cartographic perspectives

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DRAWING THE LINE

One of the original—and most persistent—motivations for map making is the desire to delineate and revise boundaries. Boundary disputes are a source both of steady business and endless frustration for map makers, keepers, and users. The *New York Times* recently reported on two North American boundary disputes that bring to light some of the political ramifications of lines drawn on maps.

THIS OCEAN IS MY OCEAN

In "New Negotiations in Fishing Dispute" (8/7/89), the *Times* reported that "New confrontations between American fisherman and Canadian patrols on the Georges Bank, one of the world's richest fishing grounds, have brought the two nations back to the conference table . . . Last month, the Canadian authorities chased an American scalloper across 100 miles of sea for 18 hours . . ." turning back ". . . only when the fishing boat, based in New Bedford, Mass., reached United States territorial waters 12 miles off the coast of Nantucket.

"The incident was the latest of at least 10 in the past two years. In

October, a .50-caliber machine gun was fired across the bow of an American vessel whose skipper refused requests by Canadian agents to board.

"Trouble arose after the two countries extended their offshore boundaries in 1977 to 200 miles.

The line overlapped in an area that included the Georges Bank, 1,200 square miles of ocean rich in scallops, flounder, haddock and cod, 80 miles off the coast of Cape Cod at its closest point. Both countries laid claim to the area, which had been fished jointly for generations.

"In 1984, the World Court divided the area, giving the United States five-sixths of the Georges Bank, but allotting to Canada what most fishermen consider the most fertile fishing waters. American fisherman said the grounds they lost had been harvested by this country 100 years before the Canadians fished there.

"The two sides met in December but failed to settle the dispute.

"American fishermen say they run when challenged because they fear the Canadian fines, which can be as high as $500,000. If the fishermen are convicted instead in the United States, they face a $10,000 civil penalty under the Federal Lacey Act, which prohibits transportation of fish or animals across international lines."

THE SOUTH WILL RISE AGAIN
In "Parties Draw Up Plans for Redistricting Battle" (8/9/89), the *Times* cites Democratic and Republican party specialists who predict that "battles over how to draw the political map for the 1990's . . . will be more complicated, more litigious and more partisan than ever" after the 1990 census.

"Drawing the lines of political maps is an important but arcane art in which either party can take the same voting population and produce radically different results." As Jeffrey Wice, counsel to the Democratic State Legislative Leaders Association, explains, "'Taking the politics out of reapportionment is an oxymoron in the sense that reapportionment is politics. No matter what kind of criteria you have, you're going to have politicians finding loopholes for them.'"

"In 1980, the Democrats controlled the line-drawing process in many of the largest states, notably

in California, where an artfully drawn set of lines helped them gain up to six seats.

"The crucial states in the reapportionment battles will be those that gain or lose seats in the United States House of Representatives as a result of the population shifts shown in the 1990 census. At this point, the Democrats control the governorship and both legislative house in 14 states, and Republicans in four.

"Election Data Services, a Washington, D.C. consulting firm, says its latest projections indicate that California stands to gain six or seven seats, Florida possibly four, Texas three, and Arizona, Georgia, Virginia and possibly North Carolina a seat each.

"Among the states expected to lose seats will be New York, projected to lose three house seats, Michigan and Ohio, two seats each, and Illinois which could lose one or two seats. Iowa, Kansas, Massachusetts and Montana are projected to lose one seat each."

States projected to gain or lose seats in the U.S. House of Representatives as a result of reapportionment following the 1990 Census
(no change projected for Alaska and Hawaii)

featured article

In 1986 Temple University began applying desktop mapping and publishing software developed for the Apple Macintosh microcomputer as alternative tools for cartographic production. Our experience indicates that these tools can significantly reduce the costs associated with photomechanical production of thematic atlases while actually resulting in superior products. This article presents an overview of Temple's desktop mapping activities with the intent of stimulating wider discussion of this important alternative approach to map design and production.

Desktop Mapping at Temple University

Mark Mattson

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The term "desktop mapping" was coined by John Sculley of Apple Computer in an attempt to define a new marketplace for consumers and developers of software based on Macintosh computers. The term has since been used to refer to a wide range of mapping products for all types of microcomputers. For the purposes of this article, "desktop mapping" will refer specifically to computer-assisted thematic cartography done at Macintosh workstations.

Desktop mapping borrows many of the tools and techniques of "desktop publishing," another Apple buzzword for a much larger hardware and software market. Desktop publishing involves the integration of word processing, page layout, and graphics programs, allowing designers to manipulate text and graphics through "what you see is (more or less) what you get" interfaces. Desktop publishing packages are based on PostScript, a "simple interpretive programming language with powerful graphics capabilities"[1] developed by Adobe Systems, Inc. In principle, PostScript obviates the traditional procedure of pasting-up mechanicals for subsequent photographic processing. High-resolution PostScript output devices now afford the ability to generate color separated, plate-ready negatives direct from the designer's desktop. In the context of thematic cartography, the computer becomes an entire cartographic laboratory capable of doing everything from data analysis to high level cartographic production and typesetting.

Prior to our initial experiments with Macintosh, our lab was devoted to the conception, design and subsequent rendering of hand-scribed thematic maps for multi-colored publications. In 1986 we initiated a survey of desktop mapping products as alternative production tools. Our search was task-specific. The mandate of our activities forced us to assess hardware and software from the perspective of its applicability to publishing and printing. This approach, although arguably myopic, worked in our favor by offering a unique vantage point from which software products could be judged and immediately categorized on the simple basis of whether they were useful or not for the production of color separations. Our survey led us to look to Macintosh for a hardware/software solution that could deliver high quality products within the context of our every day activities.

HOW WE GOT STARTED AT TEMPLE

Based on the simple categorization scheme suggested above, we found that software products fit nicely into one of two groups. The characteristics that distinguish these two groups are helpful in understanding what software is capable of doing now and where development should proceed in the future.

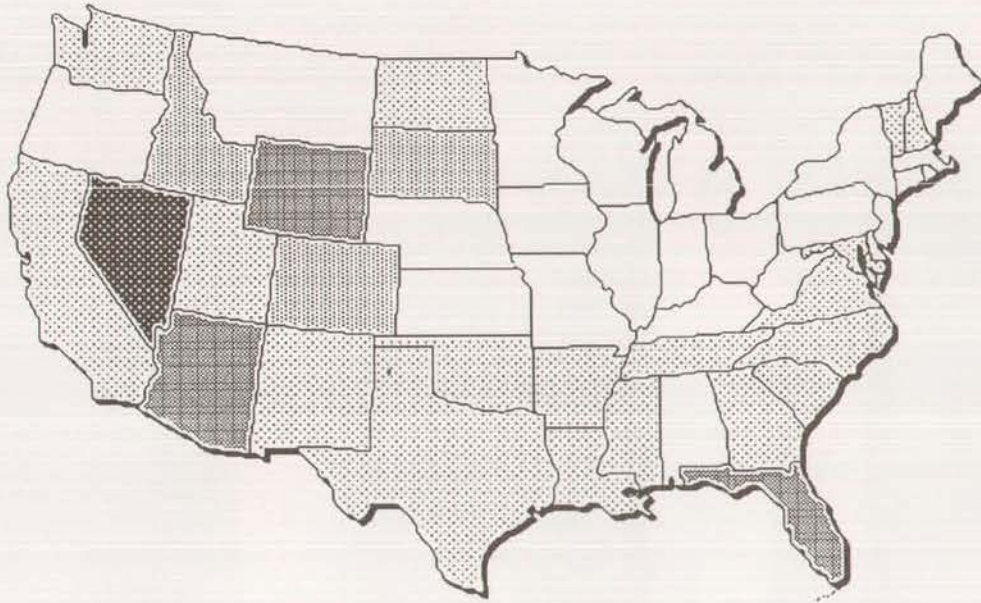### DESKTOP MAPPING: TWO SOFTWARE FAMILIES

Figure 1: Typical output of "Group one" software packages
(LaserWriter paper original)

Figure 2: Typical output of "Group two" software packages
(Linotronic film original)

Software group one consists primarily of mapping packages that are capable of generating displays of cartographic symbols in response to the output of general purpose or custom spread sheets. Typically, these packages offer poor graphic quality and no intrinsic relationship to the steps normally followed to produce color separations for offset printing. Maps generated by software of this kind tend to be simple "bit map" images embellished with a limited palette of colors and patterns to distinguish qualitative differences in areal phenomena and quantitative differences in choropleth classes (Figure 1). Once created, symbols are keyed to base maps that are either provided as part of the software package or are user-defined and created with utilities contained within the software.

Group two is comprised of desktop illustrating programs based on PostScript. These programs work wonders graphically, fit perfectly into the photomechanical production flow, but offer no data display capabilities or associated utilities designed for cartographic symbolization. They are, in effect, professional drawing tools with enormous typographic and drafting advantages that are easily capable of generating maps organized as true color-separated negatives ready for the printing plate with high density tint screens, flawless linework and superb typography (Figure 2).

THE TEMPLE PLAN

Shortly after our initial software assessment, we developed a full-fledged desktop mapping lab comprised of four Mac IIs with color monitors and assorted hardware peripherals. With the help of an equipment grant from Apple, we devised a plan to use our new system to produce an entire thematic atlas (the *Atlas of Environmental Issues*), believing that a real working environment would generate a set of pertinent—if sometimes troublesome—questions about desktop mapping as a discipline in and of itself. The basic configuration of our lab at this point is illustrated in Figure 3.

Along with our acquisitions of equipment, we purchased a variety of software programs which collectively represented what we hoped would be a solution capable of handling the atlas project as we first conceived it. Our approach was to mimic our standard photomechanical production flow, substituting computer-assisted techniques for each manual step. In a conventional production scenario, maps are designed at one table, then passed along to be produced at another. We used information display programs (Group one as described above) for data analysis and design, and illustrating programs (Group two) as digital replacements for drafting, scribing, typesetting, peelcoat making and photomechanical production. Programs such as MapMaker, MacAtlas, MacLink, Image Studio, and Superpaint, combined with Microsoft Excel are examples of the Group one programs we used. Adobe Illustrator, Aldus FreeHand, and Quark Xpress served as our illustrating and typo-
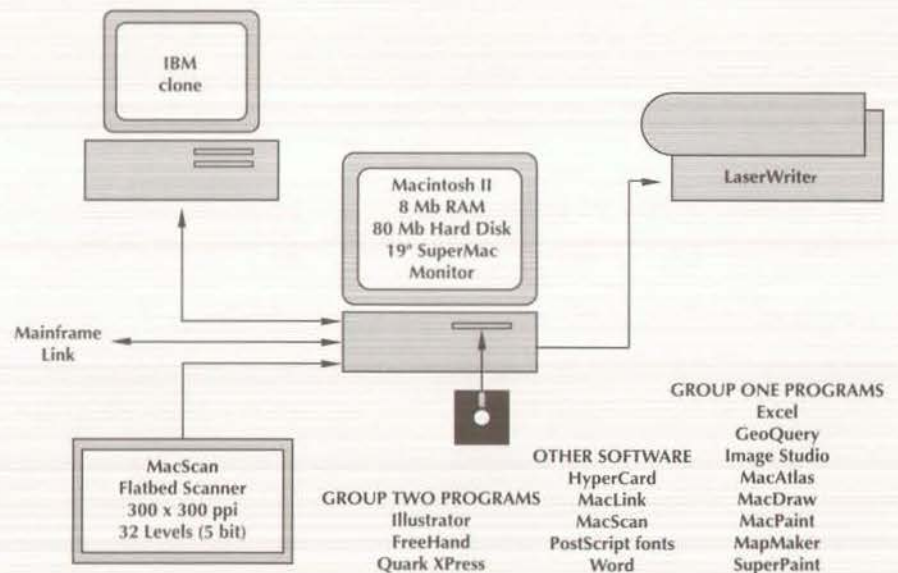

Figure 3: Temple's desktop mapping hardware and software configuration

graphic (Group two) tools. In day-by-day operation, statistical data was entered into and stored in Microsoft Excel, maps were designed with MapMaker, bases were scanned with MacScan, and composite film was produced using Illustrator output to a Linotronic L-300 imagesetter. As a final step, maps and charts were put together with text, into atlas page layouts, using Quark XPress.

THE EFFECT OF MACINTOSH ON CARTOGRAPHIC PRODUCTION

The best way to understand the impact of the configuration described above on the production of the *Atlas of Environmental Issues* is to look at the production flow chart used to produce the ten thousand hand-scribed and peeled separations used in the *Atlas of Pennsylvania* (in press, pro-
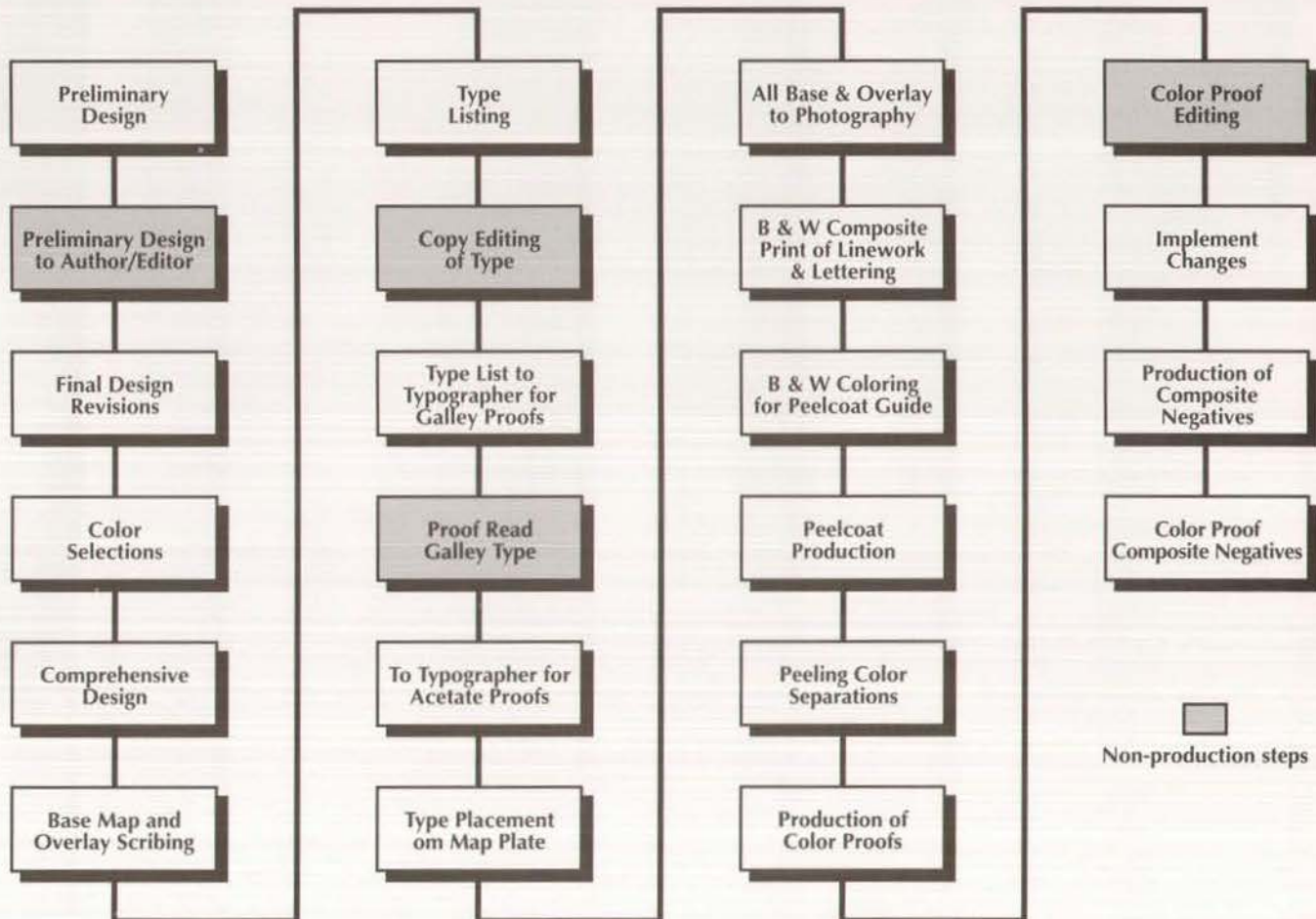
Figure 4: Photomechanical production flow

duced at Temple's Cartographic Lab). Figure 4 is a graphic representation of the steps involved in traditional map and atlas production. Each step has certain economic and chronologic ramifications (the flow presented in Figure 4 was designed following the example set forth by the *Historical Atlas of Canada* and, as such, is indicative of any number of similar project-specific guidelines or plans). Figure 5 represents a flow associated

Figure 5: Desktop mapping production flow

with the production of an identical product using Macintosh-based desktop mapping tools.

In the Macintosh flow individual tasks melt together, such that many production steps result as technological by-products of other operations. Let me explain using a well known example. In pen-and-ink cartography, linework production is a discrete step in the production flow. A subsequent photographic step is required to convert the inked linework to high contrast negative film prior to plate production. If scribecoat engraving is substituted for drafting, inking and photography melt into one step where negatives result from the exact same stroke of the hand that only produce black lines in the earlier system. This is the essential impact of desktop mapping: individual production tasks melt together and are given as by-
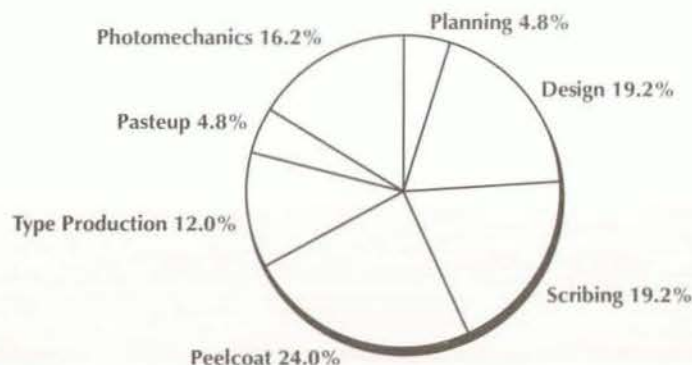

Figure 6: Time spent on production tasks as a proportion of total project time

Figure 7: Hypothetical production costs by (a) photomechanical methods and (b) desktop mapping methods

products of previous steps.

Although desktop and traditional cartographic production techniques have (to my knowledge) not been compared in a formal efficiency study, some intuitive points can be made using a graph that I produced five years ago to help estimate time and costs for bids on contract, four-color mapping jobs (Figure 6).

Without assigning dollar values or without taking materials into account, Figure 6 shows the relative time given to different tasks during map construction (Of course, different labs spend different amounts of time on various tasks depending on the systems and equipment used to accomplish those tasks). Obviously, a theoretical bill, given any standardized rate of pay, would be adjusted accordingly if steps were eliminated or for that matter affected in any way by a new piece of equipment or a new technology based on new equipment.

As eluded to earlier, tasks in the Macintosh flow of cartographic production tend to melt into one another. What this means to overall production costs, in terms of bottom-line savings, can be anticipated using the next simple bar graph where time is considered money and the percentages from the previous pie chart are regarded as cents in a hypothetical production dollar (Figure 7).

ECONOMIC RAMIFICATIONS

ECONOMIES EXPLAINED

These hypothetical savings result from the following economies. On the Macintosh bar design and planning are fixed components that are made more efficient through the use of desktop mapping. What this means is that design does not decrease as a cost or time factor. It is our experience that designers work as many hours on the Mac as they did in the traditional process. What changes is the level of their productivity. In the same time, many more design experiments can be reviewed on Macintosh.
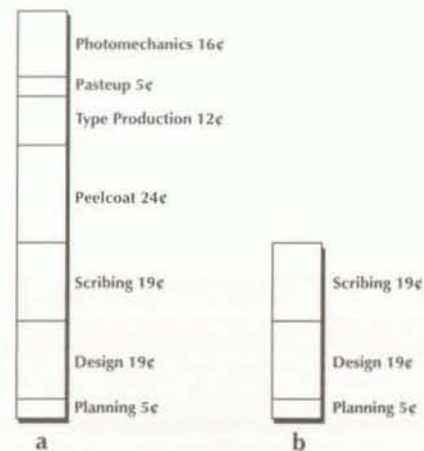
Several choropleth maps, for example, can be run past the designer every minute on the CRT, with new classification schemes and color arrangements. Maps can be instantaneously reproportioned for experimentation in a multitude of page layouts. Type can be changed in size and style at the push of a button, giving designers an opportunity to work toward the ultimate artistic and functional presentation less inhibited by the constraints of time and project cost.

Scribing is replaced by on-screen drafting and represents another fixed cost factor. Our experience, once again, shows that both screen and table lines take the same time to draw. If, however, a base map is already in digital form and can be brought straight from disk to screen, the drafting task is reduced considerably and used mainly for symbolization.

Peelcoat production and photomechanics are eliminated as cost factors being totally absorbed into the technology of the new system. Pasteup and type production, likewise, are dispensed with as a cost considerations in the production flow, having been created as a by-product of the map's original design.

The net result of desktop mapping is a potential savings of fifty-seven percent over traditional production methods.

The net result of desktop mapping, when looking at theoretical cost, is a potential savings of fifty-seven percent over traditional cartographic production methods.

MAP QUALITY

Undoubtedly, there will be cartographers who will not be impressed with savings alone and will ask immediately about desktop mapping quality. Most cartographers, and I consider myself one of them, have spent a lifetime refining their craft and would be reluctant to turn to a new technology that might create work that was not up to an accepted standard for cartographic presentation. One of the most wonderful surprises for us was the realization that desktop mapping, when done using programs like Illustrator, actually *increases* map quality.

In desktop mapping, quality results from the resolution of the printing device attached to the computer. Programs capable of generating a PostScript document, such as Adobe Illustrator and Aldus Freehand, are device independent (assuming that the device happens to include a PostScript interpreter). This means that the quality or resolution of final output is not determined by the software itself but instead is a function of the output printing device. The greater the resolution of the printer, the greater the resolution of the map. This resolution, given the capabilities of today's laser imagesetters, exceeds 2500 dots per inch. Under magnification, imagesetter output far exceeds drafting or scribing in quality and consistency. Unfortunately, high printing costs make it impossible to present an example of four color desktop mapping here in *Cartographic Perspectives*. Figure 8 is offered as a monochrome example of the level of quality one can expect [Editors' note: The printing plate for Figure 8 was generated directly from negatives produced by a Linotronic L-300 imagesetter operated by Waldman Graphics, Pennsauken, NJ. Tint screens are 133 lpi.].

CURRENT DESKTOP MAPPING AND DESKTOP PUBLISHING PROJECTS

To date, desktop mapping techniques have been used on four atlases in our lab: the *Atlas of Pennsylvania*, the *Atlas of Environmental Issues*, *The Atlas of African American History*, and the *Atlas of the United States for Middle Schools*. These atlases, comprised of nearly 2,000 maps and illustrations, have each benefited from our desktop mapping and publishing lab in some unique way.

The *Atlas of Pennsylvania*, which started as a hand-done volume four years before the development of our desktop mapping lab, finished as a hybrid compendium involving several production methods. Desktop
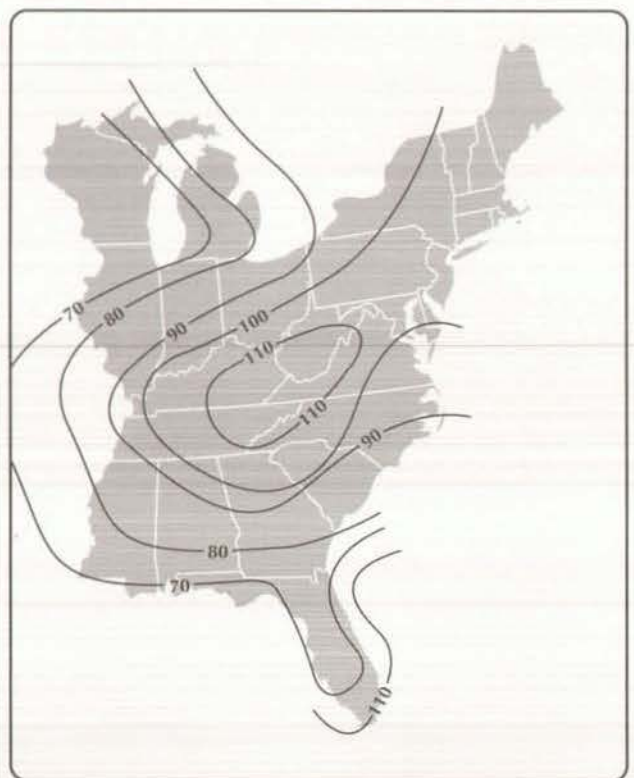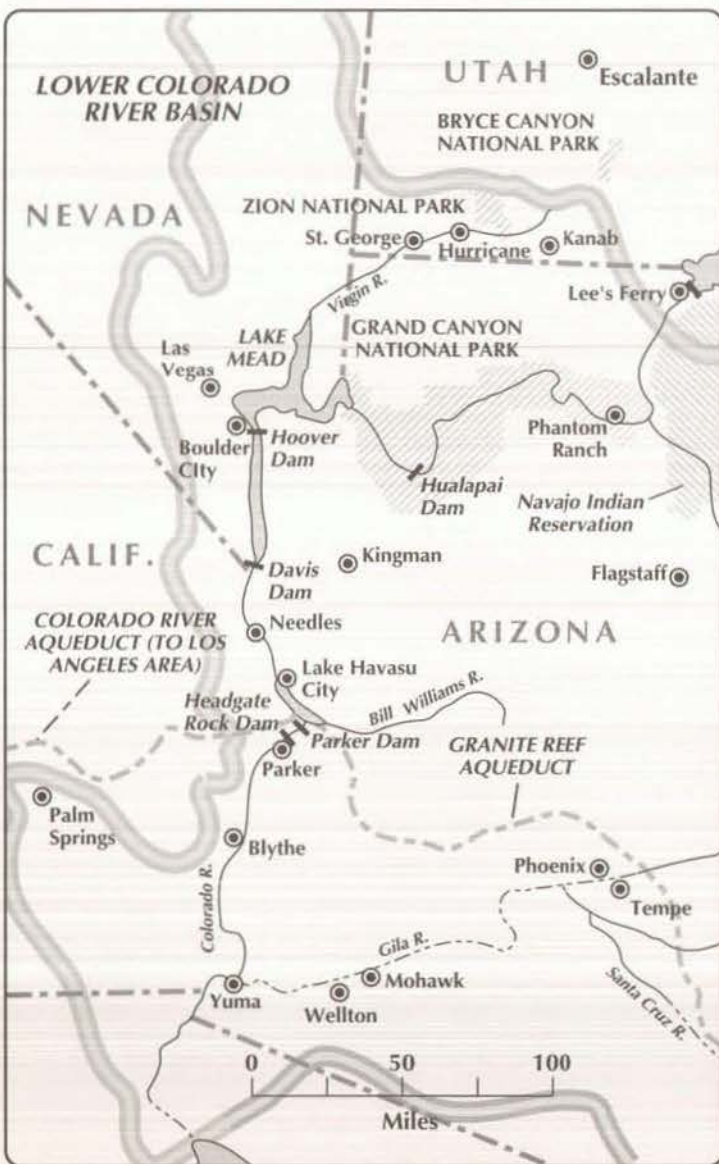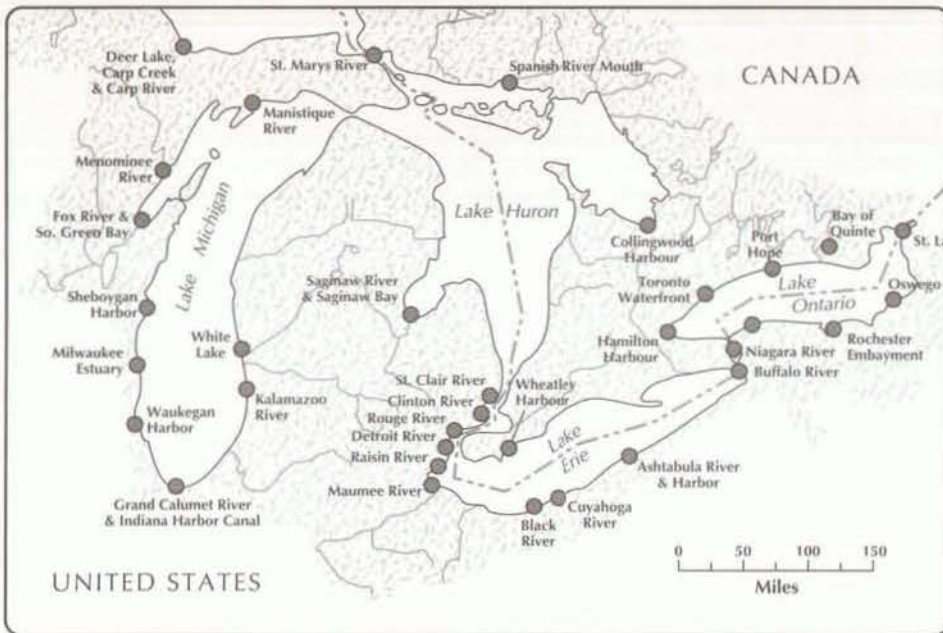
Figure 8: *Examples of cartographic products created by desktop mapping techniques at Temple University.*
Top left: *Originally designed as a four-color image, converted to monochrome in minutes. Note type placement and registration of point symbol fills.*
Top right: *A fictitious distribution highlighting registration of area fills to .003" lines.*
Lower left: *Note screened type and lines. Size, color and character of map elements can be changed with the stroke of a key.* **Lower right:** *Wiggly isolines due to unsteady hands are a thing of the past thanks to editable Bezier curves and freehand lines.*

mapping tools were used for critical type placement on graphs and maps that were otherwise produced by hand. Our method was to scan a blueline proof of a scribed illustration to be used as a template onto which Mac type was placed. The resulting imagesetter-produced type negative was then combined, using duplicating film, with the black type negative from the original illustration. We also found that the Mac is particularly useful for curving type and the drafting of nested polygons and frames around graphics. The Mac, running Quark XPress, was also used exclusively for pagination and text layout in what could be strictly called a made-to-order desktop publishing application.

The *Atlas of Environmental Issues*, to be published in December of 1989, was our first attempt at producing an entire atlas on Macintosh. I say "attempt" because we fell short of our goal by about five percent. In some cases, we found that scribing moved much faster than computing especially when maps could be created through photomechanical combinations of existing overlays. We also found that the Mac was pushed to its limit when we attempted to do choropleth maps of the United States at a county level on our own high resolution base map.

> *We found that the Mac was pushed to its limit when we attempted to do choropleth maps of the United States at county level.*

Currently in production, the *Atlas of African American History* is the direct beneficiary of the efforts required to produce its desktop published predecessors. Unlike the *Atlas of Pennsylvania* and the *Atlas of Environmental Issues*, the *African American Atlas* will have many color and black and white photos and color renderings. We hope to use the Mac for 24 bit color and grey scale scanning and image editing. If this is possible, our final product will be a combination of maps, graphs, charts, and scanned images compiled within a color-supported version of Quark XPress.

The *Atlas of the United States for Middle Schools*, which is also currently in production, is scheduled to be written and compiled in less than four months with a staff of four people. The atlas is perhaps our most entertaining from a graphic standpoint. Designed to look like a cross between an atlas, *Time Magazine*, and *USA Today*, the atlas will be chock full of computer drawings and colorful images of the type necessary to attract our youthful audience. During the construction of these illustrations, data, once entered into Microsoft Excel, is being converted into maps using the EPSF version of MacAtlas. The resulting maps are being enhanced, using the capabilities of Adobe Illustrator and symbolized using a wide variety of clip-art symbols. Charts and graphs are being created using Chart Illustrator, a Hypercard stack developed by Iden Rosenthal of Maximum Use Software in Philadelphia. In Chart Illustrator spreadsheet data is converted into line graphs, bar graphs, and pie charts and is written in an Adobe Illustrator file format.

STARTING A DESKTOP MAPPING LAB

Desktop mapping means hardware and software purchases. The basic Mac II computer system with a 14" color monitor, a flatbed scanner, a laser printer, and software runs about $14,000. A larger 19" color monitor adds $3,000–$5000 to the cost of a basic configuration. Minimum hardware requirements include 2 Mb RAM and hard disk.

SERVICE BUREAUS

Since most cartography labs will not be able to afford a top-of-the-line laser imagesetter at $65,000, the establishment of a vendor network is essential if computer files are to be turned into high quality photomechanical products. Vendors providing such services are called "service bureaus" and should be capable of delivering output of 1270 dots per inch (minimum resolution) for linework and type and 2540 dots per inch for separations that are made up of halftones or fine tint screens. A good service bureau will also be able to generate color proofs from imagesetter-

produced film while offering technical advice on file formatting and PostScript programming.

Prices for laser output vary with output resolution, page format, and job size. The going price for typewriter size pages is between five and eight dollars for resin coated paper. Film output, as positive or negative, should cost no more than fifteen to seventeen dollars per page.

Quality control for paper is exactly the same as that for commercial typesetting. Film should be examined for density and evidence of raster lines. Poorly exposed or developed film will be translucent despite a black color and will be etched with highly visible and equally unacceptable horizontal or vertical lines.

Like any technology, desktop mapping takes some up-front time to understand a new computer interface and the specifics of individual applications. Fortunately, the learning curve is short and the entire process is rather painless due to the natural friendliness of the Macintosh itself. Based on my own experience and the troubles I see students go through, I suggest that one should learn the computer first before learning its applications. This method, although not as exciting as plunging straight into a four color atlas page, will short-circuit simple but deadly problems.

TRAINING

Lenny Schafer, president of ImageSet Corporation, commented in a recent article that "The connection between desktop publishing and professional printing does not yet exist."[2] He goes on to warn that "No desktop publishing software programs or hardware, and no service bureaus working in desktop, are able to deliver four-color professional documents to the inexperienced graphics user." If you are serious about desktop mapping as an alternative to photomechanical production, be warned that generating color-separations via laser imagesetters is by no means automatic.

PROBLEMS

The biggest problem associated with desktop production is the fact that PostScript does not deliver accurate printer screen angles at pre-specified standard dot densities. As an example, a laser imagesetter driven by a PostScript Raster Image Processor (RIP) prints 45° at 123 lines per inch when the printer driver is calling for 45° at 133 lines. The net result of this and peculiarities at other angles is the development of screen moirés when composite negatives are overprinted in four color printing.

To solve moiré problems, service bureaus are following a set of instructions developed by Adobe Systems whereby files are output using non-standard printing specifications (Table 1).

Table 1: PostScript workaround specifications

Black	45°	120 lpi
Cyan	72°	133 lpi
Magenta	18°	127 lpi
Yellow	0°	127 lpi

These specifications define a simple set of parameters that seem to solve problems in screen juxtaposition. To make sure that a service bureau is aware of these specifications it is good idea to have several proofs made from random files before an entire project is committed to paper or film. Checking proofs with a ten power loupe and overlaying negatives on a light table will reveal project-threatening screen angle problems. As a final note, it is not unreasonable to ask that these tests be done free of change as a tangible demonstration of a service bureau's competence.

Remember—it is not your responsibility to ensure good output if you have sent a good file. It is your responsibility, however, to maintain quality control over the entire process even if it means sending output back when contracted services do not meet an established criterion for professionalism.

Another problem is size. Imagesetters such as the Linotronic L-300 currently are able to output paper and film of 12" maximum width. Large format thematic mapping necessitates tiling, which is usually unacceptable. Presumably new generation PostScript output devices will eliminate this constraint.

PROSPECTS

If current trends are any indication of future developments, we can expect more powerful microcomputers, faster, larger-capacity, and less-expensive data storage hardware, and improved desktop to press connectivity. Pressures brought to bear on industry by the massive desktop publishing market seem likely to work in favor of desktop mappers, at least with regard to hardware.

I think it's important to look at the future of software development. The two group system outlined in this article must, in my opinion, give way to a single class of product that handles everything from map design and analysis to cartographic production. What I envision is a single desktop mapping package that embraces the best features of both software groups. When or if such a product will emerge is not immediately apparent, but MicroMaps, Inc. (Lambertville, New Jersey) has made a good start with its QuickMap program. QuickMap converts data sets to choropleth maps that can be saved in either MacPaint (a Group one program) or Adobe Illustrator (Group two) format. What this means is that with one menu choice the advantages of Group one programs can be merged with those from Group two.

QuickMap has important limitations. First, it only makes choropleth maps. Second, it is not so much a program as it is an interface that links the two software families. The important thing is that the developer has recognized issues pertinent to cartography and is coming up with solutions that are broad based.

My hope is that developers will follow suit by introducing a comprehensive tool for desktop mapping soon. Such a package ought to include high quality digital base maps and a wide range of symbolization options including dot mapping, isarithmic mapping, and point symbols that can be generated from existing spreadsheet programs. In the meantime, practitioners of desktop mapping will need to be proficient with a variety of special purpose programs. Despite the problems discussed in this article and elsewhere, it seems clear that desktop mapping techniques represent an important alternative to traditional photomechical thematic map production.

REFERENCES

1. *PostScript Language Reference Manual*, Adobe Systems, Inc. (Reading, MA: Addison-Wesley), 1985.

2. Schafer, L. (1989), "Teenage sex and color publishing," *Pre-* 1:3, p. 10. [Editors' note: the subtitle of Schafer's article reads, "The allure, anticipation, and excitement may be there, but the result is still overrated"]

El desarrollo de la aplicación de paquetes de software para la publica-
ción de mapas por la Temple University fue instigado en 1986 por la
necesidad de buscar una alternativa para la produccíon de mapas por la
micro-computadora Apple Macintosh. Nuestra experiencia indica que
estos aperos pueden reducir significamente los costos asociados con el
diseño y produccíon de atlases tematicos sin sacrificar la calidad de los
gráficos. Este articulo presenta concisamente las actividades cartográfi-
cas de la Temple University con el proposito de stimular discursos
pláticos sobre formas alternativas para el diseño y produccíon de
mapas.

Extracto

cartographic techniques

COLOR
PRINTER TECHNOLOGIES

The July, 1989 issue of *Computer
Graphics Review* features an article
dealing with the current status and
future prospects of color printer
technologies (Kinnucan, Paul
(1989), The technology cornucopia
in color printers, *Computer Graphics
Review* 4:7, pp. 26–34).

Sales of color printers are
reported to have totalled $365
million in 1988, surpassing other
output devices such as pen plotters
and film recorders. Despite their
relatively low resolution (180–400
dpi), market analyst CAP Interna-
tional projects that annual sales of
color printers may exceed $1
billion in three years.

Kinnucan classifies color print-
ers by five general types. **Dot
matrix** color printers "employ
small wires (or hammers) in the
print head to transfer ink from a
multicolored ribbon onto the
paper." Dot matrix printers are
popular because of their relatively
low cost. **Ink jet** color printers
"propel ink droplets, either
continuously or on demand, to-
ward the surface of the paper . . .",
producing highly saturated colors
and sharp, continuous-tone
images. **Thermal wax transfer**
printers "create images by melting
pinpoint spots of colored wax onto
paper. Because this dot formation
technique entails no head move-
ment, thermal transfer printers can
create high-resolution images (200-

to 300 dpi) with highly saturated
colors at twice the speed of ink jet
printers . . .". **Dye diffusion**
printers "heat a dye-impregnated
ribbon, causing dye spots to
vaporize and diffuse onto paper
. . . [creating] images that rival
photographs in clarity and sharp-
ness." Dye diffusion printers are
as yet not in widespread use, due
to high cost and small image size
(maximum 4" x 6"). **Electrostatic**
printers "put electric charges on
paper where a spot is needed, and
then apply colored toners to create
an image." The high price of
electrostatic color printers is offset
by their capability to produce
high-resolution (up to 400 dpi),
large-format (up to E size) images
at high speed.

Kinnucan is optimistic that color
printers will improve with regard
to both performance and price.
Kodak and Hitachi, for example,
are currently working on page size
dye diffusion devices. An emerg-
ing technology dubbed the
"Cycolor" process (developed by
Mead Imaging, Miamisburg, OH)
"creates latent images by exposing
a donor sheet containing photosen-
sitive ink capsules to light. The
donor sheet is then pressed against
a receiver sheet or transparency to
create a final copy." Color laser
printers, currently under develop-
ment by Canon and Colorocs, are
expected to appear in the coming
year.

The article concludes with a
"Color Printer Survey" matrix that
compares 32 color printers from 18
vendors by output size, resolution,

imaging time, interfaces, graphics
device emulation, and price.

MacATLAS

MacAtlas, a product of MicroMaps
Software Inc., Lambertville, NJ, is
a collection of clip-art map bound-
ary files for Macintosh drawing
and paint programs. The maps
can be opened in software such as
MacDraw, MacPaint, Adobe
Illustrator and Aldus FreeHand,
and used to create choropleth
maps, or as bases for other location
or thematic mapping tasks.

Four MacAtlas products are
currently available. The MacAtlas
EPSF (Encapsulated PostScript
Format) version ($199) includes 2
world maps, 11 regional maps,
maps of the USA by state, and all
50 states by county. The MacAtlas
Professional Version ($199)
includes a similar set in PICT
format. Also available are the
MacAtlas Paint version 2.0 ($79)
and the MacAtlas Presentation
Pack ($199).

For more information, call
MicroMaps at (800) 334-4291.

A WORLD SOILS AND TER-
RAIN DIGITAL DATABASE

Marion F. Baumgardner
International Society of Soil Science
In 1985 a provisional working
group was established by the
International Society of Soil
Science (ISSS) to consider the
feasibility and desirability of
developing a world soils and
terrain digital database at a map
scale of 1:1M. The project, known
as SOTER, won a contract from the

United Nations Environment Programme (UNEP) in 1987. It had two obligations: to produce a general soil degradation map of the world at a scale of 1:15M, and to develop a soils and terrain digital database at a scale of 1:1M for an area of approximately 250,000 sq. km which includes portions of Argentina, Brazil, and Uruguay.

OBJECTIVES
The long range objective of the SOTER Project is to produce a world soils and terrain digital database containing digitized map unit boundaries and their attribute (descriptive) database. The database has the following characteristics:
§ general average map scale, or accuracy, of 1:1M;
§ compatible with global databases of other environmental resources and features;
§ amenable to updating and purging of obsolete and/or irrelevant data;
§ accessible to a broad array of international, regional, and national decision-makers and policy-makers;
§ transferable to and useable by developing countries for national database development at larger scales (greater detail).

This is an exceedingly ambitious project, one which will require sustained, innovative effort over a period of many years.

Specific short range objectives are required in the initial phases of the Project to provide a logical and orderly sequence of activities to produce an operational world soils and terrain digital database. Emphasis will be on research, development and testing of methodologies in the field and in the laboratory and demonstration of the uses of the database. Specific short term objectives are as follows:
§ development of an implementation plan;

§ adoption of a universal legend for the SOTER Database;
§ development of guidelines for correlation of soils and terrain mapping units;
§ definition of soils and terrain parameters and specifications to be included in the Database;
§ development of a detailed set of specifications and logic which define the minimum set of capabilities/functions required for the Database;
§ selection of three specific areas of 250,000 sq. km each in developing countries for initial database construction;
§ acquisition and correlation of all relevant maps and data about the selected areas essential for the Database;
§ input of data, including digitized maps, into the Database;
§ test and demonstration of the reliability, accuracy and utility of the Database;
§ conduct of an assessment of current geographic information systems and development of recommendations on the optional system for the SOTER Project; and
§ documentation of results, conclusions and recommendations from the initial phase of the SOTER Project.

A UNIVERSAL LEGEND FOR THE SOTER DATABASE
A draft version entitled "SOTER Procedures Manual for Small Scale Map and Database Compilation" was produced by an International Committee of Soil Scientists in 1988. This Manual describes procedures for compiling and coding the following kinds of data for entry into the SOTER Database:
§ Polygon file (15 attributes)
§ Terrain component file (28 attributes)
§ Soil layer file (73 attributes)
§ Soil degradation file

The Manual also presents coding forms on which to enter all the attribute file data which have been translated into the universal

legend from whatever soil classification system that is being used.

SELECTION OF BASE MAP FOR SOTER DATABASE
In 1984 a joint Working Group of the International Geographical Union (IGU) and the International Cartographic Association (ICA) was established to explore the feasibility of developing a standard global data set. This project, entitled World Digital Database for Environmental Science (WDDES), concluded that the Operational Navigation Chart (ONC) series produced by the US Defense Mapping Agency provides consistent global map coverage of high cartographic quality at a scale of 1:1M. The IGU/ICA Working Group recommended the use of digitized ONCs as the best available 1:1M base map for input into world databases for registration and overlay of other natural resource data, including soils and terrain.

Representatives of the SOTER Project, having participated in many of the deliberations of the IGU/ICA Working Group, accepted the recommendations of that Working Group and have made the decision to use digitized ONCs as the base map for SOTER.

PROGRESS REPORT
LASOTER (Latin American SOTER Pilot Area). Scheduled for completion on 31 December 1989, database development for the Latin American Pilot Area is on schedule. In March 1988 a regional workshop was held in Montevideo to develop an implementation plan and to train soil scientists from Argentina, Brazil and Uruguay to use the universal SOTER legend and procedures manual for correlating soil maps of different classification systems to a uniform system of description and attribute entry into the database.

This workshop was followed by two separate correlation field trips

by participants of the three countries and an external soil correlator into the pilot areas of each country. By mid-December 1988 acquisition of all map and attribute data from each of the three countries for the Pilot Area was complete. All attribute data have been coded and entered into the SOTER attribute files. Entry of polygon or map data into the SOTER Database will be done in the latter half of 1989 after selection of a geographic information system (GIS) for SOTER. Once the polygon and attribute files are in place, testing and demonstration of utility of the database will be conducted.

NASOTER (North American SOTER Pilot Area). Work was begun on a US-Canadian Pilot Area following a workshop and implementation planning meeting in Ottawa in March 1989. This pilot area includes the state of Montana USA and the southern portion of the Canadian provinces of Alberta and Saskatchewan. A cooperative effort by the US Soil Conservation Service and the Land Resource Research Centre of Agriculture Canada, the SOTER Database for this Pilot Area is scheduled for completion by 31 December 1989.

WASOTER (West African SOTER Pilot Area). Negotiations are proceeding now to define an area which will involve six countries in West Africa in the development, testing and demonstration of the utility of a SOTER Database for that area.

Within the next two or three years it is anticipated that the SOTER Project may expand into other areas of the world. Particular interest has been expressed for cooperative implementation of the SOTER concept in an area of the Middle East, India, Southeast Asia, northern South America, Central-Eastern Europe, and Western Europe.

In general, the overriding objective of the SOTER Project is to improve the capability to deliver accurate, timely and useful information about soils and terrain resources to decision-makers and policy-makers. It is expected that a World Soils and Terrain Digital Database will provide this improved capability of information delivery. Some more specific expected results are as follows:
§ Orderly arrangement of resource information;
§ Improvement in standardization and compatibility of reporting soils and terrain data/information;
§ Improvement in accessibility of soils and terrain and related resource information;
§ Dynamic resource information system with updating and purging capabilities;
§ Information service for national resource planning in developing countries; and
§ System model for technology transfer.

As the world is being caught up in the "information revolution," there is an increasing need to find innovative and more effective methods for using and transferring this technology. The SOTER Database Project can provide an excellent vehicle for training a cadre of specialists, especially in developing countries, for using the Database, providing new data and developing new uses of the Database. The operational World Database can also serve as a model for the design and construction of incountry databases with sufficient detail and scale (accuracy) for local and provincial use.
(reprinted from ICSU Newsletter, 6/89)

EXPERT MAP PROJECTION SELECTION SYSTEM

Doyle Smith and John Snyder
United States Geological Survey
Cartographers at the U.S. Geological Survey are developing a system for the computerized selection of map projections for special-purpose map and chart design applications. This system, named the Expert Map Projection Selection System (EMPSS), is a computer software package that uses object-oriented structures and artificial-intelligence programing methods. The EMPSS has been developed for use in the design of thematic maps and other customized map products of the type generally constructed within a geographic information system environment.

The EMPSS package includes a base of information that contains human-expert technical descriptions and evaluations of the physical attributes of more than 50 of the most commonly used map projections.

The EMPSS operates by asking the user a series of general questions about specific needs or applications. The answers to this series of 10 to 24 questions enable the system to construct an idealized set of specifications for the proposed application. Once this ideal model has been constructed, the system evaluates each of the map projections in the knowledge base against the ideal model, using the stored evaluative information provided by the human expert. The name of the map projection that compares most favorably to the specifications of the idealized model is provided to the user as the optional projection for the proposed application or usage. *(extracted from U.S. Geological Survey Yearbook FY 1988)*

SPACE SHUTTLE DEPLOYS RECONNAISSANCE SATELLITE

The space shuttle Columbia's latest mission, a secretive Pentagon exercise undertaken August 8 to 12, reportedly focused on the deployment of a $1 billion advanced photo reconnaissance satellite known as the KH-12. The satellite, a spy craft with more powerful sensors and greater maneuverability than previous

models, is expected to photograph a large portion of the world, but spend the majority of its time flying over the Soviet Union. Its less predictable orbits are being hailed by industry analysts as the beginning of an era in which it will be "far more difficult for the Soviets to evade [American] surveillance." Experts agree that the machine will greatly enhance the ability of the United States to verify treaties and arms control agreements, but have offered little clue as to just how powerful its sensors are. In this age of rumor mills, information leaks, and spy scandals, it is amazing that no one (without a high-level security clearance) seems to know what the image resolution capabilities of modern remote sensing surveillance equipment really is.
(adapted from the New York Times, 8/9/89)

cart lab bulletin board

This forum is offered to encourage communication among practitioners at a time of rapid technological transition. Questions, comments, and announcements are invited.

CARTOGRAPHY AT THE UNIVERSITY OF TORONTO

G.J. Matthews, Chief Cartographer University of Toronto
The cartography office at the University of Toronto is an integral part of the Department of Geography. The present office occupies a 2080 square foot open plan room, with natural light, in the basement level of Sidney Smith Hall in the Arts and Science Faculty.

The office was established in 1963 when I was hired to design and produce the *Economic Atlas of Ontario*. For that project the staff gradually increased to 6 cartographers. Cartographic supply and demand caused some fluctuations in staff levels over the years: from a low of 3 personnel in the early 70's to the present high level of 8

female and 5 male full-time professionals.

In the early years the cartographic mandate was to provide a drafting service to the geography academic staff for slides, overhead transparencies, and for publication materials. If time was available the cartographers were also expected to extend this free service to graduate students in need of maps and graphs for their theses. During these years, though, the *Economic Atlas* project had priority over all other work.

The office established, with the *Economic Atlas* publication, a style and quality of cartographic production second to none. When the applause abated the expected flow of major projects to our office failed to materialize, so once again we became a service lab for geography staff. Unfortunately the academic staff were now in the first hypnotic trances of the computer age and the demand for maps almost entirely disappeared.

The mid 70's introduced a new phenomena that effected our operation—the shrinking University budget! Partly, at first, to supplement the departmental budget, and later as a contribution to salaries, the "free" drafting service disappeared and "cost recovery" was now introduced. This had a profound effect on our operation and changed the direction of the office entirely. Academic staff now had to pay through pre-arranged grants for their previously free cartographic service, and our time and materials were charged to all jobs.

We now extended our cartographic service to all University departments, and later promoted our talents to provincial government departments and to interested publishing houses. Contract cartography for specific map work was now more frequent.

In 1978 a group of geographers, historians, and cartographers made a formal proposal to the

federal government, through the Social Sciences and Humanities Research Council, to produce a three-volume *Historical Atlas of Canada*. The cartography office was an integral part of that proposal. When the project was approved in 1979 (with a $5 million budget) the gradual hiring of new staff began. Today the office is staffed by 13 cartographers with a combined total of 170 years experience.

Because of our professional reputation and high quality of production our atlases have been awarded 4 gold medals; all staff are full-time highly qualified cartographers. Only occasionally has the office hired students for summer help. The cartography operating budget for salaries, supplies and filmwork is well in excess of a half million dollars a year.

Volume I of the *Historical Atlas of Canada* was published in 1987. The French and English editions sold over 24,000 copies at $95 each and received very positive reviews and awards. Production is nearing completion on the second volume in the series which will be published in September, 1990.

About the time we were gearing up for the *Historical Atlas* the number of commercial mapping contracts increased dramatically. During the past ten years there have been few periods without 2 different atlases being produced concurrently. The office has now 12 full colour atlases to it's credit and is currently working on numbers 13 and 14.

Although the office is an integrated unit and the cartographers are intermingled the cartographic responsibilities are divided. *Historical Atlas* staff work solely on that project, while geography staff work on all other contracts. On occasions when deadlines are critical manpower is rearranged temporarily to maintain production schedules.

Apart from the more complex thematic cartography the staff still produce a sizeable number of black and white maps for publication by academic staff, and for other publishers including the University of Toronto Press. An even greater volume of simple ink and leroy lettered graphs are produced for wide cross-section of departments within the University. We even produce the occasional poster. This is the bread and butter of our operation and ensures a constant flow of funds to the Department.

For colour cartography our methods are state of the art, although the office is not yet involved in the application of the computer for day-to-day production. The computer is involved, however, in the research and data manipulation for maps and on occasion for graphic illustration. Two members of the cartographic staff are specialists in computer cartography and it is inevitable that the office will eventually move in that direction.

Currently all type orders are prepared and coded on a word processor in the office and discs are supplied to a commercial typographic plant for setting. All our type is supplied on waxed stripping film.

All map production overlays are scribed. All colour separations are by the peelcoat method and peeled manually. All overlays are punch registered on a Ternes 6-hole punch. Preliminary and intermediate film requirements are produced by the Faculty of Art and Science Photographic Laboratory.

Colour proofs are contracted commercially using the watercote process. Type negatives and final plating film are also made commercially in Toronto.

The cartographic responsibility for a contract extends also to the printing stage, and a cartographer familiar with the job is always on hand with a representative of the publisher to approve the colours and registration on the printed sheet as it comes off the press.

Because each cartographer is allowed to use creative freedom in style and colour within certain guidelines, and are totally involved with all aspects of production of the maps they produce, there is a strong spirit of pride in the projects that issue from this office.

KWIK PROOF
TECHNICAL NOTE
Don Myrick
Energy, Mines and Resources Canada
Despite a whole new generation of colour proofing systems which have come into use during the past few years, here at the Map Reproduction Centre at Energy, Mines and Resources, we have continued to use the old Kwik-Proof wipe on system. This has given us the flexibility to mix our own colours (our colour book contains over fifty) and allows us to proof large format work up to 48" by 65".

For us, Kwik Proof "Brightner" has become a very important tool. Brightner is a powerful cleaning agent originally intended to remove background or scumming from a colour proof. However, in removing the scum, the Brightner renders the image very fragile and can in fact damage it unless great care is taken.

We use Brightner as part of our wash off stock solution. We mix three ounces of strong ammonia and fifteen ounces of Brightner per gallon of water. When doing a wash-off, we further dilute the stock solution to about 8 ounces to 48 ounces of water. Not only does this solution take care of any background, but, more importantly, it enhances the quality of the image itself. This is because the Brightner sharpens the screen dot, fine type etc.. compensating for unevenness and slight overexposure. This is particularly true

of high percentage screens which tend to plug with normal exposure. Since we began to use Brightner, we have significantly reduced the number of remakes and are able to provide a better quality proof.
(CCA Newsletter, 15:1, 1989)

fugitive cartographic literature

Interesting articles about cartographic information often appear in unexpected outlets. The goal of this section is to bring those publications to the attention of our readership. We invite synopses of papers appearing in journals other than those devoted to cartography, geography, and map librarianship.

CORRIGENDUM
CP number 2, Summer 1989 featured an excerpt from Mary Kingsley's *Travels in West Africa* (London: 1897) graciously submitted by Pat Gilmartin. The editors regret that *CP2* stated that "Mary Kingsley was an English explorer who explored the Ogowé and Rembé rivers of West Africa in the late 1900's." In fact, Kingsley explored West Africa in the late 1890's.

Guptill, Stephen C. and Starr, Lowell E. (1988). Making maps with computers.
American Scientist, 76: 2, (March–April 1988) pp. 136-142.
reviewed by Marsha L. Selmer, University of Illinois at Chicago

This article, written for a popular scientific journal, reviews the state of computer cartography in the 1980s for a non-specialist audience. Guptill and Starr, of the U. S. Geological Survey, National Mapping Division, introduce the topic by discussing maps as a medium of communication, by outlining the characteristics of detailed topographic mapping, by touching on the rapid changes in mapmaking technology, and by

reviewing the earlier limitations of computers in map production.

The body of the paper is devoted to an explanation of how, in the 1980s, it "has become technologically feasible and cost-effective to assemble and use the data required to automate the mapping process." The application of graph theory to the creation of digital maps is outlined and the use of this digital data in the production of perspective views is graphically illustrated. Practical applications of this cartographic database, in the form of geographic information systems, are noted.

The paper is well illustrated by both color and black and white photography, and by a table on "Digitizing a map." The titles listed in the "Suggested reading" range from the general to the scholarly level. This article could be used in an introduction to cartography class that is aimed at an undergraduate or an adult education audience.

Bylinsky, Gene (1989). Managing with electronic maps.
Fortune, April 24, p. 237-254.
reviewed by Don E. Kiel
East Tennessee State University

It isn't often that cartography and geography have been featured in a leading business magazine. In a recent issue of *Fortune* magazine, however, electronic maps and geographic informationsystems (GIS) were reviewed and characterized as revolutionizingthe way many governments and businesses operate. Illustrative,diverse examples of use of this technology include: a largeforestry company managing 600,000 acres and 4,900 timber standsusing GIS; researchers predicting the effects of an earthquake onrescue vehicle response times; transportation planners calculatingeffects of new roads and traffic signals on travel times; and adepartment store chain

determining new store locations based uponpopulation, income, and other computerized demographic data. Perhaps most revealing about the growth of the automated mapping/GIS industry is a prediction by one market research analystthat sales of such systems will reach $590 million by 1992 andpotentially be expanding by as much as 35% annually.

The article also highlights the availability of previouslydigitized maps and associated databases. In addition to well-knowndigital products from the U.S. Census Bureau and U.S. Geological Survey, mention is made of a private firm, Etak, Inc., which will bemaking available digital electronic maps to be used as automatednavigational aids in automobiles. General Motors expects to beginequipping its luxury cars with "moving maps" in the next two years.

Fortune also profiles a few of the key figures in the GIS and automated mapping industry, most notably Jack Dangermond of theEnvironmental Systems Research Institute (ESRI) firm. The company's ARC/INFO software is the most advanced and widely usedGIS package in the world, with reported sales of $40 million for1988. Other companies' strong sales are cited and the article focuses on the fact that automated cartography and GIS are becoming big business indeed.

The decade of the 1980s has seen an unprecedented cahnge take placein the usage of computers in geography and cartography. The far-ranging application of automated mapping and GIS software in suchfields as profiled in this article indicates that a new preeminenceis being achieved by these disciplines. Continued development ofthis trend will positively affect collegiate geography and cartography programs and the number of professionals in these fields. As the article sums up,

"Geography has come a long waysince you memorized the state capitals for Miss McGonagle in the fifth grade." It's good to see the business world recognize that fact.

Ganter, John (1989). CAD for cave mapping: a cautious assessment.
Compass & Tape, Spring 1989

Abstract:
It has been suggested that CAD packages may reduce the burdens of cave map drafting. I constructed some simulated caves and performed timing tests to investigate the suitability of CAD for cave map compilation and drafting. I discovered dramatic increases in processing time as the maps increased in complexity. While vector (line drawing) approaches have inherent limitations for present cave maps, some methods of breaking down large cave maps into parts (tiling, Blocks) may apply. It appears that CAD cave mapping is only practical with very fast microcomputers, and that a number of conceptual and practical problems remain. In particular the issue tends to highlight the distinctions between sophisticated tools and skilled tool users.

Abel, Robert and Kulhavy, Raymond (1986). Maps, mode of text presentation, and children's prose learning
American Educational Research Journal 23:2, pp. 263-274.
reviewed by Jeffrey C. Patton
University of North Carolina— Greensboro

A study undertaken to determine the effectiveness of reference maps in aiding children in the recall of prose presented either orally or in written form.

The authors, both educational psychologists, proposed two basic

hypotheses. First, that maps would aid, in the recall of map-related text, those students who *heard* a prose passage more than those who *read* the same passage. This supposition was based on previous studies of graphic stimuli (non-map stimuli) which had suggested that conflicting cognitive processes may be involved when an individual tries to maintain a mental graphic image and read simultaneously. However, no such conflict had been found between maintaining a graphic image and hearing information. The second proposed hypothesis was that the perceptual elements of the maps would affect a subject's recall of the maps and of the map related prose.

THE TESTING PROCEDURE
To test both of these hypotheses three maps were created to accompany a prose passage presented to 113 fifth and sixth-grade students in a middle-class Phoenix, Arizona neighborhood. The different cartographicpresentations were an attempt to vary two primary map components. First, the level of symbol abstraction (one set of maps had picture-like symbols while another used only geometric forms) and secondly the spatial distribution of features (one set of maps placed the map symbols in a "logical" spatial pattern according to the prose passage while the other was simply a pictorial list of features along the margin of an outline map).

Equal numbers of fifth and sixth-grade students were randomly assigned to a reading or listening group. Subjects in each group were then randomly assigned a picture, geometric, or list map. The subjects were asked to study their maps and told that the maps would be helpful in learning a story they were about to hear or read. The maps were then removed and a short prose passage was presented either orally or in

written form. Whenthe story was completed the subjects took their maps out again and studied them for an additional two minutes.

Recall of the text information was measured by the use of 32 completion questions which could be answered in a word or two. Sixteen questions were related to map feature information and sixteen assessing information not related to the maps. Memory for the maps was measured by having the subjects attempt to locate the features on ablank sheet of paper by placing an "X" where each feature should be and then labeling that feature. Correct location was defined as being within two inches of the actual location.

RESULTS
Results of this study failed to support the first hypothesis, as subjects who read the prose had scores on the map-related questions and on the map recall test that were not statistically different from the scores of subjects who had the prose presented orally. Reading was found to be superior for the recall of non-map related information.

Results did support the second hypothesis that the perceptual elements of the map would affect the recall of map related textual information as well as the map itself. Subjects who had the picture-like map symbols "logically" spatially arranged scored significantly higher than those subjects who viewed either the picture-like map symbols in a list or those subjects that were shown geometric symbols that were arranged "logically". No significant difference was found between the last two groups indicating that spatiality or the mimetic level of symbols alone was not responsible for the improved scores, rather a combination of the two was necessary for increased learning.

COMMENTS
One must question the reasoning for allowing the subjects to re-examine their maps after the presentationof the text material. If the intent of a portion of the study was to determine if the subject could hold a mental construct of the map while simultaneously reading the text material the viewing of the map after the text had been read should clearly have been avoided. In addition the article would have been greatly strengthened if the test maps utilized in the study would have been included.

As a cartographer this article is particularly interesting; on one hand it is a main-stream cartographic study, and yet as it is the work of non-cartographers, it provides a perspective which can be highly beneficial and stimulating. Unfortunately the article also vividly portrays the ever present problem of specialization in academia as the authors appear to be totally unaware of the wealth of published cartographic research clearly pertinent to their study.

Spencer, Jim (1988).
Orienteering for deer.
American Hunter, December, 1988; pp. 32-34,59.
reviewed by Kevin M. Kolb
Penn State University

Spencer recounts a hunting excursion on which his party conducts pre-hunt scouting of an unfamiliar forested region of north Georgia, using only USGS topo quads and their natural instincts. The party arrives after nightfall, leaves camp before daybreak, and succeeds in scoring two bucks by mid-morning.

Through the article, Spencer offers a brief explanation of magnetic declination, and the scale characteristics of USGS 7 and 15 minute quadrangles. He gives a few basics on how to use a map

and compass, and tips such as transfering pertinent information to the topo sheet from state highway, county, and Forest Service maps (ie. access road numbers), and tracing over the secondary roads with a heavy pencil ("A topo map is very often used under less than ideal light conditions, . . . since gravel roads are drawn pretty inconspicuously on topo maps . . . I don't want to have to squint to make out important details like roads.")

Spencer also discusses the importance of not merely owning a topo map, but learning to use it efficiently both when scouting and hunting:

"First, a hunter must be able to 'think like a deer.' In other words, he must know enough about the whitetail's biology and habits so that he can predict a buck's needs and movements with some degree of accuracy during the period he plans to hunt."

"Next, he must be able to project himself onto the map. He must be able to look at contour lines, elevation markers, stream corridors, fields, bluffs, roads, woodlots, and clearcuts, see them in his mind's eye, and know how the animal will react to different terrain features."

"Topo maps are indespensible tools that no serious hunter should be without, whether he thinks he knows his hunting territory or not. Let's face it, you don't know the land as well as the topo does."

Wegars, Priscilla (1989).
"Inmates of body houses":
Prostitution in Moscow, Idaho,
1885-1910.
Idaho Yesterday 33 (Spring),
pp. 25-37.
reviewed by Karl Proehl
Penn State University

Referencing early fire insurance maps, the author has traced the

location of houses of prostitution and the people who inhabited them. The earliest fire insurance maps of Moscow (1888 and 1889) show no buildings labelled "female boarding"—the euphemism used for such establishments. The first two "boarding houses" appear in 1891, and eight such structures appear in subsequent maps (1896 and 1904). Newspaper accounts can sometimes be coordinated with the fire insurance maps to provide information on the size, and to some extent the type of establishment. By 1910, female boarding houses disappeared from the Moscow fire insurance maps.

cartographic artifacts

INJECTING THE
GEO-CARTO-GRAPHIC
INTO PUBLIC THINKING
Peter Gould
Penn State University

Under the strong leadership of Professor Roger Brunet, of La Maison de la Géographie, Montpellier, and the perceptive investment of the publishing house of Reclus, we are beginning to see what computer cartography can do to make the spatial and geographic dimensions of human existence a present force and influence in public awareness, education and thinking. Quite apart from the quarterly *MappeMond*, whose color plates are the envy of traditional journals, Reclus issues a bi-monthly 'newsletter' *Informations Reclus*, now in its 16th edition (juin, 1989), of 12 pages.

Brunet's editorial Contradictions sets the tone of this issue as he comments on the apparently insatiable appetite of the media and 'decisionmakers' for scientifically impeccable data to inform the

complexities of modern life. Ironically, such expectations lead to some difficulties—the 'contradictions' of the editorial's title.

Reclus, with its growing reputation and graphic publications on space, place, region, town, country,and continent, is deluged with requests for information. While these are flattering, they simply cannot be fulfilled with the immediacy demanded. Few outside of the cartographic profession realize the number of hours of work that may have to go into single plate or graphic image. Unfortunately, and in an ironic twist, the demand for applied cartographers also leads to aggravating, and totally unfounded rumors that geography is somehow moving away from its traditional teaching tasks towards . . . *consulting,* a word which appears to lack the requisite tone of academic purity in France, and seems almost tainted with a Victorian gentlemen's disdain of 'trade.' God forbid that geography and geographers should produce something useful!

At the same time, access to policy relevant information becomes more and more difficult. Data banks are often generated at great expense by the public authorities, who realize, perhaps better than most, that information is power. And power is ultimately at stake here, in a country whose civil servants have bitterly opposed a Freedom of Information Act. Proposals about future censuses are worrying, and several countries in Europe are proposing to merge in a Common Market with very little idea of what the real consequences might be.

What is required is not simply more information, but information presented in such a way that its many implication can be teased out. Ultimately a democratic form of life depends on access to genuinely public information, information that increasingly

seems to be guarded by bureaucracies afraid of the demos. Brunet, and the carto-chevaliers of Reclus, are doing everything in their power to prevent the gradual, but increasing erosion of the public's right to information, information that truly becomes informing when it is presented in all its dramatic visual impact on the map.

This issue reviews five recent publications, including the Atlas des Villes de France, the first volume in a new series on Territorial Dynamics (Dynamiques du Territoire); L'Atlas Mondial des Libertés (World Atlas of Freedoms), with the support of the two international groups, Doctors Without Frontiers, and Reporters Without Frontiers; and Les Géographies Universelles et le Monde de leur Temps, a study of a world and time when Alexander von Humboldt's *Kosmos*, and Elisée Reclus' *Géographie Universelle*, were to be found prominently in every educated home. Perhaps especially timely is La France dans L'Espace Européen, helping the French people to visualize the implications of a changing Europe for them; and Les Villes "Europeennes," another work that encourages thinking beyond the national scale. The range and vitality of these works raises the question: where are their equivalents on the west bank of the Atlantic River? After all, we are meant to be good at this sort of thing: 'computer technology' is our middle name. Is it possible that technology is not enough? Could it be that it takes a vivid and persipient geographic imagination to produce works like these? An imagination grounded in a truly geographic, and not merely technical, education? Could it be that sitting at a CRT all day is not enough?

Not that technical matters are ignored: for example, reviews of CD-Rom plus Hypercard include a

micro-atlas of francophone America, complied by the geographers at Laval (Québec). Even this anglo-saxon, who lives in Lemont, Pennsylvanie, and whose county seat is Bellefonte, never realized the overwhelming domination of the francophone presence in eastern America (Figure 1). There hardly seems a space for those unfortunate descendants of the barbarians living on the offshore islands of Europe. Hypercard, interrogated through Hypertalk, is also the basis for the research of cartographers at Nice, research that forms the core of extraordinarly rapid atlas production.

In brief, French cartographers and geographers seem to have taken to the computer, particularly the Macintosh environment, with a speed, imagination and practical engagement that leaves others standing. Reclus is to be congratulated on its forward look. We have much to learn when it comes to the thinking task of transforming technical ability into production pro bono publico.

Further information may be obtained from Informations RECLUS, Maison de la Géographie, 17 rue Abbé de l'Eppé, 34000 Montpellier.
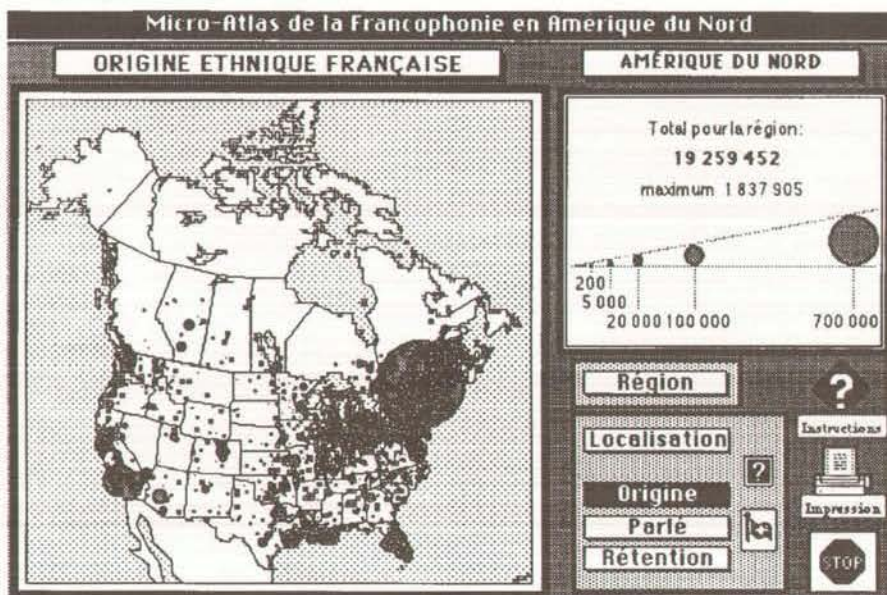

Figure 1: Extrait de La Francophonie en Amérique du Nord (Université Laval, Québec), un affichage Hypercard sur Macintosh

CANADIAN MAPPING

Two recent publications focus on the mapping of Canada. *Exploration on the History of Canadian Mapping: a Collection of Essays*, edited by Barbara Farrell and Aileen Desbarats, provides a selection of twenty articles divided into four categories: research background; exploring [and the mapping of] the coasts; routes and patterns of settlement; and survey and resources which focuses on the input of surveyors in Canadian mapping. This 1988, 274-page publication comes in hard cover

($35) and paperback ($25).

Early Canadian Topographic Map Series: the Geological Survey of Canada, 1842-1949 by Lorraine Dubreuil is a catalog/union list of all topographic maps produced by the Survey before 1949. Price: $15 Canadian.

Both publications are available from the Association of Canadian Map Libraries and Archives, c/o Cartographic and Architectural Archives Division, National Archives of Canada, 395 Wellington St., Ottawa, Ontario K1A 0N3.

**PUBLISHED SEARCH
Computer Aided Mapping.
January 1987-April 1989 (Citations
from the NTIS Database).**
National Technical Information
Service, Springfield, VA. May 89,
69p. [Cited in NTIS Newsletter,
Vol. 89, No. 29]
This bibliography contains cita-
tions concerning theoretical
aspects and applications of com-
puter techniques in cartography.
Topics include automatic map-
ping, discussions of data bases,
and computerized photomapping.
Satellite image analysis and
processing techniques, and de-
scriptions of specific mapping
projects are discussed. (This
updated bibliography contains 123
citations, 68 of which are new
entries to the previous edition.)

The National Technical Informa-
tion Service (NTIS) is a self-
supporting agency of the U.S.
Department of Commerce. It
provides access to the results of
both U.S. and foreign government-
sponsored R&D and engineering
activities. As the U.S. Govern-
ment's central source for scientific
and technical information, NTIS
announces more than 60,000
summaries of R&D and engineer-
ing activities annually. It can
provide the complete technical
reports for most of these results.
NTIS also manages the Federal
Computer Products Center which
provides access to software, data
files, and databases produced by
Federal agencies. For additional
information, call (703) 487-4780.
(NTIS Newsletter 89:29, 1989)

**SEISMICITY DATA AND
SERVICES**
The National Geophysical Data
Center (NGDC) Earthquake Data
Base holds information on more
than 500,000 earthquakes, known
or suspected explosions, coal
bumps, rockbursts, quarry blasts,
and other earth disturbances
recorded worldwide for the period

2100 B.C. to 1987. It includes
(where available) date and origin
time of the event, location, depth,
magnitude, maximum intensity,
and related earthquake phenom-
ena (including faulting, tsunami,
volcanism, and resulting casualties
and property damage). Summary
of Earthquake Data Base, a publi-
cation available free from NGDC,
describes the data base in detail.

The Earthquake Data Base was
formed from data furnished by the
U.S. Geological Survey (in earlier
years by the U.S. Coast and
Geodetic Survey and the National
Oceanic and Atmospheric Admini-
stration), the California Institute of
Technology (Pasadena), the
University of California (Berkeley),
the California Division of Mines
and Geology (Sacramento), the
Canadian Earth Physics Branch,
the Institute of Physics of the Earth
of the USSR, the Earthquake
Research Institute of Japan, and
about 20 other worldwide sources.
NGDC and the World Data Center
A for Solid Earth Geophysics
provide a variety of data outputs
from this extensive data base to the
scientific and engineering commu-
nities.

These data may be purchased in
a variety of formats. Please refer
to the appropriate product number
when ordering data or services.
§ *The Entire Earthquake Data Base.*
The entire Earthquake Data Base is
available on magnetic tapes; please
specify 1600 or 6250 bpi. (Product
number 121-A07-001; price is $341
for one magnetic tape at 6250 bpi;
$361 for two magnetic tapes at
1600 bpi).
§ *Earthquake Data Base Regional
Files.* The Earthquake Data Base
comprises 11 files of data; each file
may be ordered separately for $141
per file. Output is on magnetic
tape.
§ *Quarterly Updates of Preliminary
Determination of Epicenters (PDE)
File.* Quarterly updates are gener-
ated for the PDE file (listed above).
Output is on 1600 bpi magnetic

tapes as data becomes available
(product number 121-P07-001;
$364 for one year).
§ *Earthquake Data Base Retrievals.* A
search may be generated using any
combination of the following
elements:
—Geographic boundaries (top,
bottom, left, right)
—Area within a radius (in kilome-
ters or degrees) around a center
point
—Time period
—Magnitude range
—Modified Mercalli intensity
—Depth
—Cultural effects (e.g. damage,
casualties)
—Associated phenomena (e.g.
faulting, tsunamis, volcanism)
The retrievals are available in three
output formats: on computer
listing (121-A04-CUS, $116), on
1600 bpi magnetic tape (121-A07-
CUS, $207), or on 5.25" high-
density IBM® PC compatible
floppy diskette (121-A25-CUS,
$146). A publication-quality map
is included in each of the retriev-
als. The maps are produced using
PostScript™, a versatile and
powerful graphics language for
laser printers. The maps are
printed at 300 dpi resolution on
8.5" x 11" paper. The PostScript
programs used to produce the
maps are available on floppy
disks. This makes it possible for
you to customize the maps your-
self and to easily add other types
of data to the maps.
§ *Specialized Data and Analytical
Services.* Seismicity services have
recently been expanded to include
customized data and analysis
services. These services might
include such routine activities as:
(1) reformatting earthquake data,
(2) seismicity related graphics, (3)
catalog merging, or more complex
tasks such as network and catalog
evaluation and analysis.
§ *Educational Tools.* Earthquake
publications, printed maps, and
slide sets are also available from
the National Geophysical Data

Center. For the latest listing of these products request free brochure *Publications, Maps, and Data Services.*

[The prices quoted here are valid through September 30, 1989. Prices applicable after that date may be obtained by calling (303) 497-6472.]

U.S. Department Of Commerce regulations require prepayment on all non-federal orders. Please make checks and money orders payable to COMMERCE/NOAA/NGDC. All foreign orders must be in U.S. Dollars drawn on a U.S.A. bank. Do not send cash. Orders may be charged to an American Express card, MasterCard, or VISA card by telephone or letter; please include credit card account number, expiration date, telephone number, and your signature with the order. A ten-dollar ($10) handling fee is required on all orders; an additional ten-dollar ($10) charge is required for non-U.S.A. orders.

Inquiries, orders, and payment should be addressed to: National Geophysical Data Center, NOAA, Code E/GC1, 325 Broadway, Boulder, CO 80303. Please direct telephone inquiries to (303) 497-6472.

COMPUTERIZED IMAGE CATALOG

A campus-wide network called the Digital Image Database Project at the University of California— Berkeley is being designed to catalog the university's visual materials. The project, still in its infancy, will eventually handle a million 1 MB digital images of maps, slides, paintings and rare manuscripts.

Because of its wealth of image resources, the Department of Geography has proved a worthy pilot site. It took programmers six months to develop the software for the Berkeley Coordinate-Based Geographic Catalog. They have developed a prototype data base concentrating on California's

Mono Lake Basin. It displays a wide range of library documents including Landsat images, maps, aerial photographs and landscape views.

There are many applications for the geographic catalog. Images obtained from the library can be manipulated and used to examine and illustrate historic, current and future geographic relationships. Such analyses are helpful in studies of water and fores t resources, land use planning, human impact on the environment, transportation and even tourism.

In addition, professors and students can locate and manipulate images on screen and save the digitized data on a disk without leaving the workstation. Ideally, they could then project the images for presentation.

(Computer Graphics Today, 1989)

WORLD BANK PUBLICATIONS

The following teaching resources are available from the World Bank:

§ *The Development Data Book and Teaching Guide.* Students use 16 pages of color maps, charts, tables, and text, to master five key statistical concepts in studying the developmental process: life expectancy at birth, primary school enrollment, population growth rate, GNP per capita and merchandise exports. The 52-page *Teaching Guide* contains up-to-date outline maps, comprehensive activities for varying aptitudes, reproducible worksheets for each chapter, and a test to measure achievement. Cost: $9.95 (includes 11 student books and 1 teaching guide).

§ *Measures of Progress Poster Kits.* Two poster kits are now available: *Life Expectancy at Birth* (Poster Kit 1) and *Population Growth Rate* (Poster Kit 2). Each poster kit contains:
—*a colorful poster map of the world*

(24" x 36") with data on 148 countries, easy-to-read text, and three charts illustrating key concepts.
—*six color photographs* (8 1/2" x 11") that reveal the people behind the statistics, with texts that describe how these people are working to improve their lives.
—*comprehensive teaching guide* (16 or 20 pages) with a full range of activities or worksheets and a test to measure understanding of key concepts. Cost: $5.95 each.

§*Toward a Better World* multimedia learning kits. Each learning kit contains: 36 student books and pamphlets, 1 or 2 sound filmstrips, and a comprehensive teaching guide with worksheets. Subjects include: The Developing World, The Rajasthan Canal Project, Small-Scale Industries in Kenya, Tackling Poverty in Indonesia's Cities. Cost: $60 each.

Send orders to: World Bank Publications, Department 0552, Washington, DC 20073-0552.
(NCGE Perspective, 6/89)

NEWBERRY ACQUIRES RAND MCNALLY COLLECTION

The Newberry Library in the fall of 1988 began to acquire Rand McNally's entire archive of its printed works—books, atlases, maps, guidebooks, and globes— from the 1870's up to the 1980's. Current publications will be deposited regularly with the library in order to keep the collection up to date. The Rand McNally collections complement Newberry's special subject strengths: Chicago history, printing and publishing history, and the history of cartography. *(Mapline 54, 6/89)*

"TERRA COGNITA" TELEVISION SERIES PLANNED
Kevin Kaufman, a member of the *History of Cartography* project

headquartered at the University of Wisconsin—Madison, is researching and writing material for a television program called "The Mapping of America." Kaufman's script, covering the years 1492-1800, will be the first part of a television series on the history of cartography entitled "Terra Cognita" planned by LMcL Communications, Inc. Preliminary support for the project has come from the United States Geological Survey. *(Mapline 54 , 6/89)*

new maps

UNITED STATES. Metropolitan statistical areas. (U.S. Maps GE-50, No. 88). Washington: Geography Division, Bureau of the Census, 1988. Scale 1:5,000,000.

OHIO. Water transportation map of Ohio. Columbus: Ohio Division of Water Transportation, 1988.

MISSOURI. Mineral resources and industrial map of Missouri. Jefferson City: Missouri Geological Survey, 1988. Scale 1:500,000.

NEBRASKA. Vegetative conditions in Nebraska viewed by satellite: 1987 growing season. (GRM-11). Lincoln: Center for Advanced Land Management Information Technologies, 1988. $2.50 (CALMIT, Conservation and Survey Division, Institute of Agriculture of Agriculture and Natural Resources of Nebraska, Lincoln, NE 68588-0517).

WASHINGTON. Washington at statehood, 1889-1989: a map celebrating 100 years of progress and statehood. Ellensburg, WA: Department of Geography, Central Washington University Foundation, 1989. Scale 1:900,000. $4.00 Webpco Printing, P.O. Box 2027,

Wenatchee, WA 98801).

OREGON. An explorer's map of Oregon. Eugene: Exclusive Maps, 1988. Scale 1:1,000,000. $5.95 (Exclusive Maps, 1430 Williamette, Suite 369, Eugene, Oregon 97401).

COLORADO. Topographic recreational map of Colorado. (Map R-1). Canon City: Western Geographics, 1989. Scale 1:7, 920,000. $2.95 (Western Cartographics, P.O. Box 2204, Canon City, CO 81212).

NEW MEXICO. Water use in New Mexico, 1985. Albuquerque: New Mexico State Engineer Office, 1988. USGS Open-file Report 88-343.

ARIZONA. Geologic map of Arizona. (Map 26). Tucson: Arizona Geological Survey, 1988. Scale 1:1,000,000. $6.75 (folded) and $7.75 (rolled).

UTAH. Great Salt Lake and Newfoundland evaporation basin. Reston, VA: U.S. Geological Survey, 1987. Experimental ed. (satellite image map). Scale 1:250,000.˙

CALIFORNIA. Golden Gate Transit: bus and Ferry system map. San Francisco: Golden Gate Bridge, Highway and Transportation District, 1988. Free (Golden Gate Bridge, Highway and Transportation District, Box 9000, Presidio Station, San Francisco, CA 94129).

ALASKA. Seismicity map of Alaska, 1786-1987. Reston, VA: U.S. Geological Survey, 1989. Scale 1:2,500,000. SuDoc No. I 19.76: 89-88.

WEST INDIES. Map of modern reefs and sediments of Antigua, West Indies. DeKalb, Ill.: Department of Geology, Northern Illinois University, 1988. Scale 1:40,000. $11 (Payable to NIU Geology

Department; send to M.P. Weiss, Department of Geology, Northern Illinois University, DeKalb, IL 60115).

CHINA. Power industry in China. Hong Kong: Geocarto International Centre, 1988. Scale 1:8,000,000. $30.

AUSTRALIA, N.S.W. Mineral deposits of New South Wales. Sydney: Department of Mineral Resources, 1988. Scale 1:1,500,000. $3.00A.

NEW RAISZ MAPS
Kate Raisz, the new manager of Raisz Landform Maps, announced improvements in the reproduction and distribution of the classic maps drafted by her late grandfather, Erwin Raisz. The company has added a key of physiographic symbols to all maps and upgraded the paper stock on which the maps are printed to 60# vellum. The company also plans to reissue the 3-color maps of the United States and Canada in the near future. For a price list, contact: Raisz Landform Maps, P.O. Box 2254, Jamaica Plain, MA 02130. Phone: (617) 522-3901.

new atlases

Associated Press World Atlas. Boulder, Co.: Graphic Learning International, 1989. 184 p. ISBN 0-87746-11-2. $14.95.

Beck, Warren A. *Historical Atlas of the American West.* Norman: University of Oklahoma, 1989. ISBN 0-8061-2193-9. $29.95.

Chengdu Institute of Geography (ed.). *Atlas of the Ecology and Environment of the Yangtze River and the Three Gorges.* Hong Kong: Geocarte International Centre, 1989. 200 p. incl. 100 maps.

US$170 (Geocarte International Centre, G.P.O. 4122, Hong Kong).

Fell, R.T. *Early Maps of Southeast Asia*. New York: Oxford University Press, 1988. ISBN 0-19-588875-8. $6.95.

Hanson, Gerald T. *Historical Atlas of Arkansas*. Norman: University of Oklahoma Press, 1989. ISBN 0-8061-1844-X. $29.95.

Hitchcock, John (ed.). *California Legislative District Boundaries*. Sacramento: Key Information Service, Inc. 1988. 216 p. (chiefly maps). $39.95.

Language Atlas of China. Beijing: Chinese Academy of Science and the Australian Academy of Humanities, 1988. 2 vols. $250 (Longman Group (Far East) Ltd, 18th floor Cornwall House, Tong Chong St., Quarry Bay, Hong Kong).

Le Grand Atlas de la France Rurale. Paris: Editions Jean-Pierre de Monza, 1989. 500 p. 1200F (Editions Jean-Pierre de Monza, 30 rue du Chemin Vert, B.P. 20, 78611 Le Perray-en-Yvelines Cedex).

The Middle East Today: an Atlas of Reproducible Pages. Wellesley, MA: World Eagle, Inc., 1989. 152 p. $24.50.

Past Worlds: The Times Atlas of Archaeology. Maplewood, N.J.: Hammond Inc., 1988. ISBN 0-7230-0306-8. $85.

Pick, James B. *Atlas of Mexico*. Boulder, CO.: Westview Press, 1989. ISBN 0-8133-7695-5. $55.

Satellite Image Atlas of Glaciers of the World: Antarctica. (Professional Paper 1386-B). Denver: U.S. Geological Survey, 1988. $40.

A Social Atlas of Darwin. Darwin: Australian Bureau of Statistics and

North Australia Research Unit, 1989. $25.00 (Payable to: Collector of Public Moneys, Information Services, Australian Bureau of Statistics, GPO Box 3796, Darwin, NT 0801.

Stephens, A. Ray. *Historical Atlas of Texas*. Norman: University of Oklahoma Press, 1989. ISBN 0-8061-2158-0. $24.95.

Wind. (Climatic Atlas of Canada - Map Series 5). Downsview Ont.: Canadian Climate Program, Environment Canada, 1988. 31 p. ISBN 0-660-54132-7. $11.95 (Cdn) and $14.35 (US).

Wyrtki, Klaus. *Oceanographic Atlas of the International Indian Ocean Expedition*. Oxford & IBH, 1989. $240 (Available from: South Asia Books, P.O. Box 502, Columbia, MO 65205).

Young, Carolyn (ed.). *Oregon Environmental Atlas*. Portland, OR: Cartographic Center, Portland University, 1988. 64 p.

SAND HILLS ATLAS NOW AVAILABLE

The Conservation and Survey Division of the Institute of Agriculture and Natural Resources at the University of Nebraska-Lincoln announces the availability of *An Atlas of the Sand Hills*, the first compendium of knowledge describing the various cultural, economic, and natural aspects of the Sand Hills region of north-central Nebraska. The atlas was introduced to the public last March at the annual Nebraska Water Conference in Lincoln, Nebraska.

Chapters covering diverse topics such as geology, climate, flora, fauna, anthropology, and land development and use are included in the volume. Accompanying the maps expected in an atlas are many graphs and color photographs. Several maps and images

were produced by the Center for Advanced Land Management Information Technologies (CALMIT).

The atlas can be ordered by sending $10.00 plus handling fee ($1.00 fourth class; $1.50 first class) to the Conservation and Survey Division, University of Nebraska-Lincoln, 113 Nebraska Hall, Lincoln, NE 68588-0517. *(CALMIT News, Summer 1989)*

cartographic events

EVENTS CALENDAR

October 11–14: **North American Cartographic Information Society** Ninth Annual Meeting, Ann Arbor, MI. Contact: Diana Rivera, University Libraries, Michigan State University, East Lansing, MI 48824–1048; (517) 353–4737 ext. 4593.

November 12–15: **NCGA Mapping & GIS '89**, Los Angeles, CA. Contact: Michael Weiner, National Computer Graphics Association, 2722 Merrilee Dr., Suite 200, Fairfax, VA 22031; (703) 698–9600.

November 26–30: **GIS/LIS '89**, sponsored by AAG, ACSM, ASPRS, URISA; Orlando, FL. Contact: ACSM, 210 Little Falls St., Falls Church, VA 22046-4398; (703) 241–2446.

1990

Spring 1990: **First European Conference on Geographical Information Systems**, Amsterdam, The Netherlands. Contact: Mieke Elekan, Geoplan, Weteringschans 12, 1017 SG Amsterdam, The Netherlands; 31-20-241433/247599.

March 13–16: **GIS '90**, Vancouver, B.C. Contact: Hugh Legg; Reid, Collins and Associates, 15th Floor,

401 West Georgia Street, Vancouver, B.C. V6B 5A1; (604) 664–5922.

March 18-23: **ACSM/ASPRS** Annual Convention, Denver, CO. Contact: ACSM; (703) 241-2446.

April 19-22: **Association of American Geographers** 86th Annual Meeting, Toronto, Ont. Contact: AAG, 1710 Sixteenth Street NW, Washington, DC 20009-3198.

June 10-13: **Canadian Cartographic Association** Annual Meeting, Victoria, B.C. Contact: Dr. C. Peter Keller, Dept. of Geography, University of Victoria, P.O. Box 1700, Victoria B.C. V8W 2Y2; (604) 721-7333.

June 22: **ALA Preconference Workshop on Satellite Imagery and Aerial Photography**. Contact: Ellen Caplan (OCLC) at (614) 764–6000 or Nancy Vick at (217) 333–0827. Complete registration information will be available this fall.

July 23-27: **4th International Symposium on Spatial Data Handling**, Zurich, Switzerland. Contact: Dr. Duane Marble, Dept. of Geography, 103 Bricker Hall, The Ohio State University, Columbus, OH 43210.

September 23-28: **ASPRS/ACSM Fall Meeting**, Atlantic City, NJ. Contact: ACSM; (703) 241-2446.

1991
September 23-October 1: **Mapping the Nations - 15th Conference of the International Cartographic Association**, Bournemouth, England. Contact: Conference Services Limited, Congress House, 55 New Cavendish St., London W1M 7RE, England.

NACIS *news*

NACIS OFFICERS, 1988-89
President: **Juan José Valdés**, Cartographic Division, National Geographic Society, 1615 M Street, N.W., Washington, D.C. 20036; (202) 775-7873

*Vice-President: **Diana Rivera**, Map Librarian, Michigan State University Libraries, East Lansing, MI 48824; (517) 353-4593

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Ellen White, Department of Geography, Michigan State University, East Lansing, MI 48824, (517) 366-4658

Those positions marked by an asterisk are open for nomination for 1989-90.
Three Directors-at-Large, The Vice President and Secretary will be elected at the October meeting.

NUEVAS PERSPECTIVAS
NOUVELLE PERSPECTIVES
NEW PERSPECTIVES
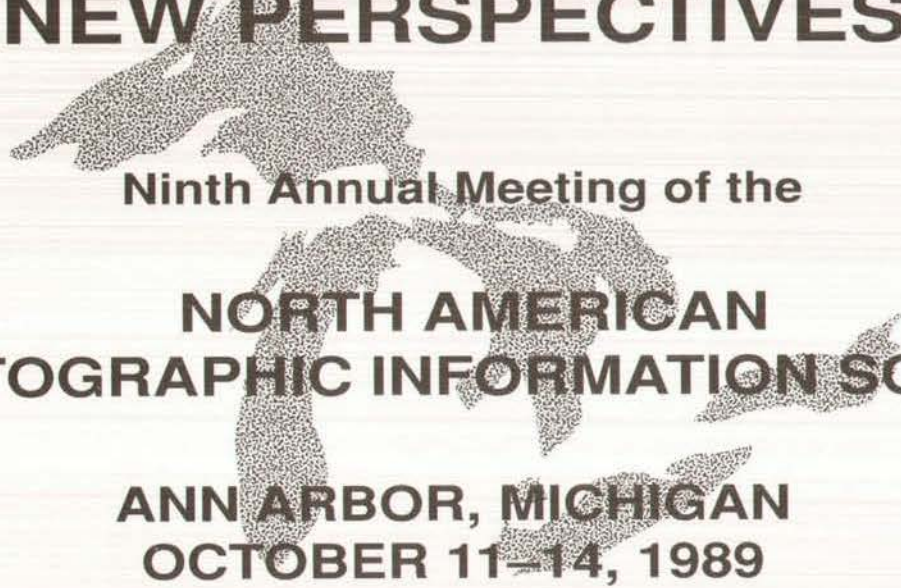
Ninth Annual Meeting of the

NORTH AMERICAN CARTOGRAPHIC INFORMATION SOCIETY

ANN ARBOR, MICHIGAN
OCTOBER 11–14, 1989

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preliminary program

You are invited to attend the Ninth Annual Meeting of the North American Cartographic Information Society (NACIS IX), to be held in Ann Arbor, Michigan, October 11-14, 1989. The goal of NACIS IX is to bring together specialists from leading private, government, and academic organizations throughout North America to display and present reports on timely topics and the latest research developments. The theme of this year's meeting is "New Perspectives" in cartography. In addition to several general paper sessions, NACIS IX will feature special sessions, exhibits, and workshops on:

§ *Atlases—Concepts to Production*

§ *Carographic Education*

§ *Cartographic Software*

§ *Cognitive Cartography*

§ *Computer Mapping*

§ *Geographic Information Systems*

§ *Historical Cartography*

§ *The Cartographic Lab: Issues and Problems*

§ *Map Librianship*

§ *Cartographic Design*

§ *Marketing Cartographic Information*

§ *Remote Sensing*

§ *Statistical Mapping*

§ *Techniques in Map Production*

§ *Government Mapping Programs*

§ *Navigation*

WEDNESDAY, OCTOBER 11

1:00 - 8:00 p.m.	*Registration*
1:00 - 3:00 p.m.	*NACIS Committee Meetings*
3:00 - 5:00 p.m.	*NACIS Board Meeting*
5:00 - 7:00 p.m.	*Dinner break*
7:30 - 9:00 p.m.	*Welcome*

Keynote Address
Judy M. Olson, Chairperson
Department of Geography
Michigan State University

9:00 - 11:00 p.m.	*Reception and Cash Bar*
9:00 - 11:00 p.m.	*Poster Session: Products and Resources of University Cart Labs*

THURSDAY, OCTOBER 12

8:00 a.m. - 7:00 p.m.	*Registration*
9:00 a.m. - Noon	*Exhibits*
8:30 - 10:00 a.m.	*Sessions*

SESSION A:
CARTOGRAPHIC DESIGN

Color Chart Use in Map Design
Cynthia A. Brewer, Michigan State University, East Lansing, Michigan

A Functional Model of Color in Cartographic Design
Charles P. Rader, Michigan State University, East Lansing, Michigan

The Look of Maps: Maintaining a Balance Between Form and Function
Jeremy Crampton and Debra Daggs, Penn State University, University Park, Pennsylvania

SESSION B: ATLASES
The Design and Production of the *Political Atlas of Illinois*
Richard Vaupel, Northern Illinois University, DeKalb, Illinois

Ukranians in Canada
Geoffrey Matthews, University of Toronto, Toronto, Ontario, Canada

Boundary Symbols in World Atlases to 1800: Towards a Standard Vision of the Political World
James R. Ackerman, Hermon Dunlap Smith Center for the History of Cartography, Newberry Library, Chicago, Illinois

10:00 - 10:30 a.m. Break
10:30 - Noon Concurrent Sessions

SESSION C: ETHICS IN CARTOGRAPHY
Roundtable Discussion
Moderator: Patrick McHaffie, Kentucky Geological Survey, University of Kentucky, Lexington, Kentucky

SESSION D:
MAPS AND LIBRARIES
Map Library Management
John Sutherland, University of Georgia, Athens, Georgia
Jim O. Minton, United States Geological Survey, Reston, Virginia

Use of Maps in Children's Literature
Nancy B. Ryckman and Jeffrey C. Patton, University of North Carolina, Greensboro, North Carolina

Noon - 1:00 p.m. Lunch break
1:00 - 5:30 p.m. Field Trips

FIELD TRIPS
Remote Sensing
Environmental Research Institute

of Michigan, Daedalus, and Geospectra.

Ann Arbor and Vicinity Geomorphology
Continental Glacial Features of the Interlobate Area of Southeastern Michigan. Guide: Allan Cichanski, Department of Geology, Eastern Michigan University, Ypsilanti, Michigan.

Map Collections and Walking Tour of Ann Arbor
Harlan Hatcher Graduate Map Library—Host: Carl Longstreth, William L. Clements Library—Host: David Bosse, Bentley Historical Library—Host: Leonard Coombs

6:30 - 7:15 p.m. Reception and Cash Bar
7:15 - 9:00 p.m. Annual Banquet

President's Address
Juan José Valdés
Cartographic Division
National Geographic Society

Banquet Address
D.R. Fraser Taylor, President
International Cartographic Assoc.
Carleton University
Ottawa, Ontario, Canada

FRIDAY, OCTOBER 13
8:00 a.m. - 4:00 p.m. Registration
9:00 a.m. - 3:00 p.m. Exhibits
8:30 - 10:00 a.m. Sessions

SESSION A:
MICROCOMPUTER-BASED CARTOGRAPHIC PRODUCTION

Microcomputer-based Cartographic Production
Part 1: Practical Problems and Prospects; John Krygier and Craig Flory, University of Wisconsin, Madison, Wisconsin

Part 2: Theoretical Problems and Prospects; John Krygier and Brian Goudreau, University of Wisconsin, Madison, Wisconsin

Marketing Cart Lab Services in Research-Oriented Universities
David DiBiase, Penn State University, University Park, Pennsylvania

SESSION B:
GEOGRAPHIC INFORMATION SYSTEMS
An Integrated Software Package for Solution of Location-Allocation Problems
Jacek Malczewski, University of Warsaw, Warsaw, Poland

Thematic Mapping from Satellite Data on the Macintosh
Micha Pazner and Allan Buck Pang, University of Manitoba, Winnipeg, Manitoba, Canada

Issues to be Considered in the Development and Management of GIS/LIS Systems
Claudette M. Dellon and Ronald M. Bolton, Aeronautical Charting Division, NOAA/NOS, Rockville, Maryland

10:00 - 10:30 a.m. Break
10:30 - Noon Concurrent Sessions

SESSION C:
CARTOGRAPHIC VISUALIZATION OF TIME-SPACE RELATIONSHIPS
Time-Space Mapping: Early Evolution of Skyscrapers in Lower Manhattan
Deryck Holdsworth and Matt Tharp, Penn State University, University Park, Pennsylvania

(Title to be announced)
Keith W. Rice, University of Wisconsin—Stevens Point, Stevens Point, Wisconsin

Animated Maps of Aggregate Data: Conceptual and Practical Problems
Alan MacEachren and David DiBiase, Penn State University, University Park, Pennsylvania

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Noon - 1:30 p.m.   Lunch break
1:30 - 3:00 p.m.   Concurrent Sessions

SESSION D:
MAP PROJECTIONS

Map Projections Applications
Ronald M. Bolton, NOAA/NOS, Rockville, Maryland

The Effects of Map Projections on Map Distance and Emotional Involvement
Patricia Gilmartin and Robert Lloyd, University of South Carolina, Columbia, South Carolina

Microcomputer Tools for Teaching Map Projections
Doug Dudycha, University of Waterloo, Waterloo, Ontario, Canada

SESSION E:
MANAGEMENT OF GEOGRAPHIC INFORMATION
The Cartographic Resource Development Program, A Management Approach to Better Local Information and Utilization
David Wiltsee, President, Information Sciences, Applegate, California

Using the 1990 Census TIGER Files on CD-ROM
Warren G. Glimpse, President, U.S. Statistics, Inc., Alexandria, Virginia.

3:00 - 3:15 p.m.   Break
3:15 - 5:00 p.m.   Annual Business Meeting

SATURDAY, OCTOBER 14
8:00 - 11:15 a.m.   Registration
8:30 - 10:00 a.m.   Sessions

SESSION A:
CARTOGRAPHIC EDUCATION
Cartographic Education at the College Level: A Cognitive Developmental Perspective
Roger M. Downs and Lynn S. Liben, Penn State University, University Park, Pennsylvania

Anatomy of the Introductory Cartography Course
James F. Fryman, University of Northern Iowa, Cedar Falls, Iowa

SESSION B:
GENERAL PAPERS

Regional Patterns on Choropleth Maps
Ruth Anderson Rowles, University of Kentucky, Lexington, Kentucky

Color and the Figure-Ground Relationship in the Perception of Bipolar Choropleth Maps
Richard E. Lindenberg and Audrey E. Clarke, Kent State University, Kent, Ohio

Can Survey Knowledge be Acquired from Procedural Knowledge?
Scott M. Freundschuh, State University of New York- Buffalo, Amherst, New York

10:00 - 10:30 a.m.   Break
10:00 - Noon   Sessions

SESSION C:
MAP AND ATLAS PRESERVATION AND COLLECTION MANAGEMENT
Maria Grandenetti, University of Michigan, Ann Arbor
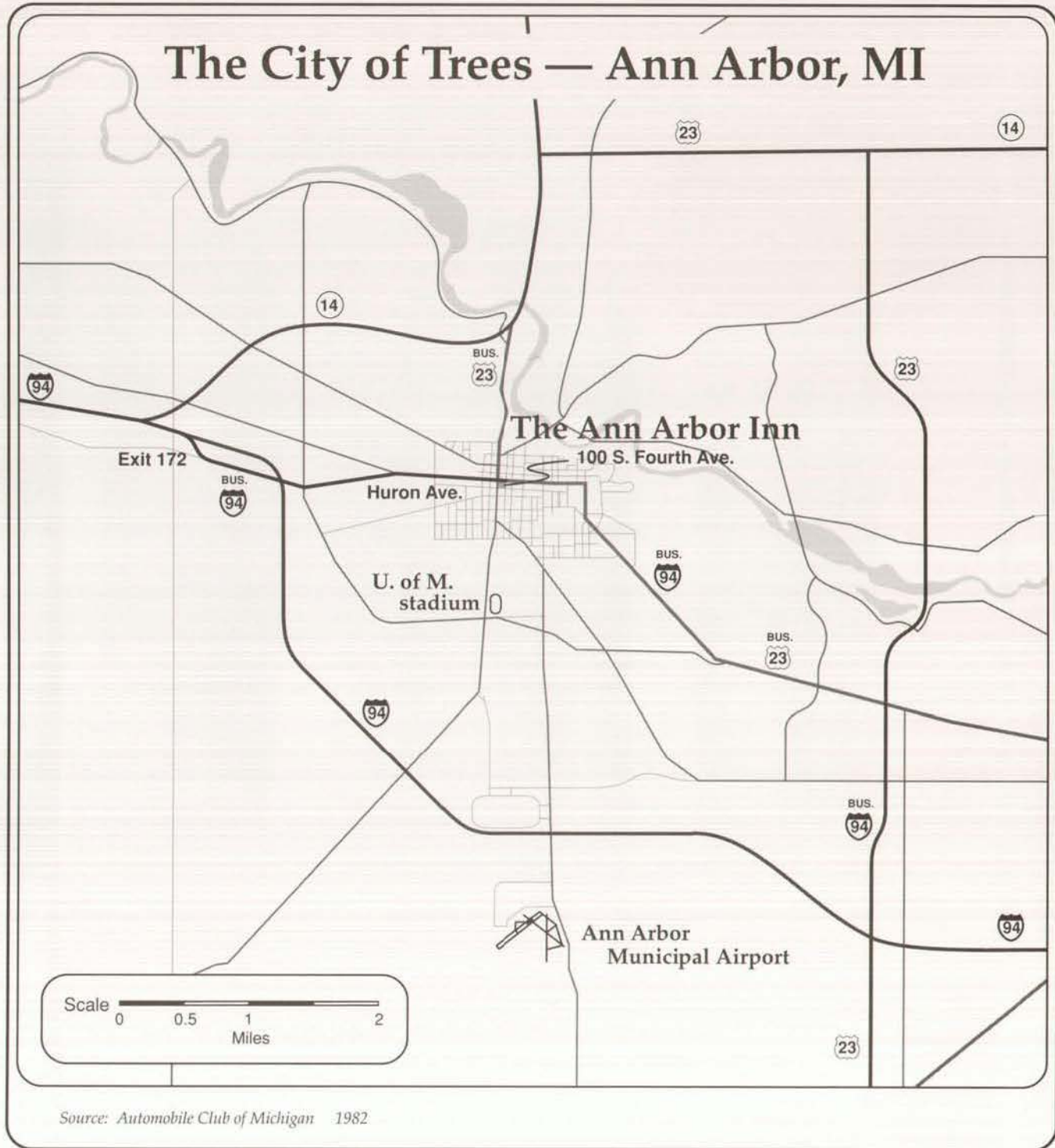
SESSION D: INTER-AMERICAN MAPPING
Bill Stewart, Ann Arbor, Michigan

Noon - 1:30 p.m.   Luncheon Luncheon Speaker

1:30 p.m.   Post Conference Social at Domino Farms - Frank Lloyd Wright Gallery, Classic Car Museum, Picnic

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SUNDAY, OCTOBER 15
9:00 a.m. - Noon   NACIS Board Meeting

The City of Trees — Ann Arbor, MI

The Ann Arbor Inn
100 S. Fourth Ave.

Exit 172

Huron Ave.

U. of M. stadium

Ann Arbor Municipal Airport

Scale
0   0.5   1   2
Miles

Source: *Automobile Club of Michigan   1982*

DEASY GEOGRAPHICS LAB

Limosine Service from Detroit Metro to Ann Arbor

Limosine service is available from Detroit Metro to Ann Arbor via Commuter Transportation Company, local 1-313-941-3252 or long distance 1-800-351-LIMO.

Driving directions to the Ann Arbor Inn

Take Interstate 94 to Huron Ave. (exit 172). Continue east on Huron Ave. approximately 2 miles. The Ann Arbor Inn is located at the corner of Huron and Fourth, one block east of Main Street. Parking is available in the garage directly behind the hotel at Fourth and Washington.

Second Floor Meeting Rooms
Ann Arbor Inn
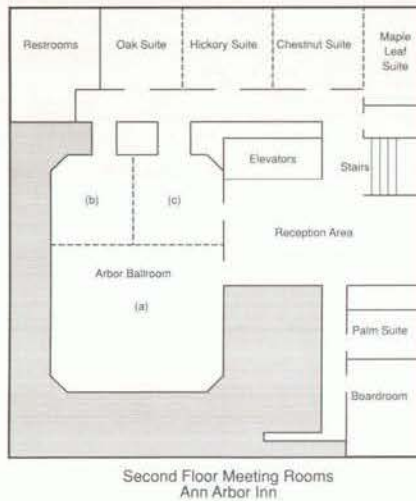
EXCHANGE PUBLICATIONS

Cartographic Perspectives gratefully acknow-
ledges the publications listed below, with
which we enjoy exchange agreements. We
continue to seek agreements with other pub-
lications.

*Canadian Cartographic Association
Newsletter.* A quarterly publication
offering news and announcements
to members of the CCA. Contact:
Canadian Cartographic Associa-
tion, c/o Department of Geogra-
phy, Memorial University of
Newfoundland, St. John's, New-
foundland, A1B 3X9; (709)
737-8988; Bitnet: CHWood@MUN

Cartographica. A quarterly journal
endorsed by the Canadian Carto-
graphic Association/Association
Canadienne de Cartographie that
features articles, reviews and
monographs. B V Gutsell, founder
and editor. Contact: University of
Toronto Press JournalsDepart-
ment, 5201 Dufferin Street,
Downsview, Ontario, Canada,
M3H 5T8; (416) 667-7781.

Cartomania. This quarterly news-
letter of the Association of Map
Memorabilia Collectors offers a
unique mix of feature articles,
news, puzzles, and announce-
ments of interest to cartophiles.
Contact: Siegfried Feller, pub-
lisher/editor, 8 Amherst Road,

Pelham, MA 01002; (413) 253-3115.

GIS World. Published six times
annually, this newsmagazine of
Geographic Information Systems
technology offers news, features,
and coverage of events pertinent to
GIS. Contact: Debbie Parker,
Subscription Manager, GIS World,
Inc., P.O. Box 8090, Fort Collins,
CO 80526; (303) 484-1973.

instructions to contributors

FEATURED PAPERS

All featured papers will be *solicited* by the
NACIS Publications Committee. The goals
of the solicitation procedure will be to
select high quality papers that provide a
balanced representation of the divers
interests of the membership. The primary
mechanism for soliciting featured papers
will be a paper competition held in conjuc-
tion with the Annual Meeting. All papers
prepared for the meeting and submitted in
written and/or digital form will be consid-
ered. Three of these will be selected to
appear in *Cartographic Perspectives* during
the next year.

In addition to the competition winners,
the Publications Committee (in consulta-
tion with the editors) will solicit one or
more papers each year from other sources.
The goal here is to ensure that all aspects of
the membership are served and to attract
some thought-provoking ideas from
authors who may not be able to attend the
Annual Meeting.

Authors of selected papers will be given
an opportunity to respond to suggestions
of the Publications Committee or meeting
participants before submitting as final
version. The writing quality must adhere
to high professional standards. Due to the
interdisciplinary nature of the organiza-
tion, it is particularly important that papers
are carefully structured with ideas
presented succinctly. The editors reserve
the right to make editorial changes to
ensure clarity and consistency of style.

Papers ranging from the theoretical/
philosophical to methodological/applied
topics will be considered providing that
ideas are presented in a manner that will
interest more than a narrow spectrum of
members.

To be considered for the paper competi-
tion, papers should be prepared exclu-
sively for NACIS, with no major portion
previously published elsewhere.

TECHNICAL GUIDELINES

Cartographic Perspectives is designed and
produced in a microcomputer environ-
ment. Therefore, contributions to *CP*
should be submitted in digital form on 3.5"
or 5.25" diskettes. Please send paper copy
along with the disk, in case it is damaged
in transit.

Text documents processed with Macin-
tosh software such as WriteNow, WordPer-
fect, MindWrite, Word, and MacWrite are
preferred, as well as documents generated
on IBM PCs and compatibles using
WordPerfect or Word. ASCII text files are
also acceptable.

Graphics generated with Adobe
Illustrator or Aldus FreeHand for the
Macintosh are most preferred, but generic
PICT or TIFF format graphics files are
usually compatible as well. Certain
graphics formats for the PC may also be
submitted (for example, HPGL (.PLT),
CGM, EPS, and TIF).

For those lacking access to microcompu-
ters, typed submissions will be tolerated.
Manually produced graphics should be no
larger than 11 by 17 inches, designed for
scanning at 300 dpi resolution (avoid fine-
grained tint screens). Continuous-tone
photographs will also be scanned.

Submissions may be sent to: David
DiBiase, Department of Geography, 302
Walker Building, Pennsylvania State
University, University Park, PA 16802;
(814) 863-4562.

COLOPHON

NACIS membership form

North American Cartographic Information Society
Sociedad de Informacion Cartografica Norte Americana

Name/Nombre:

Address/Direccíon:

Organization / Afiliacíon profesional:

Your position/Posicíon:

Cartographic interests/Intereses cartografíco:

Professional memberships/Socíò de organizacíon:

Membership Fees for the Calendar Year/
Valor de nomina de socios para el año:
Individual/Regular: $15.00 U.S./E.U.
Students/Estudiantes: $ 5.00 U.S./E.U.
Institutional/Miembros institucionales:
$35.00 U.S./E.U.

Make all checks payable to/
Hagan sus cheques a:
NACIS
6010 Executive Boulevard, Suite 100
Rockville, MD 20852
U.S.A.

The North American Cartographic Information Society

(NACIS) was founded in 1980 in response to the need for a multidisciplinary organization to facilitate communication in the map information community. Principal objectives of NACIS are:

§ 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.