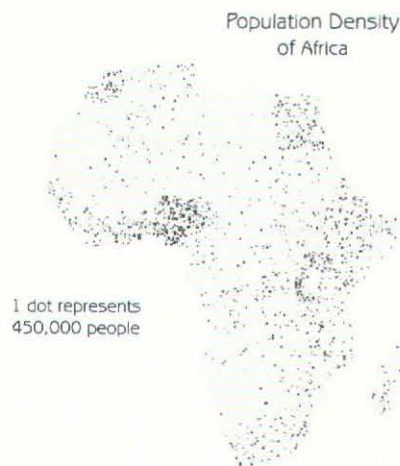


Figure 5. The dot density map of Africa population was originally created in Atlas*MapMaker, and clipped to CorelDRAW in bitmap format. Since text would not transfer as a bitmap, the title was added in CorelDRAW. Although the image is not as sharp as one produced by a plot file, this method does overcome the memory problems inherent with importing a large number of dots.

Table 4. Transfer Capability of Metafiles

SYSTEM	MAP ELEMENTS				
	Text	Vector/ Polygon outline	Polygon fill	Point symbols	Repetitive dots
Atlas*GIS/ PRO	No	Yes	Yes	Yes	Yes
Atlas MapMaker	Yes	Yes	Yes	Yes	Yes

25% shading. CorelDRAW may interpret the stippled dot pattern that results from this process as a multitude of small dots, and therefore produce an excessive number of objects.

The advantages and disadvantages associated with metafiles produced by Atlas*GIS and MapMaker are related in part to the capability they possess for thematic mapping. The advantages include the ability to transfer polygon or symbol fill, especially useful in the production of choropleth, dasymetric, and proportional symbol maps; the easy transfer of line work (solid lines); and the successful transfer of repetitive dot symbols, the number of which is limited by computer memory. A disadvantage is the poor reproduction of sectored circles transferred from Atlas MapMaker. If sectored circles with more than two slices are to be exported with a metafile, it is probably better to omit the fill within the slices while keeping the slice outlines intact and adding the fill later in CorelDRAW. There are also other limits in using metafiles. Windows Metafiles (Clipboard transfer) do not permit more than one map layer to be exported at once. CGM files produced by Atlas*GIS/PRO allow the successful transfer of cartographic features only if they have fewer than 1999 points or vertices. As a result, very intricate polygons or lines may have to be simplified either by generalization or by severing a complex feature into smaller component polygons or lines.

AUTOCAD AND GENERIC CAD FILES

Of the mapping programs discussed in this paper, SPANS GIS, IDRISI, and Surfer provide the option of exporting in CAD format. Our attempts to import the IDRISI-produced CAD files into CorelDRAW have been unsuccessful. Surfer-produced CAD files import successfully and create closed polygons within Corel when closed polygons are components of the map image. Two options are provided by SPANS: AutoCAD and generic CAD, both having DXF file extensions. Both types have been successfully imported into CorelDRAW, although the problem of open polygons is especially pronounced. The vector image may be disassembled into component line segments, producing a larger number of objects when imported into CorelDRAW. For example, a simple three-dimensional image exported as a AutoCAD DXF file actually imported into CorelDRAW as more than 12,000 objects. As a collection of open-ended vectors, the map image can only be manipulated in terms of overall

size, line width and line color once imported into CorelDRAW. If the image consists of few separate areas that do not have common boundaries the cartographer may wish to assemble the separate lines into a closed polygon for better effect once the image is in CorelDRAW.

Table 5 lists those map elements that are successfully transferred to CorelDRAW using the CAD export format. Little or no image

preparation is necessary prior to producing CAD files from SPANS. Only the vector images will be exported, while any raster overlay will not be included in the export file. Since text will not transfer to CorelDRAW, it is not necessary to include it in the DXF files created for export. Surfer DXF files may be produced without prior image preparation, although at times it may be advantageous to eliminate isoline labels, which transfer to

SYSTEM	MAP ELEMENTS				
	Text	Vector/ Polygon outline	Polygon fill	Point symbols	Repetitive dots
SPANS GIS	No	Yes	No	No	(NA)
IDRISI	(NA)	No	No	No	(NA)
Surfer	No	Yes	(NA)	Yes	(NA)

Table 5. Transfer Capability of CAD Files

CorelDRAW as curves rather than text objects, and tend to create line breaks in otherwise closed polygons.

Because DXF formats are widely used, they provide the capability to import images from a variety of graphing, mapping, and GIS programs. Another advantage to the DXF format is that closed polygons will be transferred successfully from Surfer to CorelDRAW. Some disadvantages in using CAD export formats are the impossibility of transferring polygon fill to CorelDRAW, the possible disassembly of SPANS-produced vector images, and the conversion of Surfer-produced text to curves in CorelDRAW.

Encapsulated postscript files (EPS) potentially offer the greatest utility and flexibility with respect to transferring map images to CorelDRAW. They export comprehensive information describing the graphic image, for example, vector and bitmap components of a map, as well as information enabling the transfer of type fonts (Will-Harris 1992, Strand 1992). In addition, postscript files have provided some of the earlier capability for transferring cartographic images to graphics and illustration packages, including Adobe Illustrator (DiBiase 1991). Atlas*GIS/PRO, IDRISI, Surfer, and the World Projection program produce Encapsulated postscript files. While Atlas*GIS/PRO produces a generic EPS file, the World program offers two EPS formats: a generic EPS file, and an Adobe Illustrator format EPS with either an .EPS or .AI file extension. IDRISI produces a file with an Adobe Illustrator .AI extension. We have found that neither of the generic EPS files produced by Atlas*GIS/PRO and World successfully import into CorelDRAW, while attempts at importing the Adobe Illustrator format available with IDRISI and World met with some success.

In general, EPS files should provide the best file transformation results, as type fonts and polygon shades should be preserved on importing into the receiving program. Although IDRISI .AI files import easily into CorelDRAW, they do not transfer polygon fill and the vector outlines do not import as closed polygons. Similarly, the transformation of the World-produced files is not entirely successful, as neither text nor polygon shades are transferred to CorelDRAW. The World Projection manual notes that polygon fills are configured to Adobe Illustrator standards, assuming that the receiving program possesses the information necessary to reproduce the fill. However, this does not appear to be the case with CorelDRAW.

ENCAPSULATED POSTSCRIPT FILES

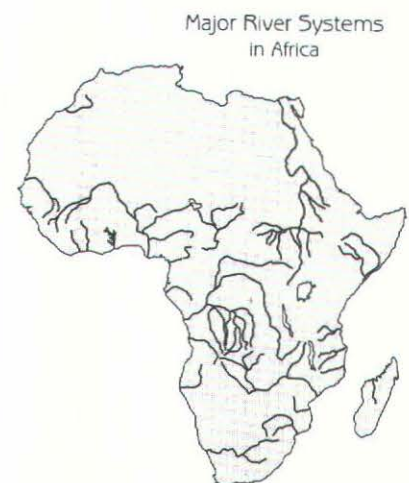
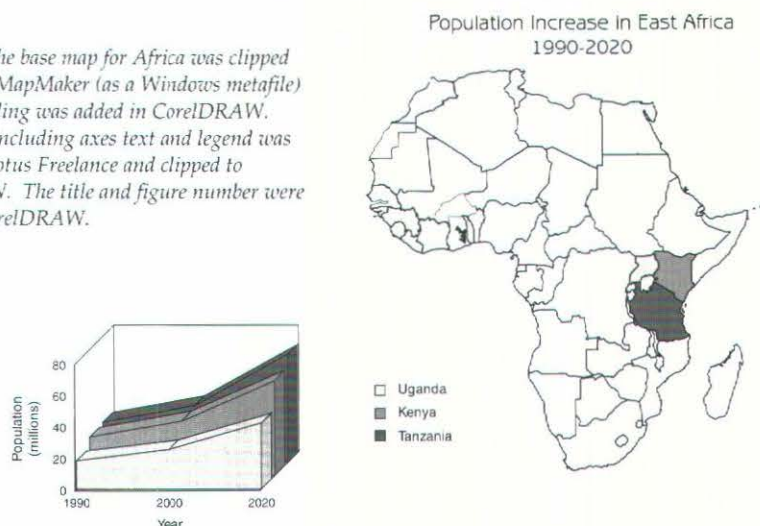


Figure 6. The outline map and rivers of Africa were imported from SPANS as an AutoCAD DXF file. It was possible to close the small number of polygons within CorelDRAW and add a background shade to the continent.

Figure 7. The base map for Africa was clipped from Atlas*MapMaker (as a Windows metafile) and the shading was added in CorelDRAW. The graph, including axes text and legend was created in Lotus Freelance and clipped to CorelDRAW. The title and figure number were added in CorelDRAW.



SYSTEM	MAP ELEMENTS				
	Text	Vector/ Polygon outline	Polygon fill	Point symbols	Repetitive dots
Atlas*GIS/ PRO	No	No	No	No	No
IDRISI	(NA)	Yes	No	Yes*	(NA)
Surfer	No	No	(NA)	No	(NA)
World Map Proj.	No	Yes	No	Yes	(NA)

Table 6. Transfer Capability of Postscript Files

* Only positional point symbols available.

Since only the World and IDRISI programs successfully export postscript files for transfer to CorelDRAW, file preparation in Atlas*GIS/PRO and Surfer are excluded from the following discussion. Little preparation is necessary prior to producing the export file in World. Table 6 lists those map elements that are successfully transferred to CorelDRAW. Before whole polygons can be exported from World (again, using one of the more detailed data sets), a World area file (file extension .ARE),

similar to a polygon file in other computer mapping standards must be produced. The area file must be shaded, although inclusion of the polygon outline is optional. The procedure offers a shading gradient from white, through gray shades, to black. Any shade selection other than full black will result in an error when importing into CorelDRAW. As a result, the choropleth mapping option provided by World cannot have shaded data representation exported to CorelDRAW, whereas this is possible for an Atlas*GIS/PRO metafile. In addition, depending on the projection selected, not all of the geographic regions will be represented as closed polygons. An example of this includes those regions that lie on the outskirts of a projection grid. It should also be noted that even if only part of the globe is to be exported to CorelDRAW, the entire global graticule will be exported with the map image unless extraneous grid lines are excluded by enclosing the map image within a window. Exporting the entire global grid will produce an unnecessarily large file, while dwarfing the geographical image (e.g. North America) once imported into CorelDRAW.

The Adobe Illustrator EPS export file format would appear to offer few, if any advantages for the purposes of importing World Projection and IDRISI map images into CorelDRAW. The inclusion of information with respect to fonts exaggerates the size of EPS files in comparison with other export file formats, increasing processing time. In fact, exporting map images as plot files would be equally suitable, while creating smaller, more manageable files. Other disadvantages inherent with the use of postscript files include the inability to transfer closed polygons from IDRISI; the inability to transfer text and polygon fill from World; and the fact that vectors imported from World may appear with an excessive line width (e.g. 6 inches).

BITMAPS

Atlas MapMaker and IDRISI both produce bitmaps as export file formats. MapMaker can utilize the Clipboard utility within Windows to paste images in bitmap standard into CorelDRAW. IDRISI will export map images as TIFF bitmaps that can be accepted by CorelDRAW. Although not evaluated here, the currently available update version of SPANS GIS (version 5.3) promises a PCX bitmap export format which should be importable into CorelDRAW.

Once in CorelDRAW, bitmap images may be manipulated only in terms of size and orientation, while the polygon and line shades remain fixed. In TIFF images produced by IDRISI, vector patterns will be reproduced as they appeared in the original raster image, as a series of pixels of

uniform width. An alternative to importing directly into CorelDRAW is to first bring the TIFF file into CorelPHOTO-PAINT, an adjunct program available with the main CorelDRAW package. PHOTO-PAINT allows some manipulation and enhancement of the shades in the image by using traditional Windows tools such as pen nibs, erasers, etc. The principal advantage of using PHOTO-PAINT as a step toward the final map is the ability to refine the map image for subsequent presentation and finishing in CorelDRAW. Although processing of map images may be tedious, an advantage in using TIFF files is the ability to import and present satellite imagery in CorelDRAW. PHOTO-PAINT can be used to enhance these satellite images to increase the detail in areas of interest.

There are differences in the TIFF information exported from IDRISI and Atlas MapMaker. IDRISI exports only the raster map image, while omitting any peripheral information including legend or title. MapMaker can save a map image to the Clipboard for pasting into CorelDRAW and can include most map elements in the transfer (Table 7). Unlike some vector files, little or no preparation is necessary prior to creating the IDRISI export version, while none is necessary for the Clipboard bitmap in MapMaker. Upon creating a TIFF file the IDRISI program will inquire whether a palette should be exported with the image. For color maps the best results can be achieved by exporting a full color palette with the image. Exporting a color image without a palette or with a gray scale palette will result in a monochrome image in CorelDRAW and PHOTO-PAINT that is almost uniformly black. Exporting a black and white satellite image for CorelDRAW is best accomplished by including a gray scale palette with the image.

In summary, some of the advantages of using the bitmap format include the ability to import, clarify (using PHOTO-PAINT), and display satellite images and scanned air photos derived from IDRISI's TIFF format. It is also possible to transfer from MapMaker more than one layer of data simultaneously, as well as screen marginal information if desired. For simple maps CorelTRACE may be used to create an EPS vector file from a bitmap file for subsequent use within CorelDRAW, although attempts at this process have met with limited success. Some disadvantages to using the bitmap format include the lack of flexibility in terms of post-import image manipulation, as well as a generally poor image resolution inherent in many bitmap. Also a problem is the large file sizes (even for simple images) that result if an IDRISI TIFF file is exported with a full color palette.

Table 8 presents a summary of the utility and ease with which various export file formats were found to transfer map images to CorelDRAW for the tested software packages. The Map Type column lists a variety of thematic map types, along with cartographic programs that are able to produce each map type.

In terms of the amount of information transferred to CorelDRAW, the most success was attained using Windows Metafiles (usually transferred

Table 7. Transfer Capability of Bitmap Files

SYSTEM	MAP ELEMENTS				
	Text	Vector/ Polygon outline	Polygon fill	Point symbols	Repetitive dots
SPANS GIS	not tested	not tested	not tested	not tested	not tested
IDRISI	(NA)	Yes (1), (2)	Yes (2)	Yes (2), (3)	(NA)
Atlas MapMaker	No	Yes (2)	Yes (2)	Yes (2)	Yes

(1) Vectors may be exported in bitmap format by transforming vectors to raster within IDRISI or by a screen dump of a raster image with a vector image overlaid on the monitor.

(2) Feature colors (& pattern of polygon fill) may be manipulated with CorelPHOTO-PAINT.

(3) Only positional point symbols are available.

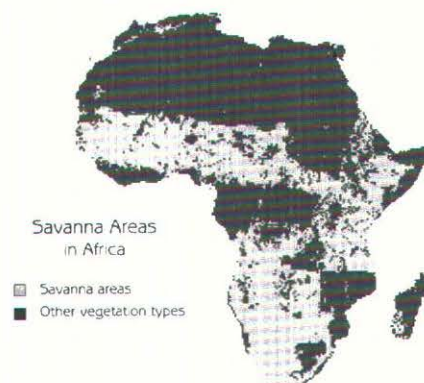


Figure 8. The raster image of vegetation was created in IDRISI and exported as a TIFF file with a color palette. The TIFF file was brought into CorelPHOTO-PAINT where the palette was changed to grey-scale and brought into CorelDRAW for the addition of text and final printing.

SUMMARY AND RECOMMENDATIONS

Table 8. File Format Ratings

MAP TYPE	PROGRAM	FORMAT				
		Plot File	Metafile	CAD	Postscript	Bitmap
<i>Outline map</i>	SPANS GIS	A	F	A	(NA)	(NA)
	Atlas*GIS/PRO	A	A	(NA)	F	(NA)
	Atlas MapMaker	A	A	(NA)	(NA)	C
	IDRISI	A	(NA)	F	A	C
	World Map Proj.	A	(NA)	(NA)	C	(NA)
	Surfer	A	(NA)	A	F	(NA)
<i>Choropleth</i>	SPANS GIS	F	F	F	(NA)	(NA)
	Atlas*GIS/PRO	C	A	(NA)	F	(NA)
	Atlas MapMaker	C	A	(NA)	(NA)	C
	IDRISI	C	(NA)	F	C	C
	World Map Proj.	C	(NA)	(NA)	F	(NA)
<i>Proportional symbols</i>	Atlas*GIS/PRO	B	A	(NA)	F	(NA)
	Atlas MapMaker	B	A	(NA)	(NA)	C
<i>Dot maps</i>	Atlas*GIS/PRO	B	B	(NA)	F	(NA)
	Atlas MapMaker	B	B	(NA)	(NA)	C
<i>Bivariate maps</i>	Atlas*GIS/PRO	B	A	(NA)	F	(NA)
	Atlas MapMaker	B	F	(NA)	(NA)	C
<i>Sectored circles</i>	Atlas MapMaker	B	B	(NA)	(NA)	C
<i>3-D maps</i>	SPANS GIS	C	F	C	(NA)	(NA)
	IDRISI	F	(NA)	F	F	C
	Surfer	A	(NA)	A	F	(NA)
<i>Satellite images</i>	IDRISI	F	(NA)	F	F	B

Letter grades are as follows: A - file format works satisfactorily; B - file format works with some limitations; C - file format should only be used as a last resort to transfer map image to CorelDRAW; F - file format does not satisfactorily transfer map images to CorelDRAW; and (NA) - file format is not available for that particular mapping package.

through the Clipboard utility) followed by Computer Graphics Metafiles. It should be kept in mind that different software programs may produce slightly different versions of export file formats and results of transferring CGMs or TIFFs from programs other than those included here may differ from those reported in this paper. WMFs, however, should be standard throughout the Windows platform so whenever a cartographic program is Windows-based it is recommended that Windows Metafiles be used to transfer map images to CorelDRAW. Alternatively, due to a lack of post-import flexibility, it may be best to leave bitmap file transfers as a last resort.

Although most map images may be transferred from cartographic packages to CorelDRAW it is important to note that the effort required varies for different map types. For example, choropleth and proportional symbol maps may be transferred relatively easily and quickly with appealing results in the final map. The transfer of dot maps on the other hand, may involve more effort, including some sessions of trial and error to achieve an acceptable final product. In some cases, the final product may be less satisfactory than desired.

The capabilities offered by CorelDRAW, however, allow the cartographer to expand greatly on the product that may be achieved using any of the cartographic software packages alone. The variety of export file formats available with any number of software packages lends flexibility to overcome various obstacles that may hinder the enhancement of maps in CorelDRAW. As this paper illustrates, transferring map images between application packages is not always easily accomplished. The guidelines reported in this study reflect the results of repeated experimentation using multiple file formats, mapping programs, and map elements. The bright side of the story is that virtually every map, regardless of the program with which it was created, could eventually be successfully imported into CorelDRAW. Identifying the appropriate file format to facilitate this transfer is the key to unlocking the impressive capabilities of CorelDRAW and other illustration packages. The task, however, is well worth the effort and hopefully the recommendations reported here will make the road a little smoother for those who wish to explore the graphic potential of CorelDRAW.

The bright side of the story is that virtually every map, regardless of the program with which it was created, could eventually be successfully imported into CorelDRAW.

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RESUMEN

Este trabajo enfoca el uso del diseño gráfico microcomputarizado (CorelDRAW 4.0) en conjunción con una variedad de software de mapas GIS para examinar su capacidad de transferir imágenes de mapas. Se hace énfasis en las ventajas y desventajas de transferir diferentes mapas y formatos vectores y no en la naturaleza de los formatos. Todos los paquetes de cartografía examinados tienen capacidad de exportar mapas temáticos a CorelDRAW, aunque algunos formatos tienen mayor flexibilidad que otros. Generalmente, parece que los mapas mas sencillos se transfieren con mas facilidad, mientras que los mapas de tipo más complejo requieren mucho más esfuerzo para ser transferidos con éxito. Los formatos Metafiles para Windows y los gráficos computarizados Metafiles han dado prueba de ser formatos eficientes para exportar la imagen de la mayoría de tipos de mapas a CorelDRAW.

SOMMAIRE

Ce mémoire se concentre sur l'utilisation d'un ensemble conceptuel graphique de micro-ordinateur connu (CorelDRAW 4.0) en conjonction avec divers logiciels de cartographie/GIS pour mettre à l'épreuve leur capacité à transférer des images cartographiques. L'emphasis se porte sur les avantages et les désavantages du transfert de différent formats de fichiers-mode point et de fichiers vectoriels plutôt que sur la nature même des formats. Tous les groupes cartographiques mis à l'essai possédaient une certaine capacité à exporter des cartes thématiques à CorelDRAW, bien que certains formats de fichiers aient fait preuve de plus de souplesse que d'autres. D'une manière générale, il semble que les cartes thématiques plus simples se transfèrent facilement tandis que les cartes plus complexes demandent des efforts considérables pour que le transfert soit réussi. Les Metafiles Windows et Computer Graphic se sont prouvés des formats fichiers efficaces pour l'exportation de la plupart des images cartographiques à CorelDRAW.

Culture of the Wisconsin Official State Highway Map

Wood and Fels (1986) strikingly reveal that even a cartographic product as "taken for granted" as a road map is as much a tool of the maker as of the user. Indeed, a highway map comprises a sophisticated package of messages. In this paper, a series of State of Wisconsin official highway maps is examined to illustrate that each is a product of the culture in which it is produced. Map messages reflecting state institutional cultures are communicated through the principal state map image as well as through other map elements. Examples are selected from the 1920s to the present to highlight a changing transportation and mapmaking culture, appropriation of the official state highway map as a tool of tourism and gubernatorial promotion, and the presence of certain persistent and disturbing depictions of women and minorities. Wisconsin's official highway map is found to include both deliberate and unintentional reflections of the changing (and in some aspects, unchanging) state of the state.

Mark H. Bockenhauer

Mark H. Bockenhauer is an instructor of Geography at St. Norbert College, De Pere, WI 54115

In their 1986 article, "Designs on Signs/Myth and Meaning in Maps," Denis Wood and John Fels state that highway maps are "accepted as inevitable, as about as natural a thing as can be imagined," and even a cartographic product as "taken for granted" as a highway map "trades in values and ambitions," and "is politicized" (Wood and Fels 1986, 63, 72). Whether beneath unpaid parking tickets in the glovebox or unpaid bills in the desk drawer, the highway map is more than likely the most used map by the typical state resident. Even though Robinson and Petchenik (1976, 14) include the "common road map" as an example of a "less sophisticated" tool of study, there is no doubt that highway maps are indeed sophisticated and multi-purpose. They are full of messages and meanings and are used by both motorist and maker alike.

INTRODUCTION

Wood and Fels' (1986) deconstruction of a single edition of the 1978-79 North Carolina official highway map was a springboard to an incisive discussion of cartographic conventions and map messages. One might ask what would a series of road maps from a single state reveal about the cultural contexts of their makers? To gain a perspective on this issue, fifty-one Wisconsin official state highway maps, spanning a seven-decade period were examined. The discussion which follows is based on a longitudinal reading of these maps in an attempt to discern agendas of the makers (whether intended or not), and to discover how these agendas may (or may not) have changed.

For its 70-plus year history, Wisconsin's official state highway map has portrayed how the state is, and in some ways how it should be, to those who map it. Three dominant "cultures" can be identified as factors influencing the map product: a transportation/modernization culture, a culture of promotion, and a subtle, beneath-the-surface culture of domination. A deconstructionist view is adopted for this examination. Harley describes the deconstructionist approach as a "search for the social forces that have structured cartography and to locate the presence of power—and its effects—in all map knowledge" (Harley 1989, 2). Examples are drawn from various editions of Wisconsin's Official State Highway Map

CULTURE OF
TRANSPORTATION/
MODERNIZATION

These maps were not just the products of an advancing technology of cartographic methods, but also products of a culture of a progressing transportation technology . . .

in order to highlight how these cultures influenced the map products and messages.¹ The focus here is primarily on the map products, and the ideas presented are not intended as an in-depth analysis of all aspects of Wisconsin's political or transportation culture.

Wisconsin formally entered the transportation business in 1911 when the Wisconsin State Highway Commission was established to administer state aid for roads. Up until that time roads had been a local government responsibility. With the passage of the Federal Highway Aid Act of 1916 the federal government became a highway transportation player and the state agency became receiver and distributor of these funds (Beimborn 1987, 209). Wisconsin produced its first road map in 1918, becoming one of only a handful of states to do so before 1920 (Bender 1991). This first real "highway" map was a railway map adapted for road transportation use.² The mapped railroads were omitted by the 1920s and the Highway Commission's products became much more of its own creation.

The manually-drawn, black-line, single-sided, onionskin maps of the "State Trunk Highway System" published in the early years are technologically a vastly different product than the computer-assisted, text-processed, double-sided, full-color counterpart of 1991-92. Yet each map appears to have been sophisticated in its day, conceived "under the banner of cartographic science" (Harley 1987, 279). These maps were not just the products of an advancing technology of cartographic methods, but also products of a culture of a progressing transportation technology within an increasingly important state transport bureaucracy. The 1926 map boasts of the state's growing transportation network with the statement, "It's harder to get lost in WISCONSIN than to find the way in many states." This was also the first issue to include city inset maps and show the newly-established "U.S. Highway System" (this numbering scheme was adapted from the Wisconsin Highway Commission, which was apparently the first state to number rather than name highways (Bomkamp 1991)). Evident on this map is a sense of pioneering and pride in achievements of the state's transportation culture, representations of which appear repeatedly through the years.

The flip-side spread on the 1952 map focuses on highway construction technology and shows before and after photos of road projects, touting "Highway Planning Does This." Governor Gaylord Nelson's message on the 1964 map, "This map does all but steer for you," and the reverse-side spreads of the editions of the mid-1960s heralding Wisconsin's ties to the expanding "National System of Interstate and Defense Highways," all extol pride in transport achievements. The 1968 map message "TRANSPORTATION - The key to progress," and the remarks which follow it on "50 Years of Mapping" (Figure 1) make explicit the linkage between advancements in transportation and the state's maps. Photographs of other modes of modern transportation are included on this map and part of the message reads: "Highways unite the rails, harbors and modern

¹ Although one cartographic designer has called non-map image elements on highway maps (e.g. illustrations, text, and photographs) "non-substantive" and "peripheral" (Sullivan 1984, 17, 18), these elements seem indeed to shoulder much of what Wood and Fels call the "burden of myth" in the map (Wood and Fels 1986, 63) and, for this reason they are included in the examination presented here.

² It is interesting to note that while the 1918 map legend describes red lines marking "state trunk highways," one of the two copies examined did not contain this linework on the map itself. That same map did have a myriad of rail lines in black, but with no mention of them in the legend.

airports into a thriving, comprehensive transportation system." It was just at this time that the Wisconsin Department of Transportation (DOT) had formed as a result of the Administrative Reorganization Act of 1967 which combined the Highway Commission with the Aeronautics Board and the Motor Vehicle Department (Beimborn 1987, 212). The symbols and text on the 1968 map did a good job to announce the enhanced bureaucratic stature and autonomy of this newly initiated branch of state government.

With the 1987-88 edition of their highway map, the Wisconsin DOT was again a national leader by being one of the first state highway departments to produce a computer-generated version of their state map.³ Automation of the state map image was followed by computer renditions of the city inset maps in the 1991-92 issue.

Automation appears to have influenced Wisconsin DOT cartographic design. Recent maps lean toward less clutter and cleaner lines in an effort to get rid of the "old-fashioned look" (as an unidentified DOT cartographer put it). The results, however, appear to be uneven. Comparing legends before automation (1978-79, Figure 2a) and after automation (1991-92, Figure 2b) show the more recent to possess cleaner-looking typography, yet with a more "classic" appearance. Paradoxically, the newer legend actually appears more elaborate and complicated than the older version, perhaps owing to the extra boxes categorizing more map symbols.

The automation of Wisconsin's official mapmaking is also visible in other common map features such as the north arrow. For decades, the directional indicator

³ There seems to be some dispute of this claim in that Larry Bender (1991) reports that South Carolina was the first state to produce a computer assisted highway map.

50 YEARS OF MAPPING

This map marks the completion of a half-century of production for the official Wisconsin highway map. The first map in 1918 showed the original 5,000-mile network of state trunk highways as marked for federal-aid purposes. Identical sections, at right, of the original and current maps emphasize changes and improvements in both map-making and the roads themselves during the past 50 years. The 1968 map, for example, carries additional route markings, symbols for wayside or public facilities, and accurate designations of roadway surfaces.

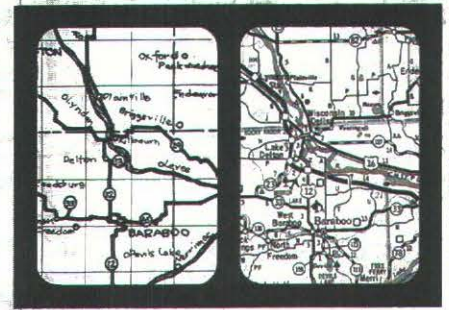


Figure 1: Excerpt from the 1968 Wisconsin Official State Highway Map.

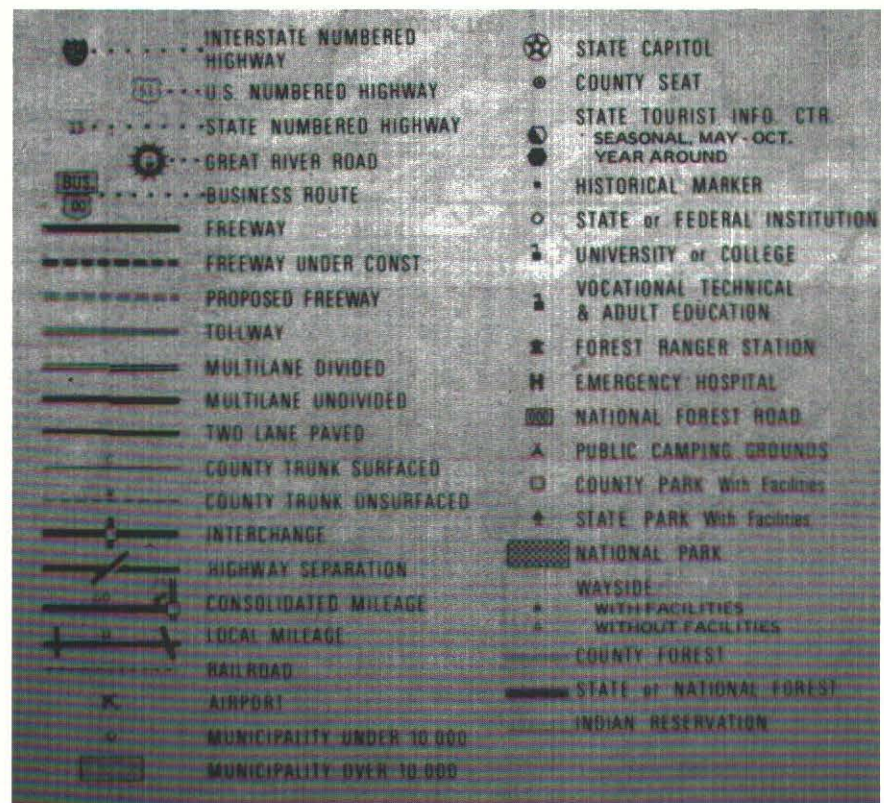


Figure 2a. Legend from the 1978-79 Wisconsin Official State Highway Map.

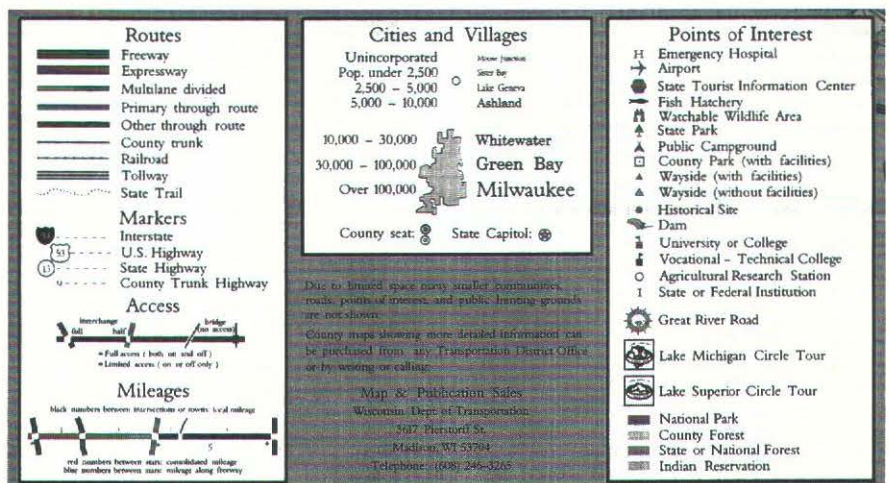


Figure 2b. Legend from the 1991-92 Wisconsin Official State Highway Map.

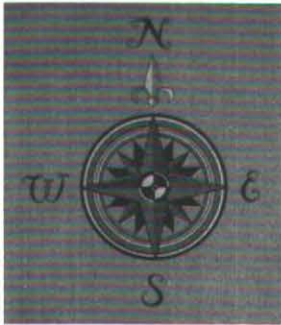


Figure 3a: Directional indicator from the 1976 Wisconsin Official State Highway Map.

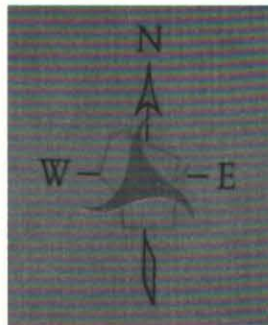


Figure 3b: Directional indicator from the 1991-92 Wisconsin Official State Highway Map.

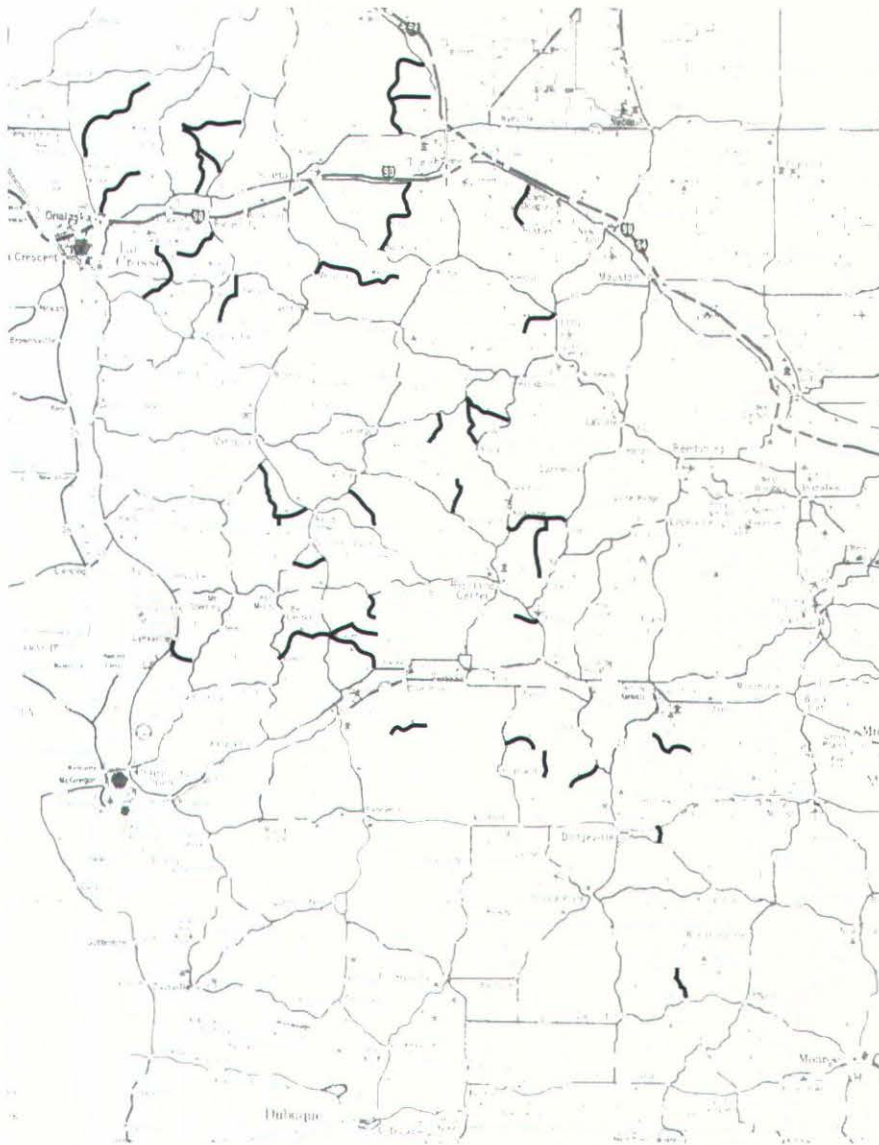


Figure 4: A portion of the 1984 Wisconsin Official State Highway Map. The bold black lines are roads that appear on the 1984 map but do not appear on the 1989-90 edition.

of the manually-created highway maps had a classic compass-rose look (Figure 3a). The last three automated editions have sported the modern, Wisconsin DOT logo as the center of the north arrow (Figure 3b). This change may merely suggest that the old compass rose was too complicated to replicate in digital form, or it may be that this simple iconic shift reflects the modernizing transportation culture in which the agency sees itself.

There are also evidences of "silences" (a term explained in a cartographic context by Harley (1988)) on the highway map. Silences tend to "challenge the apparent honesty of the image" (Harley 1988, 58), and it is interesting to make note of their "presence." For decades, each issue of the Wisconsin state highway map has employed a disclaimer about its silences by stating the inability to show all roads and towns. A comparison of an eight-county area on the 1984 and 1989-90 editions of the map illustrates how some roads have "disappeared." At least 45 segments of surfaced, lettered county trunk roads present on the manually-drawn 1984 version are missing from the 1989-90 automated edition (Figure 4). In this same area the 1989-90 edition includes four segments previously not shown on the 1984 edition. Neither the presence, status, nor the per-county mileage of these county trunk highways have changed during this period (Wisconsin Legislative Reference Bureau 1985, 1989).

These missing roads have become invisible to the user of the later map. The consequences of such map silences are well stated by Stickler (1990) in his study of South African Black township silencing: maps "enjoy a long standing reputation as unbiased and neutral sources of information about the world. Such is the

power of the map that if authoritative, official maps and atlases . . . fail to map places, the impression is given that those places do not exist" (Stickler 1990, 329). What applies to towns applies to roads. If not shown on the official state highway map, it will surely be "the road less traveled."

These decisions to eliminate selected road segments may have been based on sound principles of generalization, choices to eliminate road segments which carry less traffic, or a quest for a cleaner, less cluttered mapped road network. Whether this is a "good" or a "bad" cartographic change is not the issue—the result is a silence and a practice in DOT mapmaking that reflects a modern transportation agency intent on getting us from here to there by encouraging travelers onto the freeways through emphasis of the interstate system on its maps.⁴

In 1952 there were a half million copies printed of the Wisconsin highway map; a million by 1972; and 3.5 million copies printed of the 1991-1992 biennial edition (Bomkamp 1991). These numbers parallel increases of similar magnitude in state motor vehicle registrations (Wisconsin Legislative Reference Bureau 1989). In addition to increased map production, there is little doubt that the purposes of the state's official highway map have gradually changed. The map has evolved from its beginnings as a tool for the highway commission to manage and maintain its road network and as an aid to the hardy motorist who dared to drive about the state's early twentieth-century roads, to become a promotional device. An array of state agencies over the decades have jockeyed for space on the map through cooperative interagency agreements with the Department of Transportation. These include agencies or agency divisions of business development, tourism, and recently the Wisconsin Department of Natural Resources (DNR).

State economic development issues have been given space on many editions of the state's highway map. The state's economic soundness was stressed in the Depression Years, and the 1947 issue included a photo and text which explained, "Wisconsin trucks, used extensively by the War Department, were part of the state's war effort." The ensuing two decades exhibited even greater business-promotion efforts, often on the map's flip-side tableau. An "Industry Fact Kit" was advertised in the 1960s. Governor Nelson's 1961 message states in part, "But this is more than just a highway map. It is a catalog of pleasure and beauty, a directory of business and profit." By 1975 the business pitch included the Department of Development address; by 1978-79 its address and phone number; and by 1987-88 its toll-free "800" phone number. Most recently, the map has contained less direct mention of business or economic messages and there was no inclusion of a business-promotion message in the 1991-92 edition of the map.

But it is tourism (and more recently, a natural resource-based tourism) that has appropriated an increasing portion of the Wisconsin map sheet. Attention to tourism was also evident in a survey of 46 state highway maps by Sullivan (1984) in which he found that "the importance placed on tourist trade appears to influence the design of many [highway maps]" (Sullivan 1984, 17). While some have negatively criticized highway map design for an excessive tourism "focus" (Bender 1991, 77-79), there is no doubt that tourism in Wisconsin, like most states, is big business and was worth \$6.3 billion to the state in 1991 (Wisconsin Department of Business

CULTURE OF PROMOTION

But it is tourism...that has appropriated an increasing portion of the Wisconsin map sheet.

⁴ Interestingly, it seems that at the request of even a single citizen, through his or her state representative, a "silent" road segment can be re-entered—"given voice" on the next map issue (Bomkamp 1994).



Figure 5: From the 1936 Wisconsin Official State Highway Map.



Figure 6: From the 1989-90 Wisconsin Official State Highway Map.



Figure 7: From the 1989-90 Wisconsin Official State Highway Map.

Development 1991, 1). The promotion of tourism on such a widespread product as the official state highway map is to be expected. From 1918 to the late 1940s each Wisconsin highway map examined included somewhere the phrase "Playground of the Middle West" (Figure 5). In the early 1960s, a large flip-side recreation map appeared, with gaudy tourist postcard-like icons of assorted outdoor activities, state parks, and fish and wildlife. A "family vacation land" slogan appeared in the early 1970s. Oddly enough, the maps of the late 1970s (particularly the 1978-79 map) contain virtually nothing of parks and tourism.

The early 1980s, however, saw a resurgence of the recreation agenda. The Wisconsin DNR (the state's largest owner-operator of tourist attractions), has incrementally monopolized nearly all of the non-transportation space on the DOT map. This is evident in the increasingly large, expanding, and detailed tables of state-owned tourist destinations and the listing of all DNR public facilities. It is also evident in the recent prominent

advertisements for the DNR's "official magazine" appearing on the first panel as one unfolds the map (Figure 6). This is an attempt to "put the best face" on an agency responsible for environmental and game enforcement which many state residents find objection to.

Wisconsin's highest elected officials haven't missed the chance to appropriate the "official" state highway map as a tool of promotion. Somewhere, on all but two of the maps examined since 1931 is an innocuous-looking "Governor's Message."⁵ All but one governor has availed himself of the opportunity to endorse chosen aspects of the state, his ideological agenda, and often his ambitions (with an accompanying photo since the late 1930s). Governor Julius Heil employed tourist boosterism in 1941, inviting all to his state, "truly a land of milk and honey" (though he modified his message for a country at war in the following year's issue). Governor Lee Dreyfus preached conservation to highway users in energy-conscious 1982: "Travel only as often as necessary so there may be fuel for all reasons in all seasons." Governor Thomas (Tommy) Thompson showcased himself and a Duesenberg replica (Figure 7)

⁵ The 1984 and 1985-86 maps are the exceptions. They have a photo and synopsis of the State Capitol instead of the governor.

produced in his hometown of Elroy, Wisconsin on the 1989-90 edition of the map. The Thompson photograph appears to be a contradiction to a statement on the face of the map that states that this "official" map is "not intended for private promotional use." While the "private promotional use" statement is obviously intended primarily as a warning to map sellers, it is certainly a debatable practice to use the official map as advertising space for promotion of clearly private agendas or products.

These Governors' messages, tourist slogans, and business promises are sure to be seen repeatedly by millions each year. Though there is no question that the official state highway map is a handy reference for an increasingly recreation-minded public, it should also be recognized as an implement of everyday propaganda, a trusted tool of a culture of promotion.

Overlapping and embracing the transportation/modernization and promotional cultures is a third set of map-borne agendas in the form of cultural rule. They are carried out in both designed and unintentional ways in order to maintain control of the state. These include "educational" messages which serve both to inform and to control highway map users, as well as other official "messages" of a less certain, yet ultimately disturbing character which show manifestations of Wisconsin's social order.

As one would expect, the Department of Transportation has all along used the official state highway as a teaching tool. In the 1930s and 1940s the DOT's predecessor agency endeavored to instruct generations of people getting behind the wheel for the first time about Wisconsin's "rules of the road." The highway maps of this period included various illustrations and text about road signage, lane markings, and pedestrian protection. The 1946 map contained the caution, "Old folks do not always move fast and they do not always see or hear you." Vignettes on "Restrictions on Heavy Vehicles," "In Case of Accident," and "Prevent Forest Fires" were present for decades. These and other omnipresent warnings about speed, and more recently on littering, seat belts, and driving under the influence also bear the unwritten, yet clear message, "make no mistake about it, the Department of Transportation controls the roads of Wisconsin." It should be noted that these safety and traffic-law messages have been greatly reduced in the last several editions of the map.

Some messages were initiated, not from state-specific agendas, but from national ones. For example, from 1978-79 until 1984 the DOT promoted the short-lived "move to metric" through a flip-side doubled "mileage kilometer log." At about the same time a small inset route map of AMTRAK, the national passenger railroad, rolled onto the state highway map as a national political agenda item. Like the move to metric, it departed a few years later.

Patriotism has also been encouraged via the state highway map, particularly in the 1948 Wisconsin Centennial "anniversary" issue which focused on state accomplishments. A photo (also used a year earlier) of General Eisenhower and his brothers with their catch of muskellunge (Figure 8 on page 24) ably serves several agendas by linking Wisconsin to a war hero who likes to fish here, and who happens to be on the rise as a national politician. The 1976 United States bicentennial issue was built around the theme "out of the past . . . into the future," heralding how far we've come as a nation and a state. A recent example of a strong patriotic presence on the map (and on the roadways) is the prominently featured "veterans memorial highways," linking selected segments of state high-

CULTURE OF DOMINION

As one would expect, the Department of Transportation has all along used the official state highway as a teaching tool.



Figure 8: From the 1948 Wisconsin Official State Highway Map.



Figure 9: From the 1949 Wisconsin Official State Highway Map.



Figure 10: From the 1952 Wisconsin Official State Highway Map.

ways with recognition of state armed forces. These examples demonstrate how the official state highway map has done its small part in what Foucault termed the "implanting and inculcating [of] the civic and patriotic spirit" (Foucault 1980, 62).

The overt and expected social agendas mix with other unintended ones on Wisconsin's official state highway maps. There is evidence of what Harley has identified as "rules of the social order" (Harley 1989, 6). These are portrayed by photos and drawings which are plainly those of a white male-dominated society. Among the most common and prominent images appearing on the state highway maps through the years are those of women in swim suits and fishermen. Nearly all of the photos of people enjoying Wisconsin fishing (and there are many shown over the decades), are of white men. When fisherwomen are in photographs, they are generally shown in bathing suits or comparably skimpy clothing. Especially from the late 1940s through the 1950s, map verso layouts regularly included sexist photos of young women in bathing suits (Figure 9). These women seem to be part of the package of "pleasure" offered to white men in Wisconsin.

Photographs that include minorities may be interpreted to occasionally contradict the written words on the official state highway maps. While a laudable human rights statement appeared for almost four decades that guarantees "full and equal enjoyment" of Wisconsin public attractions to "all persons of every race and color" (Figure 10), these statements contradict the lack of, and type of accompanying images of minorities. Only two maps (1991-92 and 1987-88) of all those examined included photographs of African-Americans. The 1991-92 photo

shows several African-American men depicted as tourists, however, the 1987-88 map shows an African-American as a dancer and "cast" as an attraction. While it is true that African-Americans have constituted just a small, yet increasing percentage of the state's population (about five percent in 1990), it is only recently that we see their inclusion in tourist imagery on the official highway map. The situation is a bit different for Wisconsin's Native American population. They have been featured quite heavily in photos on the maps, but all of the images of them in the entire series examined are those in which Native Americans appear as icons and tourist attractions (Figure 11).

The sexist use of images of women as objects, the "silencing" of minorities or their depiction as tourist icons, and messages of highway use and jurisdiction on the official state highway maps suggests where the power has resided in Wisconsin, and how those in control have viewed their state. There is surely no evidence on these maps that such portrayals or oversights are intentional, however, there have been disturbing overtones of sexism and exclusion (just as there is a flavor of impropriety in governors' use of the official maps for private commercial promotion).

"...while our eyes should always be open to human foibles and latent social messages hidden beneath the scientific veneer of maps, we must surely admit that being able to make and use maps to show where things are physically located has great practical value. The two positions are not irreconcilable; a map can be considered a product of both scientific objectification and of the social and cultural circumstances in which it was made" (Woodward 1992, 69-70).

Highway maps are everyday essentials and the efforts to make them more effective tools for travel and recreation are worthwhile and appreciated. Although this longitudinal examination only briefly illustrates selected agendas of the cultures of transportation/modernization, promotion, and dominion borne by Wisconsin's official state highway maps, it is clear that these maps are much more than utilitarian tools for their users. They are implements of their makers and bearers of a multitude of messages. Some of these messages are deliberately placed on the map, whereas others are unintentional or subtle. All of them, however, are real and they reveal the "state" of the state.

Each official state highway map, as well as every other map, is set in its cultural context whether composed at the drafting table six decades ago or at the workstation just this year. The Wisconsin Department of Transportation has long been a leader in producing effective transportation maps and the agency has justifiably taken pride in all of its achievements. They have communicated that pride through their maps. The DOT and other state agencies and offices have quite logically used this ubiquitous medium to advertise, inform, and educate. Most of the messages seem planned and clear in their intent, however, some might not be intended and may need to be rethought and changed.⁶ In any case, these maps present an interesting mirror and record of state history. They can be used to speculate about the attitudes and images of the cultures that influence the map and the message it communicates to others.

CONCLUSIONS



Figure 11: From the 1948 Wisconsin Official State Highway Map.

⁶ Indeed, the DOT does field and respond to complaints about the official state highway map through a map committee composed of state DOT, DNR, tourism, and public relations staff.

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WISCONSIN OFFICIAL STATE
HIGHWAY MAPS EXAMINED

1918, 1925-27, 1931-33, 1935-36, 1939, 1940-43, 1946-55, 1957-72, 1974-76, 1978-79*, 1980, 1982, 1984, 1985-86*, 1987-88*, 1989-90*, and 1991-92*.

* two-year edition.

This paper was originally presented at the 1993 Annual Meeting of the Association of American Geographers, Atlanta, Georgia in a session on "Map perception, quality, and design." The author wishes to thank the anonymous reviewers for their suggestions on the manuscript draft submitted for publication.

END NOTE

En 1986 Wood y Fels revelaron que inclusive un producto cartográfico "tan sencillo" como un mapa de rutas es una herramienta muy importante tanto para el que lo hace como para el usuario. Verdaderamente un mapa de autopistas contiene un sistema muy sofisticado de mensajes. En este trabajo, se han examinado una serie de mapas del sistema de rutas del Estado de Wisconsin, para ilustrar que cada uno el producto de la cultura en que se produce. Los mapas que reflejan culturas institucionales del estado son comunicados a través de la imagen del mapa principal del estado, como también a través de otros mapas. Algunos ejemplos han sido seleccionados desde los años 20's hasta el presente para notar: el cambio en el transporte y en la elaboración de mapas, la apropiación oficial del mapa de autopistas del estado como una herramienta de turismo y promoción gubernamental, y la generalización persistente y molesta de la mujer y las minorías. El mapa físico de las autopistas del Estado de Wisconsin en general es muy completo. Sin embargo, a veces hay omisiones deliberadas o sin intención.

RESUMEN

Wood et Fels (1986) révèlent de façon frappante que même un produit cartographique "admis" comme carte routière est un outil de l'auteur comme de l'utilisateur. En fait, une carte de grandes routes porte un ensemble très étudié de messages. Dans le présent mémoire, on examine une série de cartes routières officielles de l'État du Wisconsin pour illustrer que chacune est un produit de la culture dans laquelle il a été façonné. Les messages cartographiques reflétant les cultures institutionnelles de l'état sont communiqués au moyen de l'image cartographique principale de l'état ainsi que par d'autres éléments cartographiques. Des exemples ont été choisis entre 1920 et le présent pour souligner : une culture évolutive des transports et de la cartographie, l'appropriation de la carte routière officielle de l'état comme outil pour le tourisme et la promotion officielle, et l'existence de certaines descriptions persistantes et troublantes des femmes et des minorités. On remarque que la carte routière officielle du Wisconsin reflète de façon à la fois délibérée et involontaire l'aspect évolutif (et non-évolutif à certains égards) de l'état.

SOMMAIRE

cartography bulletin board

We are fortunate in this issue of *CP* to have three individual submissions for the *cartography bulletin board*. The first is a summary of cartographic activities that took place at the 1994 Association of American Geographers Meeting in San Francisco in April. The second piece is a description of the activities of the Cartographic Research Laboratory at the University of Alabama. This is part of our ongoing series designed to feature university cartography laboratories and discuss their functions, equipment, and structure. The last item reports the results of a survey conducted on university cartography laboratories. Information from this survey was presented at the 1993 NACIS Annual Meeting and is a useful summary of cartographic laboratory activities and changes.

Cartography at the 1994 Association of American Geographers Meeting

*by Jim Anderson, Director
Florida Resources & Environmental
Analysis Center
Florida State University*

At the recently concluded annual meeting of the Association of American Geographers held in San Francisco, cartographers were well represented with twenty sessions, many of which were sponsored by the Cartography Specialty Group. Four workshops were also conducted: Mapping on the Macintosh Computer, An Introduction to GPS and Its Integration with GIS, Map Design and Production with COREL DRAW, and Mapping and Image Analysis Using Microcom-

puters. NACIS members were well represented as participants. Of special interest to university cartography lab directors were sessions on multimedia, electronic atlases, teaching cartography, and lab and equipment grants. Other sessions dealt with cognitive cartography, TIGER, and state atlas funding.

Multimedia applications for cartography are emerging as major research interests as well as providing a source of funding for cartography labs. Multimedia, with the ability to link animation, video, sound, graphics, text, and photographs interactively, provides the cartographer with unique opportunities, but also many challenges. Two sessions dealing with multimedia cartography were held. One dealt with the development of electronic atlases. Examples of completed and ongoing projects were presented which gave an indication of the flexibility and design options that are available to the cartographer when developing a multimedia project. The other session titled "Multimedia Cartography" presented papers on four multimedia projects which have maps as one of their primary components. Considerations in animating maps were discussed and illustrated. Also, the issues of scanning methods and resolution, storage and image compression, cross platform development, database design, and delivery systems were presented. In the next issue of *Cartographic Perspectives*, multimedia activities at several cartography labs will be highlighted as well as reviews of several multimedia authoring software packages.

An interesting session on teaching cartography presented the viewpoints of several cartography instructors and included course outlines for their introductory cartography courses. Current

teaching methodologies ranged from conventional pen and ink to total use of computers for cartography exercises. A discussion on the usefulness of teaching manual techniques evolved from the presentations. While no consensus was reached on this issue, there was general agreement that the teaching of map design and data representation techniques needed to remain an integral part of the curriculum. Two sessions dealt with the issue of equipping laboratories with computer equipment. Several speakers discussed their successful applications to the National Science Foundation's Instrumentation and Laboratory Improvement Program (ILI). The second session dealt with proposal writing for the ILI program. Next year's AAG meeting will be held in Chicago. I would encourage NACIS members to participate and work with the Cartography Specialty Group in organizing sessions or submitting papers. □

The Cartographic Research Laboratory at the University of Alabama

*by Craig Remington, Director
Cartographic Research Laboratory
University of Alabama*

The Cartographic Research Laboratory at the University of Alabama is part of the Geography Department and plays an integral role in the Department's teaching and research missions. Our Lab currently employs three student assistants who work under my supervision. Most of our projects, and therefore income, come from outside the Department. Our services are provided to the Department without charge.

Like many labs in a similar setting, we have been going through a major technological transition and now have four 486 computers. Our principal software includes Aldus Freehand, Aldus PageMaker, Aldus Persuasion, Microsoft PowerPoint, Microsoft Excel, Microsoft Word, Photofinish, Harvard Graphics, Atlas*GIS, ArcInfo, and Intergraph MicroStation PC. Of course, what we do with these resources is more important than simply having them available.

About this time last year we were finally ready to try a large automated project. My student help had only limited experience with computer cartography, but they were eager to learn. I looked for a project which would help them learn the software and at the same time provide something of value to the State. We decided to create a Statistical Atlas of Alabama.

Much of the information contained in the Atlas was obtained by reading Census CD-ROMs and extracting selected data into dBASE. The data we were interested in was copied to Excel and linked to Atlas*GIS to create choropleth maps. We were able to produce both tabular and graphic output. Additional elements of the Atlas were produced using Harvard Graphics, FreeHand, Quattro Pro, and Word. We ended up with 269 pages of everything you ever wanted to know about Alabama along with four students ready to conquer the world of computer cartography. To date, we have sold over 1,000 copies. A modest number certainly, but enough to warrant similar projects in the future.

We achieved considerable savings in our output costs by investing in a LaserMaster WinJet 1200 print controller. When installed in our HP 4M laser printer, we get 1200 dpi output

which looks really remarkable. While not suitable for every application, this output meets the needs of the majority of our clientele, and we skip the costs associated with service bureaus. We have just acquired software which will allow us to translate Tiger line files to polygons for use in Atlas*GIS. This will enable us to create new atlas projects focused on tract level data and as a result we are developing the Statistical Atlas of Birmingham.

Although this type of project does not sit on the cutting edge of cartography, there are several reasons why it is important to us. First, everything we do makes available a resource which was previously not available. I have received many letters from those who have our Alabama Atlas are asking for additional products. Second, it puts our Lab and Department in the spotlight on a statewide basis and I have received funding for a number of projects which were spin-offs of the Atlas. Finally, it can be done at a low cost.

This is just a single example of how we have tried broaden the services we offer as we take advantage of ever changing technology. In addition, our Lab has expanded its output capabilities through the purchase of a Polaroid CI 5000 Digital Palette. This image processing system allows us to produce color slides of screen images in a matter of minutes. It is not inexpensive, but it has saved the day for several of our most procrastinating customers. I'm happy to say the Department and the University have supported our efforts, allowing us continued growth. □

University Cartography Labs: A Decade of Transition

by Claudia James
*Cartography Laboratory
The University of Akron*

In 1988 Doyon & Gibson (1990) conducted a survey of cartography labs in the United States and Canada to discover the management practices, services, and operations performed by these labs. In response to a question about production techniques, only 20 percent of cartography lab products were being done on computers in 1988 (Doyon and Gibson 1990). In the past 5 years we have seen automated production at the University of Akron Cartography Laboratory increase from approximately 25 percent of our work to 80 percent. Along with this change in technology we also experienced a significant drop in the number of jobs we did for other departments on campus. The usual graphs and charts that had formed a distinct part of our typical work load in the past were becoming almost nonexistent. Even special on-campus advertising on our part brought little added work (except for occasional darkroom work). Good community ties and reasonable rates seemed to encourage off-campus projects but not consistently enough to assure financial solvency. Departmental work remained relatively unchanged, however, it did not bring in outside funds and tended to drain the lab budget.

Along with changes in who we were producing work for we also were experiencing technical changes. New technology brought with it the pressure to obtain larger, faster machines, newer software, and higher quality peripherals to input and output products. Maintenance costs were higher, training for student

workers more demanding, and supervision of costly machines more intense. Our departmental income, faced with all too common cutbacks, was hard-pressed to cover costs associated with this new technology and new computers trickled in only as the budget allowed.

These changes gave pause for thought. Were other labs experiencing similar problems and challenges and if so how were they coping? Had any strategies for dealing with rapidly changing technology been devised for labs on limited budgets? A questionnaire was designed and mailed to cartography labs in the United States and Canada to answer some of these questions. Using the list of cartography labs published by Ellen White (1990), 82 questionnaires were mailed or faxed and several more were distributed at the 1993 NACIS Annual Meeting in Maryland. We received a total of 36 responses. We eliminated the response received from the Boston University lab (leaving a total of 35) because it had recently closed. The questionnaire solicited information on staffing, production, funding, and equipment. Laboratories were given the option to select the time frame for the reporting period. Twenty-five respondents answered for either a 5 year or a 5-10 year time frame, 3 for 11-20 years, and 4 for over 21-25 years. Two labs chose less than 5 years and one had no response for this portion of the survey.

Survey Results

Staffing. Nearly half of the 35 respondents indicated some change in staffing. Ten labs reported an increase in staffing, whereas 7 reported a decrease. A higher demand for cartographic products was cited most often (7 times) as the reason for increases. Financial cuts were the primary

reason four of the labs lost staff. Oddly, policy changes and new technology were cited as responsible for cutbacks as well as for increases in staffing levels.

Student Workers and Training.

Eighty percent of the respondents said their labs employed student workers and the average for all labs combined was 13.5 hours per week. Only 3 respondents felt that training requirements for student employees had not changed during their time frame (though these were all responding for a 5 year period). The remaining respondents thought new technology required more worker training in software use, hardware, math, design, and/or GIS concepts.

With the exception of 4 respondents, few were prepared to completely abandon traditional training in cartography. The majority (77%) felt training in traditional manual methods was a necessary and a desirable complement to training on computers. Only 2 (both with 22 years experience in cartography) answered that no training on computers was necessary.

Teaching and Production. Thirty-one labs spent more than 50 percent of their time on production work. One was a teaching-only facility and 94 percent had at least some teaching function within their university setting.

Product Types. The products being produced by the labs have changed. Products based on new technology (digital, animated, interactive, color, and large format products) accounted for the greatest changes. Even labs whose products remained the same cited computers as new tools for generating them. Graphs, maps for publication, government work, and remote sensing projects experienced decreases.

Only 12 of the 35 labs attributed product changes to their clients obtaining their own software and hardware. Sixteen thought changes in products produced occurred independently of what their clients had or did not have. Several labs mentioned their services were needed to "clean up" or "pretty up" graphics and maps produced by their clients. Three labs mentioned providing services when the clients obtained sophisticated computer products and needed the cartography lab's expertise to help them use the software and create maps and graphs.

Production Sources. The sources that are generating work for cartography labs are changing. Work from resident geography departments declined for 16 of the labs. Other university departments accounted for declines for some labs and increases for others (about half reported changes for the better and half for the worse). Increases in production from non-university sources were reported by 13 respondents. Other sources of lab work included government contracts and book production. Only 7 labs reported no changes in production sources during their time frame.

Funding. Resident geography departments were the main source of support for 15 labs and the sole support for 9. Non-university sources were the next most important, followed by other sources and other departments. Of the 16 labs relying primarily on university sources (resident geography and other departments), 9 reported that funding was inadequate. Of the 13 labs relying on outside sources of funding, only 6 said the funds were inadequate.

Funding source changes were not quite as dramatic as production source changes. Seventeen

labs reported no changes in the source of their funding. Labs reporting changes most often showed increases from non-university or "other" sources and decreases from other departments or the resident geography department. The reasons for funding source changes were primarily increases generated by new research and production from outside sources. University funding was generally cited as decreasing rather than increasing. Several labs mentioned economic recessions as the primary impetus for decreased funding. Two labs stated that funding costs had decreased because operating costs had been lowered when newer technology was implemented.

The responses were divided almost in half as to whether current funding was adequate to support the hardware and software requirements of the lab. Eighteen said it was adequate and 15 that it was not. Those reporting a deficit said efforts were being made to offset this lack of funding. Eight hoped to attract more university funding in the form of grants, fees, projects, and other funds. Six were looking outside the university to bring in additional money and 4 stated the outlook was glum economically and that there was little hope of generating the necessary funds as things stood at present.

Conclusions

With only 35 cartography labs responding, it may be misleading to draw sweeping conclusions or generalizations about the overall state of university cartography labs and the ways they are dealing with technological and economic changes. The responses, however, give a clue as to some of the adjustments being made by these types of cartographic educational facilities.

The technological advances that have swept through the entire field of cartography in the last decade are making a mark on many university cartography labs. Computer have replaced traditional production techniques, even for those labs whose end products have remained consistent. Technology has opened a new vista of cartographic products, from interactive and animated maps to digital map files, and large format and/or color maps. Clients have changed too. Only 7 of the 35 respondents have been doing cartographic work for the same clients. Eighty percent have seen their sources of production work shift or change within the last decade, and 43 percent are trying to find new clients and funding to maintain their labs and equipment. Without exception, all cartographic facilities are confronting the "cartographic revolution" and it is shaping these organizations and the products they are creating.

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For a specialized survey of Cartography Laboratories also see:

Javenkoski, B. 1993. Postscript microcomputer cartography trends and possibilities. *Cartographic Perspectives*. 14:16-18.



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NACIS XIV



**August 9-13, 1994
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reviews

BOOK REVIEW

Flattening the Earth: Two Thousand Years of Map Projections

John P. Snyder. Chicago & London: The University of Chicago Press, 1993. 365 pp., 170 figures, 6 tables, 500 notes, 800+ references, index. \$45 Cloth (ISBN 0-226-76746-9).

Reviewed by Mark P. Kumler
Department of Geography
University of Colorado at Boulder

To call *Flattening the Earth* a detailed history of map projections is akin to calling a dictionary a list of words. *Flattening the Earth* is almost certainly the most exhaustive, detail-packed, well-written, and well-illustrated compendium of information on the origin and use of map projections ever published. This work was originally intended for inclusion in the *History of Cartography* series, conceived by David Woodward and the late Brian Harley and edited presently by Woodward. The four chapters in this book were written to accompany the planned volumes 3 through 6 of the *History of Cartography*, and thus correspond to the time periods 1470-1669, 1670-1799, 1800-1899, and 1900-1992. In the preface Snyder thanks Woodward for suggesting that the chapters be published now as a single work, and later in the *History* in a condensed form. The University of Chicago Press agreed to this arrangement and everyone benefits by having this information available today in a single piece, and by soon having it in the *History* as well.

Chapter One opens with the classic story of the challenge of representing the round earth on a flat surface. Snyder breezes through the symbolic T-O maps and launches quickly into the equirectangular (plate carrée), the trapezoidal, and the three projections devised by Ptolemy. The pace remains brisk through the classical orthographic, gnomonic, and stereographics, and the chapter finishes with the new projections developed during the Renaissance—the heart-shaped cordiforms, ovals, Mercator's and the sinusoidal. Just as the reader begins to wonder how all these projections will be kept straight, Snyder comes to the rescue with a timeline and a table summarizing all the projections mentioned so far. The first chapter is atypical in the sense that every mentioned projection is accompanied by an illustration; in the latter chapters the sheer number of projections discussed precludes illustrating every one.

Each of the remaining chapters is divided into two major sections: the first section reviews uses of projections developed previous to the time period of the chapter, and the second describes every new projection developed in that period. In story form, Snyder provides the details of the development of every known projection, including the originator, the construction technique, the projection's properties, the dates of first and significant subsequent uses (for both the spherical and ellipsoidal projections), independent rediscoveries, and how other projections are related. Snyder's command of the lineage, and the mathematics, is masterful. Each chapter concludes with a table summarizing the projections in the chapter. The table includes columns for the figure number (if illustrated), the inventor and date, and a few words on the design.

Flattening the Earth also includes the mathematics for projections. Trigonometric functions, logarithms, differential calculus, Cauchy-Riemann equations, complex algebra, and elliptical integrals have all been critical to the development of certain projections, and they are discussed in *Flattening*. To fully appreciate the entire history of each projection a reader must be comfortable with the mathematical terms, but even those without the patience or background will be entertained by the remaining prose. In many cases the forward formulas are provided to convert latitude and longitude coordinates into Cartesian units for the benefit of those intending to program their own projections of coordinate data.

All the "big issues" in the history of projections are covered in this book: the reasons behind the Mercator, the significance of different projection properties, Tissot's indicatrix, the development of Gall's Orthographic and its rediscovery and propagandizing by Peters, Goode's homolosine, the extensive use of the Van der Grinten by National Geographic, and the recent acceptance of the Robinson for most new world maps.

The book also includes many small gems. There is the Foucault stereographic equivalent that looks a bit like a cinched sinusoidal (p. 114), the Berghaus star projection that is still in use as the logo of the Association of American Geographers, retroazimuthals that look like melted French curves, Raisz' orthoapsidal "armadillo" projection, and cartograms by Raisz and Tobler. Proper pronunciations are provided for both Peirce ("purse") and Raisz ("raw' ess"). There is even the often-whispered but rarely documented story of how many United States Geologic Survey topographic quadrangles published since the late 1950s portend to be on a polyconic

projection but in fact on the projection used for the local State Plane Coordinate System (either Lambert's conformal conic or a transverse Mercator) (p. 173).

The numerous figures are carefully executed. The majority are simple base maps showing continental outlines and graticule at 15° intervals. How Snyder managed to persuade the editors to run a transverse cylindrical equal-area to within two millimeters of the page edges (Figure 2.15, p. 88) mystifies this reviewer, but Snyder deserves praise for providing such a great collection of projection examples. This collection of illustrated projections makes a fine supplement to the other outstanding collection of projections, *An Album of Map Projections*, by Snyder and Voxland (1989).

References to five hundred endnotes are sprinkled liberally throughout the text. Most of the notes are full citations to the supporting references, but several include additional explanatory information, such as a discussion of the disadvantages of patenting or copyrighting a projection (note 96 in chapter 3) or additional information on the "Peters" projection (notes 29-33 in chapter 4). This reader would have preferred a mix of endnotes (for references) and bottom-of-the-page footnotes (for explanatory information).

The pleasant typeface, frequent illustrations, and careful attention to formatting all make for a pleasant read. Overall, this book constitutes a superb addition to the literature on map projections. Snyder has secured his reputation as the foremost authority on the history and use of map projections, to the extent that one wonders what more could possibly be written. This book belongs in every college and university library, and in the personal libraries of all scholars interested

in map projections or the history of cartography.

References

Snyder, J. and Voxland, P. 1989. *An Album of Map Projections*. U.S. Geological Survey Professional Paper 1453, Washington, D.C.: U.S. Government Printing Office. □

BOOK REVIEW

Things Maps Don't Tell Us: An Adventure Into Map Interpretation

Armin K. Lobeck. Chicago & London: University of Chicago Press, 1993. 159 pp, \$17.95 paper (ISBN 0-226-48877-2).

Reviewed by James E. Young
Department of Geography
& Planning
Appalachian State University

This edition of *Things Maps Don't Tell Us* is a reprint of a book originally published in 1956, with the addition of a forward by Dr. Mark Monmonier. The book is an excellent example of older, high quality, publications that have not been widely available to recent generations of geographers and cartographers. Although the book is almost forty years old, it still is a valuable source of information to current students of natural landscapes.

The title, *Things Maps Don't Tell Us*, is misleading. The author has used many examples of maps, from simple to complex, to show how much maps really can tell us about the world. In his original introduction to the book, Lobeck claimed that many facts on maps remain hidden to map readers, but that careful map interpretation can uncover a wealth of information.

He makes a distinction between map reading (gathering simple geographic facts from a map, such as distances and location) and map interpretation (drawing inferences and conclusions from a map).

A series of 72 case studies comprises the core of the book. Lobeck studied landform features in 71 of these examples and focuses on a cultural landscape (the layout of Paris) in only the last example. Each case study uses a two page layout to ask and answer questions about a place. Although a few examples require more than two pages, Lobeck was able to pack a lot of information about the landscape into two well organized pages. The left-hand page of each example has a simple map showing geographic details of the place under consideration. The text calls attention to specific details of the mapped landscape, setting up a problem that can be solved by careful map reading and interpretation. The right-hand page provides an explanation of the landscape in the form of additional maps and printed comments. For example, the second case study from the book examines coastline projections and protuberances along the Gulf of Mexico. The left-hand page contains a map of the coast in the southern United States and text that draws the reader's attention to bulges and indentations along the coast. The right-hand page has a map highlighting the large rivers that flow into the Gulf of Mexico. The text material discusses the creation of deltas at the mouths of each of the rivers that cause the conspicuous bulges along the coastline.

Although the case studies focus on physical geography, Lobeck managed to work in ideas about human settlement, economic activity, and even the science of cartography. For example, the first case study describes distorted coastlines on a map created in 1589. Lobeck discussed the

difficulties of accurately measuring longitude prior to the development of precise chronometers, and explained how the problems determining location produced distance distortions on maps. This is a very nice case study, presented in a simple, yet effective manner, that would fit nicely into classroom discussions of global location, navigation, exploration, and mapping at many levels of schooling.

Lobeck selected locations for the case studies from all around the world. However, certain regions receive much more extensive coverage than others and a Western bias certainly exists. The United States and Europe are the sites of the majority of the examples: 47 examples come from the U.S. and 24 from Europe (many of the case studies use more than one site). Parts of the world with relatively little coverage are Latin America (8 examples), Asia (also 8), and Africa (5 examples). Lobeck does mention additional places in the text material, but this book certainly is not a good foundation for a global studies course.

The book provides 24 examples of coastline features, 12 cases of island features, 23 cases of river features, 12 cases of lake features, and the single case of a city layout. Lobeck is able to demonstrate a wide variety of landscape features, processes, and theories in the 72 case studies, including: glaciation, faults, coastal plains, spits, barrier islands, estuaries, fiords, alluvial fans, water gaps, sinkholes, tarns, and finger lakes. Lobeck also includes general comments about rivers in an introduction to the case studies of river features and in the conclusions he discusses some additional landscape features not covered in the book.

The age of the book is noticeable through some of the descriptions, particularly the material based on the work of William

Morris Davis. As Monmonier points out in his forward, modern geographers have rejected some of the ideas and concepts accepted by Lobeck. However, the dynamic nature of the earth's landscapes generally comes across very clearly in Lobeck's writing, even though modern concepts of continental drift, weathering, and other processes were not fully developed or widely accepted at the time. A few other minor details also date the book, including the mention of roads that are seldom used nowadays and references to travel by train (a relatively rare occurrence at the present time).

The maps do look old-fashioned to modern eyes accustomed to high quality color printing and detailed computer images. They are black-and-white, using line patterns, stippling, hachures, and shaded relief. Some of the lettering appears to have been done by hand and Leroy lettering is common. Although the maps have an old-fashioned look they are not outdated.

The written explanations provided are vital to understand some of the maps, but most of the maps stand well on their own. Lobeck kept the maps simple, using a reasonable level of generalization and avoiding unnecessary details. The symbolization, lettering, and general design convey the map messages to the readers and the design of most of the maps works well. A few of the maps are confusing, especially when they combine surface detail with three-dimensional representations of underlying geologic structure. For example, in case study ten (a study of Keweenaw Point in Michigan's upper peninsula), Lobeck's attempt to show a geologic cross-section on top of a vertical view of the region is difficult to decipher.

This is a book that would be a valuable resource for many college or high school level basic physical

geography or geomorphology classes, especially if it was combined with topographic maps of the places in the case studies. The maps and descriptions have great potential for helping students learn about basic physical processes and landform development, as well as developing some map interpretation skills. The course instructor would need to add information about modern concepts and theories to Lobeck's discussion to assure that students get the entire story about places and processes.

Students in map reading and map interpretation courses also could benefit from Lobeck's book. The ability to look beyond map symbols, answer questions about a place, and to evaluate and explain what is happening in a place is an objective of many map interpretation classes. This book can serve as a model for students learning to interpret physical landscapes. Students in more advanced cartographic design courses might use selected examples to study useful ways of showing physical forms on maps. The map forms used in the book might serve as a source of inspiration for a neophyte cartographer looking for some good ideas about how to depict the physical landscape.

Overall, the book is a treasure trove of tidbits describing how the world around us came about. Lobeck wrote in an interesting, and often amusing manner about the physical settings where humans find themselves and it is too bad he did not do more of the same for the cultural landscape. The book is a good investment for anyone interested in physical geography, geology, cartography, or just the world around them. *Things Maps Don't Tell Us* actually communicates a great deal about the things maps can tell us if we care to look carefully underneath the printed symbols. □

announcements

County High Points Publication Available

Old Adit Press announces the publication of its book, *County High Points: for all western and northeastern states* (ISBN 0-9628762-1-6). The 34 page book lists the highest elevation for every western and northeastern county in the United States. The book also includes tables covering the 50 National Parks and the 32 Mexican States. The publication can be ordered for \$6.00 (inc. shipping and handling). Contact: Andrew Martin, 3030 North Sarsaparilla Pl., Tucson, AZ 85749, (602) 760-0337, e-mail: modular!martin@arizona.edu.

NEH Grant Announcement

The National Endowment for the Humanities Reference Materials Program supports projects to prepare reference works that will improve access to information and resources. Support is available for the creation of dictionaries, historical or linguistic atlases, encyclopedias, concordances, reference grammars, databases, textbases, and other projects that will provide essential scholarly tools for the advancement of research or for general reference purposes. Grants also may support projects that will assist scholars and researchers to locate information about humanities documentation. Such projects result in scholarly guides that allow researchers to determine the usefulness or relevance of specific materials for their work. Eligible for support are such projects as

bibliographies, bibliographic databases, catalogues raisonnés, other descriptive catalogues, indexes, union lists, and other guides to materials in the humanities. In both areas, support is also available for projects that address important issues related to design or accessibility of reference works. The application deadline is September 15, 1994, for projects beginning after July 1, 1995. For more information write to: References Materials, Room 318, NEH, Washington, D.C. 20506. □

cartographic events

EVENTS CALENDAR 1994-95

1994

August 9-13

XIV Annual Meeting of the North American Cartographic Information Society

Ottawa, Canada

held in conjunction with the
Annual meeting of the
Canadian Cartographic
Association
see program on pages 37-39

**For more information
contact**

Henry Castner
164 Fearington Post
Pittsboro, North Carolina
27312
(919)542-1602

August 7-8: *Symposium on Cartographic Design and Research*. Ottawa, Canada. Sponsored by the Canadian Institute of Geomatics. Contact Clifford Wood, Department of Geography, Memorial University, St. John's, Newfoundland A1B 3X9 Canada (709) 737-8988, fax (709) 737-4000, e-mail: chwood@kean.ucs.mun.ca.

August 7- 11: **URISA 94**. Milwaukee Exposition Center, Milwaukee, Wisconsin. 32nd Annual conference of the Urban and Regional Information Systems Association. Contact: URISA Secretariat (202) 289-1685.

September 5 - 9: **SDH94** Edinburgh, Scotland, UK. Sixth International Symposium of Spatial Data Handling sponsored by the International Geographical Union Commission on Geographic Information Systems and the Association for Geographic Information. Contact: Thomas C. Waugh, SDH94, Department of Geography, University of Edinburgh, Drummond Street, Edinburgh, EH8 9XP, Scotland, UK. (44) - (31)-650-2530/2531, fax (44)-(31)-668-2104.

September 26-28: **FGT'94** (Federal Geographic Technology Conference, Exposition and DataMart) Omni Shoreham Hotel, Washington, D.C. Contact: GIS World, Inc. Conference Division, 155 E. Boardwalk Drive, Suite 250, Fort Collins, CO 80525, (303) 223-4848, fax (303) 223-5700.

1995

International Cartographic Association Conference -
Barcelona, Spain. □

NACIS news

NACIS OFFICERS

President: Charles E. Harrington
10904 Kingstead Rd.
Damascus, MD 20872
(301) 713-278, ext.147
Fax: (301) 443-8701
(term expires Aug. 94)

Vice President: Henry Castner
164 Fearrington Post
Pittsboro, NC 27312
(919) 542-1602
(term expires Aug. 94)

Secretary: Craig Remington
University of Alabama
Box 870322
Tuscaloosa, AL 35487
(205) 348-1536
(term expires Oct. 95)

Treasurer: Ed Hall
410 McGilvrey Hall
Kent State University
Kent, OH 44242-0001
(216) 672-2017
(term expires Aug. 94)

Past President: Jeff Patton
Department of Geography
University of North Carolina
Greensboro, NC 27412
(919) 334-5388
Fax: (919) 334-5864
(term expires Aug. 94)

NACIS EXECUTIVE OFFICER
Christopher Baruth
AGS Collection
PO Box 399
Milwaukee, WI 53201
(800) 558-8993 or (414) 229-6282
Fax (414) 229-4380
e-mail: cmb@csd4.uwm.edu.

NACIS BOARD OF DIRECTORS

Ron Bolton
Aeronautics Chart Branch
N/CG31
1305 East West Highway
R. 5523
Silver Spring, MD 20910-3281
6010 Executive Blvd. Rm. 1013
(301) 713-2836
Fax: (301) 443-5071
(term expires Aug. 94)

Patricia Chalk
Department of Geography
University of Western Ontario
London, ON N6A 5C2
Canada
(519) 661-3425
(term expires Oct. 95)

Barbara Fine
1636 Eye Street N.W.
Washington, D.C. 20006
(202) 628-2608
(term expires Oct. 95)

Hull McLean
1602 Society Court
Herndon, VA 22070
(703) 834-3123
(term expires Aug. 94)

Donna Schenström
Department of Geography
3413 N. Downer Ave.
Univ. of Wisconsin-Milwaukee
Milwaukee, WI 53211
(414) 229-4865
fax: (414) 229-3981
e-mail: dgs@csd4.csd.uwm.edu.
(term expires Oct. 95)

John Sutherland
Map Collection, Science Library
University of Georgia Libraries
Athens, GA 30602-7412
(706) 542-0690
Fax: (706) 542-6523
e-mail: jsutherl@uga.cc.uga.edu
(term expires Oct. 95)

David W. Tilton
Department of Geography
Univ. of Wisconsin-Milwaukee
Milwaukee WI 53211
(414) 229-4866
fax: (414) 229-3981
e-mail:
tilton@convex.csd.uwm.edu.
(term expires Oct. 95)

CARTOGRAPHIC PERSPECTIVES

Editor: Sona Andrews
Assistant Editor: David W. Tilton
Department of Geography
208 Sabin Hall
3413 N. Downer Ave.
Univ. of Wisconsin-Milwaukee
Milwaukee, WI 53211
(414) 229-4872
fax: (414) 229-3981
e-mail: sona@csd4.csd.uwm.edu.
or tilton@convex.csd.uwm.edu.

EDITORIAL BOARD

Chair: Michael Peterson
Department of Geography /
Geology
University of Nebraska-Omaha
Omaha, NE 68182
(402) 554-2662
Fax: (402) 554-3518

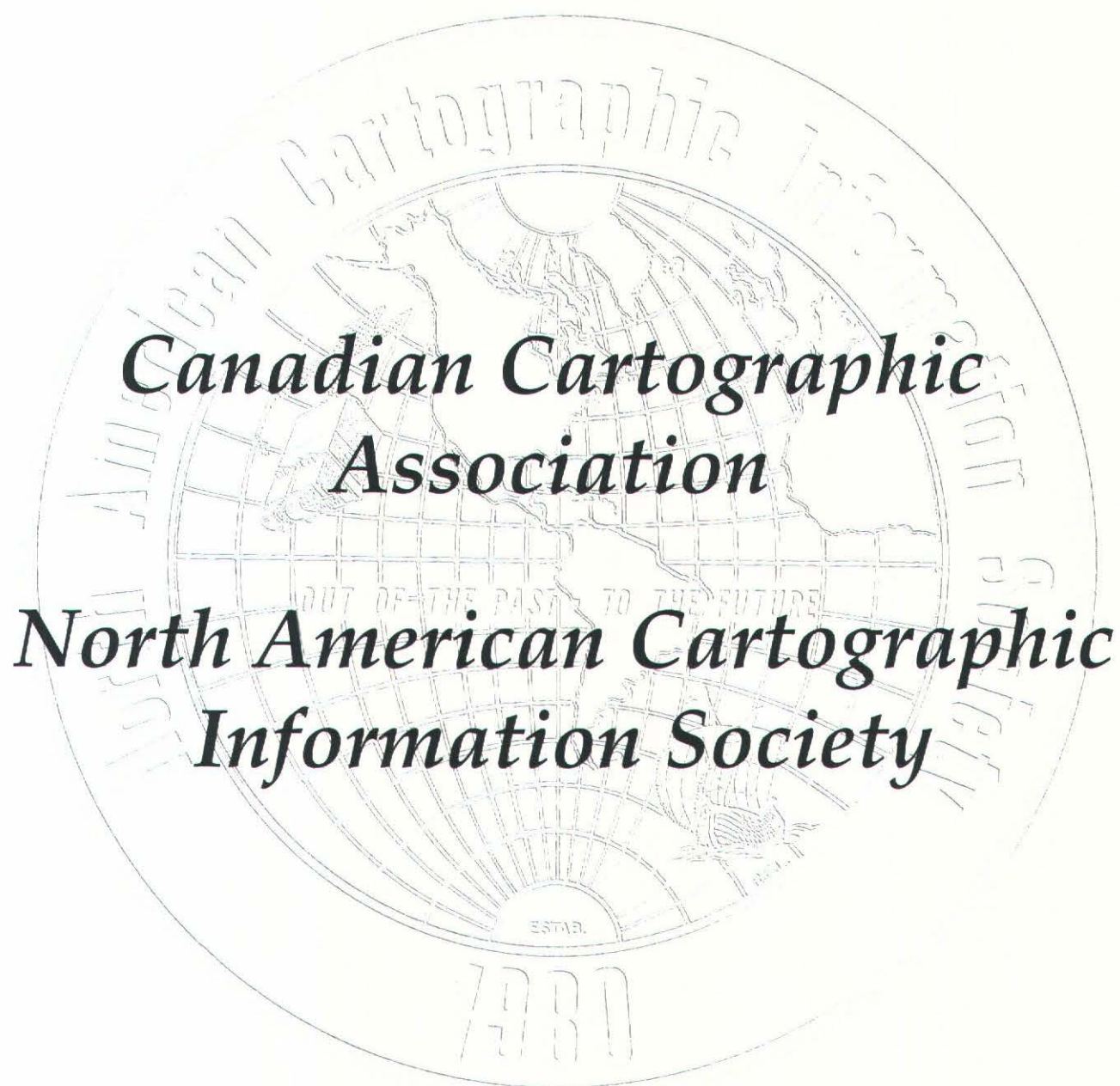
cartographic perspectives

Back Issues

The first issue of Cartographic Perspectives was published in March 1989. Back issues (for all issues) are now available at a cost of \$20 per issue (\$10 for members). Please specify the issue numbers (1-17) when ordering. Makes checks or purchase orders payable to NACIS. Send your back issue requests to:

Edward Hall, Treasurer
410 McGilvrey Hall
Kent State University
Kent Ohio 44242-0001

Program for the Joint Meeting



Ottawa, Ontario

9-13 August, 1994

TUESDAY AUGUST 9

9:00 am- 12:00 noon

Tours of Map Collections

- National Archives of Canada
- Carleton University
- University of Ottawa

1:00 pm- 7:00 pm

REGISTRATION

1:00 pm - 5:00 pm

CCA EXECUTIVE MEETING

2:00 pm

**Opening of the Canadian
National Map Display for
ICA Barcelona**

3:00 pm - 5:00 pm

NACIS BOARD MEETING

7:00 pm

ICEBREAKER RECEPTION

9:00 am - 10:00 am

SESSION A

- Mapping Aspects of Landscape

10:30 am - 12:00 noon

SESSIONS B & C

- Cartographic Animation and Innovation
- Education and Research

1:30 pm - 3:00 pm

SESSIONS D & E

- Cartographic Theory
- Public Sector Mapping

3:30 pm - 5:00 pm

SESSIONS F, G & H

- Round Table Discussion - Keeping Your Cartography Lab Current and Busy.
- Mapping for the Blind and Partially Sighted
- Demonstration - ArcView as a Tool for the Visualization of Temporal Change.

5:30 pm - 7:00 pm

DINNER ON THE TOWN
(Byward Market area)

7:00 pm - 10:00 pm

SESSION I

- Opening of the Poster Session
- Reception and Cash Bar

THURSDAY AUGUST 11

8:30 am - 9:30 am

**Bus Transportation to Natural
Resources Canada, Booth
Street Complex**

9:00 am - 5:00 pm

**The Canadian National Map
Display available for viewing**

9:00 am - 12:00 noon

**Concurrent Tours of the
following areas:**

- National Atlas Info Service
- Aeronautical Charts System
- Canadian Permanent Committee on Geographical Names
- Ctr for Remote Sensing & Geoscope
- Topographical Mapping Digital System & Products Development
- Canada Centre for Remote Sensing and Geoscope
- Navigational Charts, Fisheries and Oceans Canada
- Digital Cartography, Geoscience Information & Communications Div., Geological Survey of Canada;
- Map Collection, Geological Survey of Canada
- Agriculture Canada, CanSIS

WEDNESDAY AUGUST 10

8:00 am - 5:00 pm

REGISTRATION

8:30 am

CONFERENCE OPENING

12:00 noon - 1:30 pm

LUNCH

(at ethnic restaurants along
Preston Street)

1:30 pm - 3:00 pm

Concurrent Tours Repeated
(as noted above)

1:30 pm - 3:30 pm

• **Cartographic Animation
Review**

3:00 pm - 4:00 pm

**Bus Transportation - return
to University of Ottawa**

4:00 pm - 6:00 pm

CCA ANNUAL MEETING

5:30 pm - 7:00 pm

**Cash Bar and Social
Gathering**

6:00 pm - 7:30 pm
**NACIS ANNUAL
MEETING**

7:30 pm
**DINNER AND FREE
EVENING**

**FRIDAY
AUGUST 12**

8:00 am - 6:00 pm
SESSION J

• **Poster Session Continues**

8:00 am - 9:45 pm

SESSIONS K, L & M

• **Orienting Ourselves in
Space: Implications for the
School Curriculum**

• **Analytical Cartography in
the GIS ERA**

• **Demonstration- Map
Finishing with Intergraph on
Microsoft Windows**

10:15 am - 12:30 pm

SESSIONS K, N & O

• **Orienting Ourselves in space
Applications With GIS**

• **Demonstration - An Elec-
tronic Atlas of the Evolution
of Agriculture in Quebec,
1981-1991**

2:00 pm - 3:30 pm

SESSIONS P & Q

• **Round Table Discussion -
Map Projection Programs
Under Inspection: Cartogra-
phers Discuss Their Latitudes**

• **Concurrent Orientation
Workshops:**

***Help! I know that North is
the wall with the windows
— but what does that
really mean?**

***Where am I? Basic
Concepts in Human
Orientation**

***I know where I am and I
know where I am going!**

4:00 pm - 5:30 pm

SESSIONS Q, R & S

• **Concurrent Orientation
Workshops (as noted above)**

• **Continued Informal Discus-
sion on Orientation and the
Curriculum at a happy hour
venue.**

• **Perceptual Research**

• **Cartographic Education**

7:00 pm

BANQUET

**SATURDAY
AUGUST 13**

8:30 am - 12:00 noon

SESSION

• **MicroCAM Workshop**

9:00 am

CCA EXECUTIVE MEETING

9:00 am

NACIS BOARD MEETING

11:30 am

TOURS - FIELD TRIPS

• **Rideau Waterway**

• **Steam Train to Wakefield**

• **Ottawa On Our Own**

NACIS Board Conference Call January 27, 1994

The following members of the Board participated: Charles Harrington, Craig Remington, Ed Hall, Ron Bolton, Henry Castner, Hull McLean, Barbara Fine, John Sutherland, Donna Schenström, David Tilton, and CEO Chris Baruth. The meeting was called to order at 10:00 a.m. (EST). The minutes of the October 22, 1993 were amended to reflect institutional membership dues of \$58.

Executive Directors Report

Baruth reports that individual membership renewals were mailed in December and institutional renewals in January. The separation of institutional members from subscribers will be accomplished through a check off system. Institutional members will be asked to provide a contact person. Over 1,000 "Call For Papers" announcements have been mailed. Baruth reports that Sona has prepared a Society brochure for publication in the AAG Cartography Specialty Group newsletter. Extra copies are available. A second membership renewal notice will be mailed in early Spring. The next issue of *C.P.* will be mailed to only those current with their dues. Baruth reports that A.G.S. will likely become the depository for the Societies archives.

Treasurer's Report

Ed Hall reports a total balance in all NACIS accounts of \$26,478.24

NACIS XIV

Henry Castner reports on conversations with Cliff Wood concerning the structure of a joint registration system for the triad of meet-

ings in Ottawa. A schedule of registration fees dealing with all the possible participant choices is being established. One full day of programs have been firmed up. The meeting is being scheduled with fewer concurrent sessions to allow participants the opportunity to take advantage of the local environs. Hall will provide Castner a summary a previous meeting expenses for budgetary purposes.

Other Business

It was established that the terms in office that expire this year will expire at the meeting in Ottawa, not in October. A meeting of the Board will take place on either April 16 or 23 at a location of agreed convenience. Reports concerning the meeting site of NACIS XV will be offered at that gathering.

The speedily paced meeting was adjourned at 10:45 a.m.

*Submitted,
Craig Remington, Secretary*

NACIS Board Meeting April 16, 1994 Silver Spring, Maryland

The following members of the Board were present: C. Harrington, H. Castner, E. Hall, C. Remington, J. Patton, P. Chalk, J. Sutherland, R. Bolton, B. Fine, D. Schenström, H. McLean and CEO Chris Baruth. The meeting was called to order at 10:10 a.m. with approval of the minutes of the January 27, 1994 conference call.

Executive Directors Report

C. Baruth reports that membership renewals and second notices have been mailed. Sona's NACIS flyer

was distributed with the AAG's Cartographic Specialty Group's Newsletter and has met with success in recruiting new members. Cartographic Perspectives will be mailed around July 1 to members in good standing. Baruth, Harrington, Fine and Bolton will work together as a membership committee to continue recruitment efforts. Baruth is working on the complications of maintaining our non-profit status with state, federal and postal authorities. A reaffirmation of the Society's educational mission is key in resolving this matter.

Treasurer's Report

Ed Hall reports a total balance of \$28,794.63 in all NACIS accounts as of March 31, 1994. Owing to a poor rate of interest, he suggests the transfer of \$10,000 from the money market account to a Certificate of Deposit in Milwaukee. Accounting procedures between Baruth in Milwaukee and Hall in Kent are working well. As a note of clarification, minutes of a previous meeting inferred that both Baruth and Hall could draw funds from accounts in Milwaukee. While technically correct, Baruth emphasizes that the disbursements of these funds rest solely in the authority of the Treasurer.

Nominations

J. Patton offered a review of contacts made in his efforts to secure Board nominations. Plainly, the Board has had to seek out potential office holders in order to fill the ballot. The Board once again solicits any Society member who might wish to serve to contact Jeff. C. Baruth is gathering an informational packet which will familiarize new Board members with the organization and the duties of their position.

NACIS XIV

H. Castner circulated to the Board a tentative registration form, a budget checklist, and a preliminary program for our Ottawa meeting. Some time was spent reviewing this material and finalizing details. NACIS XIV promises to be another successful meeting, due in large part, to the efforts of Henry. The Board waived the conference registration fee for one Brazilian and three British registrants.

NACIS XV

J. Patton reported on his investigation of future meeting sites in the Carolinas and has suggested Wilmington, North Carolina as the most satisfactory. October 26, 27 and 28, 1995 have been tentatively established as meeting dates. Negotiations with local accommodations will continue. Looking to offer a meeting site which might attract participation from our friends to the south, Jeff will contact Dennis Fitzsimons at S.W. Texas State to investigate the potential of a San Antonio meeting site.

NACIS Outreach

C. Harrington suggested an opportunity for the Society to sponsor traveling cartographic exhibits compiled by the Library of Congress. An exhibit of the work of R. E. Harrison is, or shortly will be, available. Harrington suggests that NACIS can line up exhibit sites and, for the cost of transportation, associate the Society with the display. The positive exposure that such an arrangement might generate warrants further investigation. With all matters on the agenda being addressed, the meeting was adjourned at 3:40 p.m.

Submitted,

Craig Remington, Secretary



EXCHANGE PUBLICATIONS

Cartographic Perspectives gratefully acknowledges the publications listed below, with which we enjoy exchange agreements. We continue to seek agreements with other publications.

ACSM Bulletin. Published six times a year by the American Congress on Surveying and Mapping. Offers feature articles, regular commentaries, letters, and news on legislation, people, products and publications. Contact: Membership Director, 5410 Grosvenor Lane, Bethesda, MD 20814; (301) 493-0200.

Baseline. Published six times a year by the Map and Geography Round Table, American Library Association. Contact: Editor Nancy J. Butkovich, Physical Sciences Library, 230 Davey Laboratory, Penn State University, University Park, PA 16802; (814) 865-3716; e-mail: njb@psulias.psu.edu

Bulletin of the Society of Cartographers. Published twice a year, the *Bulletin* features articles on techniques and ideas applicable to the Cartographic Drawing Office. Contact: John Dysart, Subscriptions Manager, Room 514, Middlesex Polytechnic, Queensway, Middlesex, EN3 4SF, England.

Cartouche. A quarterly publication offering news and announcements to members of the Canadian Cartographic Association. Contact: Canadian Cartographic Association, c/o Jim Britton, Sir Sandford Fleming College, School of Natural Resources, P.O. Box 8000, Lindsay, Ontario K9V 5E6 Canada; (705) 324-9144; e-mail: britton@trentu.ca; fax: (705) 324-9716.

Cartographica. A quarterly journal endorsed by the Canadian Cartographic Association/Association Canadienne de Cartographie that features articles, reviews and monographs. B V Gutsell, founder and editor. ISSN 0317-7173. Contact: University of Toronto Press Journals

Department, 5201 Dufferin Street, Downsview, Ontario, M3H 5T8 Canada; (416) 667-7781.

Cartographic Journal. Biannual Journal of the British Cartographic Society. Includes research articles, 'shorter' articles, official records of the Society, book reviews, and a list of recent cartographic literature. Contact: Hon. Secretary, Charles Beattie, 13 Sheldrake Gardens, Hordle, Lymington, Hants, SO4 10FJ, England.

Cartography. Biannual Journal of the Australian Institute of Cartographers. Each issue contains two parts, the Journal proper and the Bulletin. The Journal contains original research papers, papers describing applied cartographic projects, reviews of current cartographic literature and abstracts from related publications. ISSN 0069-0805. Contact: John Payne, Circulation Manager, GPO Box 1292, Canberra, A.C.T. 2601, Australia.

Cartography Specialty Group Newsletter. Triannual publication of the Cartography Specialty Group of the Association of American Geographers. Features news, announcements and comics. Contact: Ann Goulette, Editor, Intergraph Corporation, 2051 Mercator Drive, Reston, VA 22091-3414; (703) 264-7141; e-mail: ann@pluto.ne1300.ingr.com.

Cartomania. The quarterly newsletter of the Association of Map Memorabilia Collectors. Offers a unique mix of feature articles, news, puzzles, and announcements of interest to cartophiles. ISSN 0894-2595. Contact: Siegfried Feller, Publisher/Editor, 8 Amherst Road, Pelham, MA 01002; (413) 253-3115.

Geotimes. Monthly publication of the American Geological Institute. Offers news, feature articles, and regular departments including notices of new software, maps and books of interest to the geologic community. Articles frequently address mapping issues. ISSN 0016-8556. Contact: Geotimes, 4220 King Street, Alexandria, VA 22302-1507.

GIS World. Published monthly, this news magazine of Geographic Information Systems technology offers news, features, and coverage of events pertinent to GIS. Contact: John Huges, Managing Editor, GIS World, Inc., 155 East Boardwalk Drive, suite 250, Fort Collins, CO 80525; (303) 223-4848; fax: (303) 223-5700.

Information Bulletin. Triannual publication of the Western Association of Map Libraries. Contains features, atlas and book reviews, WAML business, and news. Contact: Mary L. Larsgaard, Executive Editor, Map and Imagery Laboratory, UC-Santa Barbara, Santa Barbara, CA. 93106; (805) 893-4049; fax: (805) 893-8799, 4676, 8620; e-mail: mary@wash.uscdic.ucsb.edu.

Information Design Journal. Triannual publication of the Information Design Unit. Features research articles reporting on a wide range of problems concerning the design and use of visual information. Contact: Information Design Journal, P.O. Box 185, Milton Keynes MK7 6BL, England.

Mapline. A quarterly newsletter published by the Hermon Dunlap Smith Center for the History of Cartography at the Newberry Library. This newsletter contains notes, announcements, recent publications, calendar, and short essays on topics of interest to the history of cartography. ISSN 0196-0881. Contact: James R. Akerman, Editor, *Mapline*, The Newberry Library, 60 West Walton Street, Chicago, IL 60610.

Perspective. This newsletter of the National Council for Geographic Education (NCGE) is published five times a year in October, December, February, April and June. News items related to NCGE activities and geographic education are featured. Contact: NCGE, Leonard 16A, Indiana University of Pennsylvania, Indiana, PA 15705; bitnet: clmccard@iup. □

FEATURED PAPERS

Each issue of *Cartographic Perspectives* includes featured papers, which are refereed articles reporting original work of interest to NACIS' diverse membership. Papers ranging from theoretical to applied topics are welcome. Prospective authors are encouraged to submit manuscripts to the Editor or to the Chairperson of the NACIS Editorial Board. Papers may also be solicited by the Editor from presenters at the annual meeting and from other sources. Ideas for special issues on a single topic are also encouraged. Papers should be prepared exclusively for publication in *CP*, with no major portion previously published elsewhere. All contributions will be reviewed by the Editorial Board, whose members will advise the Editor as to whether a manuscript is appropriate for publication. Final publication decisions rest with the Editor, who reserves the right to make editorial changes to ensure clarity and consistency of style.

REVIEWS

Book reviews, map reviews, and mapping software reviews are welcome. The Editor will solicit reviews for artifacts received from publishers. Prospective reviewers are also invited to contact the Editor directly.

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Materials should be sent to: Dr. Sona Karentz Andrews, Editor- *Cartographic Perspectives*, Department of Geography, 3413 N. Downer Avenue, University of Wisconsin-Milwaukee, Milwaukee, WI 53211; (414) 229-4872, fax (414) 229-3981; e-mail: sona@csd4.csd.uwm.edu.

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§ to promote communication, coordination, and cooperation
among the producers, disseminators, curators,
and users of cartographic information;

§ to support and coordinate activities with other professional
organizations and institutions involved with
cartographic information;

§ to improve the use of cartographic materials through
education and to promote graphicacy;

§ to promote and coordinate the acquisition, preservation,
and automated retrieval of all types of cartographic material;

§ to influence government policy
on cartographic information.

NACIS is a professional society open to specialists from private, academic, and government organizations throughout North America. The society provides an opportunity for Map Makers, Map Keepers, Map Users, Map Educators, and Map Distributors to exchange ideas, coordinate activities, and improve map materials and map use. *Cartographic Perspectives*, the organization's Bulletin, provides a mechanism to facilitate timely dissemination of cartographic information to this diverse constituency. It includes solicited feature articles, synopses of articles appearing in obscure or non-cartographic publications, software reviews, news features, reports (conferences, map exhibits, new map series, government policy, new degree programs, etc.), and listings of published maps and atlases, new computer software, and software reviews.

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