

PROGRAM & ABSTRACTS

NACIS XII

*UNFOLDING THE MAP: NEW
DIRECTIONS IN CARTOGRAPHY*

North American
Cartographic Information Society

Twelfth Annual Meeting

ST. PAUL, MINNESOTA

The Ramada Inn

October 14 - 17, 1992

NACIS XII

**Unfolding the Map:
New Directions in Cartography**

**October 14 - 17, 1992
St. Paul, Minnesota**

The Ramada Inn
St. Paul, Minnesota
October 14 -17, 1992

Welcome to the Twin Cities, the site for the twelfth annual meeting of the North American Cartographic Information Society. It is the hope of the many individuals who helped put together NACIS XII that you will find this year's program to be enjoyable, thought provoking, and useful. NACIS XII was designed to further the Society's primary purpose of improving communication and co-operation among all cartographic professionals.

The broad range of papers, panel discussions, field trips, and workshops found on the program reflects the theme of this year's conference "*Unfolding the Map: New Directions in Cartography*". Many of the sessions are devoted to the technological innovations which have opened new dimensions and are creating so many exciting possibilities as well as new problems in the field. Other sessions explore the very nature of map information and of the map user, the education of cartographers, and the changing role of the map librarian and the services they provide.

I am very grateful to Gregory Chu and Brent Allison for all of their hard work in their role as Local Arrangements Co-Chairs. I would also like to thank the speakers, organizers, workshop leaders, and all of the participants in this year's program for sharing their insights and expertise.

I encourage you to participate fully in NACIS XII and to play an active role in your Society.

Again, welcome to the Twin Cities and have fun!

Jeff Patton
Vice President and
Program Chair

1992 NACIS Executive Board

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Ron Bolton <i>NOAA</i>	Conference Site Selection Chair

NACIS XII - SESSION & WORKSHOP ORGANIZERS

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Gregory Chu <i>University of Minnesota</i>	Nancy Kandoian <i>New York Public Library</i>
Philip Gersmehl <i>University of Minnesota</i>	Nancy Ryckman <i>Univ. of North Carolina- Greensboro</i>
Donna Schenstrom <i>University of Wisconsin-Milwaukee</i>	Joseph Stoll <i>University of Akron</i>
Keith Rice <i>University of Wisconsin-Stevens Point</i>	Michael Peterson <i>University of Nebraska- Omaha</i>
John Sutherland <i>University of Georgia</i>	James Minton <i>University of Tennessee</i>

NACIS XII

UNFOLDING THE MAP: NEW DIRECTIONS IN CARTOGRAPHY

WEDNESDAY, OCTOBER 14

- 2:00 - 7:00 pm **REGISTRATION**
- 2:00 - 5:00 pm **NACIS BOARD MEETING**
- 2:00 - 7:00 pm **POSTER SESSIONS SETUP - Wabasha Room**
- 7:00 - 9:00 pm **OPENING SESSION - Ramsey Ballroom**

WELCOME

Gregory Chu, Local Arrangements Chair
University of Minnesota

Jeffrey C. Patton, Program Chair
University of North Carolina - Greensboro

PRESIDENT'S ADDRESS

Jack Dodd, NACIS President
Tennessee Valley Authority

KEYNOTE ADDRESS

Professor John Fraser Hart
University of Minnesota

- 9:00 - 11:00 pm **NACIS RECEPTION and CASH BAR - Wabasha Room**

- 9:00 - 11:00 pm **POSTER SESSION - Wabasha Room**
"University Cartography Laboratories

Organizer: Donna Schenstrom, Univ. of Wisconsin-
Milwaukee

Participants:

James R. Anderson, Florida State University
Gary Brannon, Waterloo University
Gregory Chu, University of Minnesota
Will Fontanez, University of Tennessee
John Krygier, Penn State University
James Meacham, University of Oregon

Catherine Reeves, Pennsylvania State University
Craig Remington, University of Alabama
Donna Schenstrom, University of Wisconsin - Milwaukee
Bonnie Sines, University of Northern Iowa
Joseph Stoll, University of Akron
Barbara Trapido, Arizona State University

9:00 - 11:00 pm GENERAL POSTER SESSION - Wabasha Room

Forming and Transforming Digital Maps
Kevin Byrne, Minneapolis College of Art and Design

Merging Art and Technology: Creating an Atlas Series
Don Larson and Paul LoBue, Mapping Specialists Ltd.

Down at the Diner: Cartography Served on the Side
Janet Mersey, University of Guelph

A Review of ATLAS PRO and ATLAS GIS
Jill Christianson, Jace Holzemer, Laura
Lawton, Michael Murphy, Michael Smalley,
and Robert Werner, University of St. Thomas

THURSDAY
TUESDAY, OCTOBER 15

8:00 am - 7:00 pm REGISTRATION

9:00 am - Noon EXHIBITS OPEN - Wabasha Room

8:30 - 10:00 am SESSION A : Ramsey Room West
Child Development and Cartographic Education:
In honor of the Memory of Barbara Bartz Petchenik

Organizer: Henry W. Castner, Queens University

Ecological Perspective
Herbert L. Pick Jr., Institute of Child Development,
University of Minnesota

Affordances of the Environment
Marian Heinrichs, Institute of Child Development,
University of Minnesota

Integrating Spatial Information

Catherine Sullivan, Institute of Child Development,
University of Minnesota

Route Planning and Description

Jodie Plumert, Department of Psychology, University of Iowa

The Use of Spatial Representations

Gina Dow, Institute of Child Development,
University of Minnesota

8:30 - 10:00 am PAPER SESSION B : Ramsey Room East

*A History of Maritime Boundaries on National Ocean Service
Nautical Charts*

Charles E. Harrington, Nautical Charting Division, Coast and
Geodetic Survey, National Ocean Service, NOAA

*The Impact of the Implementation of the North American Datum of
1983 (NAD-83) on Aeronautical Navigation in the United States*

Ronald M. Bolton, Aeronautical Chart Branch of the Aeronautical
Charting Division, National Ocean Service, NOAA

10:00 - 10:30 am REFRESHMENT BREAK

10:30 - Noon PANEL DISCUSSION C: Ramsey Room West

Child Development and Cartographic Education (Cont'd)

*Implications for Cartographic Education:
Comments on the Morning Papers*

Organizer: Henry W. Castner, Queens University

Panel Members:

Mary Kay Carlson, Minnesota Geographical Alliance
Ann Hoehn, Minnesota Geographical Alliance
Carol Gersmehl, Macalester College
Patricia Gilmartin, University of South Carolina
Herbert L. Pick Jr., University of Minnesota

10:30 - Noon PAPER SESSION D: Electronic Atlases - Ramsey Room East

The Electronic Atlas of Georgia

Thomas W. Hodler, University of Georgia

P.C. Based Animation for the Electronic Atlas Environment

Jeffrey S. Torguson, University of Georgia

*A Review of ATLAS*PRO and ATLAS*GIS*

Robert J. Werner, University of St. Thomas

Noon - 1:00 pm LUNCH

1:30 - 5:00 pm FIELD TRIPS: Meet in Hotel Lobby
Please select the field trip you would like to attend at the NACIS
Registration desk as early as possible. Space is limited

Minnesota Dept. of Transportation and the Minnesota Land
Information Center

Minneapolis Institute of Art

6:30 - 10:00 pm ANNUAL BANQUET - Summit Room South

Speaker:

Arthur H. Robinson

Professor Emeritus,

University of Wisconsin - Madison

FRIDAY, OCTOBER 16

8:00 - Noon REGISTRATION

8:30 - 10:00 am PANEL DISCUSSION E: Ramsey Room West

Software Use in Cartographic Production with an Emphasis on the Small Laboratory

Organizers:

Joseph Stoll, University of Akron

Donna G. Schenstrom, University of Wisconsin - Milwaukee

Participants:

Patricia Chalk, University of Western Ontario

Jan Coyne, University of Florida

Charles Rader, Michigan State University

Donna Schenstrom, University of Wisconsin - Milwaukee

Joseph Stoll, University of Akron

Barbara Trapido, Arizona State University

8:30 - 10:00 am PAPER SESSION F: Communication and Cognition in Mapping
Ramsey Room East

A Reassessment of the Debate over Cartographic Language in Postwar Communication Research

Margaret Pearce, Clark University

Spatial Knowledge Acquired from Narrative

Scott M. Freundschuh, Memorial University of Newfoundland

Possible Perceptual and Cognitive Advantages of Map Animation

Riley A. Jacobs, University of Nebraska - Omaha

10:00 - 10:30 am REFRESHMENT BREAK

10:30 - Noon PAPER SESSION G: Ramsey Room West

Interactive Videodisc Mapping Project

Sona K. Andrews, University of Wisconsin - Milwaukee

Chris Baruth, American Geographical Society Collection

Yvonne Bode, American Geographical Society Collection

David Tilton, University of Wisconsin - Milwaukee

10:30 - Noon PANEL DISCUSSION H: Ramsey Room East

Accessing Map Library Services

Organizers:

Nancy Kandoian, New York Public Library

Nancy B. Ryckman, University of North Carolina - Greensboro

Participants:

Brent Allison, University of Minnesota

Ron Grim, Library of Congress

Nancy Kandoian, New York Public Library

Nancy Ryckman, University of North Carolina - Greensboro

Susan Peschel, American Geographical Society Collection

Jon Walstrom, Minnesota Historical Society

Noon - 2:00 pm LUNCH BUFFET and
ANNUAL BUSINESS MEETING - Summit Room South

2:00 - 3:30 pm PAPER/PANEL DISCUSSION I: Ramsey Room West

The Need for Curriculum Rejuvenation in Cartography

Keith Rice, University of Wisconsin - Stevens Point

Discussion on Cartographic Education

Participants:

Sona Andrews, University of Wisconsin - Milwaukee

Rod Bassler, Kansas Geological Survey

Jeffrey Harris, Rand McNally, Skokie, Illinois

Don Larson, Mapping Specialists Limited, Madison, Wisconsin

Robert McMaster, University of Minnesota

Keith Rice, University of Wisconsin - Stevens Point

Jay Tappen, West Central Regional Planning Com, Eau Claire, WI

Representative from the Environmental Systems Research Institute

2:00 - 3:30 pm PANEL DISCUSSION J: Ramsey Room East

The Map Librarian's Dilemma with Digital Data

In Honor of the Memory of John Schroeder

James Minton, University of Tennessee

John Sutherland, University of Georgia

4:00 - 6:00 pm NACIS BOARD MEETING
7:30 pm CHINESE DINNER OUTING

SATURDAY, OCTOBER 17

- 8:30 - Noon** **FIELD TRIP - Meet in Hotel Lobby**

Tour of the Megamall "Mall of America"
- Noon - 1:30 pm** **LUNCH**
- 1:30 pm** **Treasure Island Casino (Shuttle will be provided)**
- 5:00 pm** **WINE AND CHEESE RECEPTION**
University of Minnesota Map Library
and Cartography Laboratory

NACIS XII WORKSHOPS **(Fee Required)**

- 8:30 am - 4:30 pm** **CARTOGRAPHIC ANIMATION**
on the Macintosh Platform

This workshop will examine a variety of methods for creating cartographic animations on the Apple Macintosh. A total of twenty Macintosh IIfx computers will be available for hands-on use. Five different instructors will demonstrate the different techniques. Every workshop attendee will be able to create their own cartographic animation.

Cartographic animation with microcomputers has emerged as a significant new area of research and development in cartography. The Apple Macintosh has been at the forefront of developments in microcomputer graphics. The release of Apple's Quicktime will assure the Macintosh's lead in the area of animation as well. Join us for this workshop to learn how to create maps as they will be in the future.

Workshop Presenters and Programs Demonstrated:

- Dr. Michael Peterson, University of Nebraska - Omaha,
MacChoro II, Premiere
- Riley Jacobs, University of Nebraska - Omaha, HyperCard
- David Tilton, University of Wisconsin - Milwaukee,
MacroMind Director
- John Krygier, Pennsylvania State University,
MacroMind Director
- Catherine Reeves, Pennsylvania State University,
MacroMind Director

8:30 am - 4:30 pm

CARTOGRAPHIC ANIMATION
on the IBM PC Platform

Participants in this workshop will examine methods for developing animated maps utilizing the IBM PC platform. They will learn, through hands-on experience, the basic principles of designing and producing dynamic animated maps for broadcast purposes. The workshop will be conducted with a combination of lectures, demonstrations, and hands-on exercises. There will be opportunities for questions and answers.

Instructor: Philip J. Gersmehl, Professor Dept. of Geography,
University of Minnesota

Software: Autodesk Animator

8:30 - Noon

MAP DESIGN AND PRODUCTION
on the IBM PC Platform

Learn to produce maps with the popular CorelDraw! 3.0 graphic software package. Workshop includes an analysis of the differences between traditional design methods and computer-assisted design methods. Participants will receive hands-on training in creating their own maps and will receive a set of public domain base map files.

Instructor: Gregory Chu, Director, Cartography Laboratory,
University of Minnesota

Software: CorelDraw! 3.0

5:00 pm

WINE AND CHEESE RECEPTION
University of Minnesota Map Library
and Cartography Laboratory

ABSTRACTS

Poster Session: General (Wabasha Room)
9:00 - 11:00 p.m. Wednesday, October 14

Forming and Transforming Digital Maps
Kevin Byrne
Minneapolis College of Art and Design

This poster display will document a specific process for digital mapmaking via several "project histories." Important visualization "components" (such as azimuthal projection) were identified and created in one software application, moved to (and through) a second program known for its "image processing" effects, and (finally) assembled in a "vector-based" application as a complete digital map. Goal was to transform a cartographic message into a suitable manifestation of both connotation and technique. Columbian, DaGaman, and other voyages served as content for maps that were created on a Macintosh platform using Azimuth, Photoshop, and Freehand software programs and then output to Linotronic and Dupont imagesetters. The poster's main point: today's key to desktop mapmaking centers on isolating the intrinsic strengths of particular software (e.g. Photoshop can be great at softening or "aging" a hard-edged map) and figuring out how best to match such "digital charm" to the feelings that one wants.

Merging Art and Technology: Creating an Atlas Series
Don Larson and Paul LoBue
Mapping Specialists Ltd.

Mapping Specialists, Ltd., is a full-service cartography house providing a broad range of mapping services. One of our primary markets is the elementary and high school book publishing industry. As a result of our experience with this industry, we have perceived a need for digitally created atlas and base map products.

We propose to show how we have taken manually produced base linework and artistically rendered relief shading and converted them to digital format. The base map and artwork can then be merged to produce standard and custom atlas or thematic maps. We will demonstrate the various stages that the maps go through, from the original compilation from public domain sources to the final product. We plan to use a series of charts, artwork samples, and final proofs to show how we have developed these maps.

Mapping Specialists is developing its own base map series for several reasons. Among them are concerns about quality, flexibility, and copyrights. We believe that the digital base maps and scanned artwork will help us to continue to provide high quality cartographic products to our clients at reasonable prices. In this way, we are employing the revolutionary technology of the microcomputer to stay competitive in the cartography business.

Down at the Diner: Cartography Served on the Side

Janet Mersey

University of Guelph

A Review of ATLAS PRO and ATLAS GIS

Jill Christianson, Jace Holzemer, Laura Lawton,

Michael Murphy, Michael Smalley, and Robert Werner

University of St. Thomas

Examples of ATLAS PRO and ATLAS GRAPHICS maps will be displayed and authors of the maps will be on hand to discuss advantages and disadvantages of using ATLAS to make them. There will be sample maps for each type of map that ATLAS makes: choropleth, other area-shaded maps, point-symbol maps, and line-symbol maps. ATLAS PRO maps will be displayed that show major Minnesota cities, U.S. imports and exports, and a store-location problem using the analog method. ATLAS GIS maps will be displayed that illustrate ATLAS used to manage forest resources, including a general-purpose map, a buffer map, and maps that show output resulting from GIS analysis, e.g. lost timber value from a proposed trail, the effect of changing timber prices, timber value resulting from a pine-beetle infestation, and change in timber value resulting from closing of a paper mill. They are good illustrations of how GIS can answer "what if" questions. Authors of the maps will be present to discuss how well ATLAS works to make the maps. They can describe the ease of program use, adequacy of help and screen messages, quality of the tutorials, and flexibility and power of the program to manipulate the various elements of map design.

If you are interested in keeping up on mapping software, considering purchase of an ATLAS product, or if you are already a user of ATLAS, this poster session will present advantages and disadvantages of using ATLAS, as well as some new ideas.

Paper/Panel Discussion: A and C (Ramsey West)
8:30 - 10:00 a.m. Thursday, October 15
10:30 - Noon

Organizer: Henry Castner, Queens University

Participants:

Henry Castner, Queens University

Herbert L. Pick, Jr., Institute of Child Development, University of Minnesota

Marian Heinrichs, Institute of Child Development, University of Minnesota

Catherine Sullivan, Institute of Child Development, University of Minnesota

Jodie Plumert, Department of Psychology, University of Iowa

Gina Dow, Institute of Child Development, University of Minnesota

Carol Gersmehl, Dept. of Geography, Macalester College

Child Development and Cartographic Education
in Honor of the Memory of Barbara Bartz Petchenik

In this session we will be meeting with researchers from the Institute of Child Development at the University of Minnesota to explore areas of their research that may have implications for cartographic and geographic education. Presentations will be made on two general topics: 1) the perception of spatial layout, especially as articulated by the late American psychologist, James Gibson; and 2) the representation of spatial information, in particular integrating spatial information, route planning and description, and the use of spatial representations.

Following these presentations, there will be an open discussion led by colleagues with experience in child-based research (both cartographic and behavioral), the elementary classroom, curriculum development, special education, and cartographic theory. We will consider how the summarized research might be significant in helping children develop: their thinking about space, their awareness of position in space, and their ability to express themselves graphically. Collectively, cartographers and psychologists are concerned with three aspects of human orientation: how we can achieve greater accuracy in specifying spatial position; how we can convey this information to others; and how we obtain and manipulate feedback from an environment, particularly as our navigational speed through this environment increases. The first two aspects form the basis of much of our formal teaching as we present various techniques for angular measurement and systems for organizing space, particularly at continental or global scales. The third aspect is the domain of research aimed at modelling the interaction of humans with their environments, particularly at local scales. It appears that there are few educational connections between the three aspects.

The question for cartographic (and geographic) education is whether or not we should

be building upon the local scale skills and experiences of children to give them a better understanding of the abstract techniques and systems which we value in society. Ultimately, the consideration of these innate perceptual skills and large-scale environmental experiences should lead us to discover the concepts and cognitive processes upon which cartographic education into orientation should be based.

Paper Session B: (Ramsey East)

8:30 - 10:00 am Thursday, October 15

**A History of Maritime Boundaries on
National Ocean Service Nautical Charts**

Charles E. Harrington
Nautical Charting Division
Coast and Geodetic Survey
National Ocean Service, NOAA

The National Ocean Service (NOS) is the lead Agency for the portrayal of maritime limits of the United States of America because of its responsibility to chart the Nation's coastal waters. The 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone states "...the normal baseline for measuring the breadth of the territorial sea is the low water line along the coast as marked on large-scale charts officially recognized by the coastal state." In 1976, the National Ocean Service (NOS) was requested to show various maritime limits on its regular issue of nautical charts. I will discuss the history of maritime boundaries on NOS charts, methods used in constructing the various maritime limits, the definition of the limits, the push for lateral seaward boundaries, and the technical aspects of maritime limits.

**The Impact of the Implementation of the North American Datum
of 1983 (NAD-83) on Aeronautical Navigation in the United States**

Ron Bolton
NOAA, National Ocean Service

On October 15, 1992, the horizontal geodetic reference system used in all aeronautical charts and chart related products published by National Oceanic and Atmospheric Administration (NOAA) /National Ocean Service (NOS) will change from the North American Datum of 1927 (NAD-27) to the North American Datum of 1983 (NAD-83). This change was mandated by the Congress of the United States. The latitude and longitude of almost all points in the National Airspace System (NAS) will be revised. The greatest coordinate shifts will be in Hawaii and Alaska where latitude will be moved by as much as 1200 feet and longitude by up to 950 feet. In the conterminous U.S., the largest changes will be approximately 165 feet in latitude and 345 feet in longitude.

In the U.S., latitude and longitude are based on a network of geodetic control points established by the National Geodetic Survey of NOAA. Control point coordinates are determined mathematically based on a single reference point; the NAD-27 was referenced to a control point in Kansas. The Global Positioning System (GPS) now allows satellites to define much more accurately geographic locations in terms of latitude and longitude utilizing an earth centered reference system; the NAD-83 is based on this new technology.

The impact to Aeronautical Navigation in the U.S. of the datum shift from NAD-27 to NAD-83 will not be limited to aeronautical charts and related publications. All Flight Management Systems (FMSs) and Air Traffic Control Systems (ATCs) will have to be modified to accept and utilize the NAD-83 coordinates. FMS databases on aircraft will be purged and new coordinates loaded for points in space, ground based navigational facilities, and/or airport position parameters. The ground based ATC Systems will also be required to purge all databases and redefine all latitude and longitude references in the National Airspace System (NAS).

The Aeronautical Charts, Chart products, FMSs, and ATCs that define the NAS will all be revised and the NAD-83 will be implemented in the NAS on October 15, 1992. This will be a massive effort directed by the Federal Aviation Administration and NOAA. The impact of the implementation of NAD-83 on aeronautical navigation in the United States will be significant.

Paper Session D: Electronic Atlases (Ramsey Room East)
10:30 - Noon Thursday, October 15

The Electronic Atlas of Georgia

Thomas W. Hodler
Institute of Community and Area Development
and Department of Geography
University of Georgia

The Electronic Atlas of Georgia runs in a PC-DOS environment and is designed to allow the user to not only view statistical information in map form but also to interact with the data base used to construct the maps. Each image displays one to four maps of Georgia using either discrete or derived county based statistics. The unique and innovative feature of this atlas allows the user to access the data base at any phase and to interactively query the data. When viewing the map screen, the user can determine and have displayed the data value of: 1) a single county (Georgia has 159 counties); 2) the entire data base provided in alphabetical order by county; 3) the entire data base provided in rank order of the data from highest to lowest; and 4) by the specific

classified nature of the map image. The user does not leave the map image in order to interact with the data. The special query approach allows the user to select any number of map combinations and to identify data ranges or criteria to each map for which a search is conducted. The atlas will search the records of the maps chosen and display a new map on screen with the counties highlighted that meet the criteria specified and a summary table is displayed. A record of the counties that meet the criteria can be obtained in either a digital file or as hard copy directed to a printer. This option provides the atlas user with complete flexibility to interact with the data and, in essence, ask questions of the data and to get answers to those questions.

P.C. Based Animation for the Electronic Atlas Environment

Jeffrey S. Torguson
University of Georgia

The development of cartographic animation sequences for the microcomputer is an expected result of the merger of increasingly sophisticated graphics output for the PC and the use of cartographic analysis of temporal information, particularly as applied to thematic mapping. One practical application of this development is in the construction of electronic atlases. This is accomplished by applying GET/PUT programming structures and/or color cycling routines to the color graphics palette in order to emulate cartographic animation. Several animated thematic map types can be produced using these techniques, such as choropleth, isoline, flow, and moving symbolization. Such an application may provide a greater appeal for electronic atlases and graphical imagery in general, and may provide an impetus for perception based cartographic research.

A Review of ATLAS*PRO and ATLAS*GIS

Robert J. Werner
University of St. Thomas

ATLAS*PRO is the successor to ATLAS*GRAPHICS, with a new user-interface and greater cartographic functionality. ATLAS*PRO is a vector-based mapping program that produces choropleth and other area-shaded maps, point- and line-symbol maps. ATLAS*PRO is menu driven like LOTUS 1-2-3, where the screen shows the next subset of commands available if a user chooses any one particular command. The manual is reasonably well-organized with good tutorials. Sample data sets come with the program and are used with the tutorials. The appearance of the screen is well-designed and screen messages are usually informative. Flexibility in designing the map is quite good, allowing a rather wide range of shading options, including fine-screen patterns, and quite a number of point- and line-symbols. Elements of the map, such as the map itself, titles, legends, scale, and freehand symbols, are all sizeable. ATLAS supports a good range of input and output devices. Attributes are kept in a database and good selection

and query methods are available. Data reports can be printed with relative ease. Shortcomings do exist, such as the inability of the program to give a bar graph display of pre-classified choropleth data so that a user can choose an appropriate choropleth classification method. Error messages are sometimes obscure. The user cannot access the data format of geographic data. Geographic data either has to be purchased from Strategic Mapping Inc. (the makers of ATLAS) or digitized with ATLAS*DRAW (a separate program).

ATLAS*GIS does everything that ATLAS*PRO does, plus some GIS functionality. Like ATLAS*PRO, ATLAS*GIS uses the ATLAS*PRO graphics interface, plus any DBase-compatible file (or it's own database) for attribute data. ATLAS*GIS will perform union and intersecting overlays, address matching, and buffers.

Panel Discussion E: (Ramsey Room West)
8:30 - 10:00 am Friday, October 16

Software Use in Cartographic Production with an Emphasis on the Small Laboratory

Organizers: Joseph Stoll, University of Akron and
Donna Schenstrom, University of Wisconsin - Milwaukee

Participants:
Patricia Chalk, University of Western Ontario
Jan Coyne, University of Florida
Charles Rader, Michigan State University
Donna Schenstrom, University of Wisconsin-Milwaukee
Joseph Stoll, University of Akron
Barbara Trapido, Arizona State University

Cartographic production laboratories, especially those in smaller colleges and universities are faced with a myriad of difficult choices during these austere "belt-tightening" times. Among these inevitable choices is the incorporation of computer software into the laboratory production process. With the increasing number of operating platforms and programs with varying applications and merits, how does one hope to systematically arrive at an effective and relatively inexpensive software solution to cartographic design and production issues? One possible solution is to learn from those who have already become proficient in the use of software for similar types of production and benefit from their experience. This discussion will feature input by laboratory supervisors experienced in the use and application of specific programs which have become popular for use in cartographic production. Along with the relating of

experiences with featured programs, the presenters will suggest configurations, steps toward the solution of particular cartographic production problems and provide examples of finished products.

Paper Session F: Communication and Cognition in Mapping
(Ramsey Room East)

8:30 - 10:00 am Friday, October 16

**A Reassessment of the Debate over Cartographic Language
in Postwar Cartographic Communication Research**

Margaret Pearce
Clark University

The extent to which cartography operates as a language remains both an unsolved and focal problem in cartographic communication research. One of the stumbling blocks to resolving the issue has been caused by the interdisciplinary nature of the research. In order to compare language and the map, cartographers have drawn from (among other places) literary theory, communications research, education, artificial intelligence, psychology, and graphic design. This approach has enabled cartographers to widen the scope and definition of the problem; however, it has brought with it a multitude of models and vocabularies, each theoretically complex, which seem to work separately rather than together on the same problem. The reassessment of the cartographic language debate in terms of its broader context in the philosophy of language is thus a necessary step toward both the resolution of the problem and application of such solutions to graphic design.

The cartographic literature will first be reviewed in the terms by which it has generally been approached, as though language were defined by the same problems which define structural linguistics. To this will be brought a review of the themes of linguistic theory, and their relationship to the linguistic assumptions of the cartographic research. Next, linguistics will be examined in terms of the paradigms which have transformed it, specifically, the cognitive and semiotic paradigms. Finally, it will be shown that not only has the existence of cartographic language been proven beyond the "metaphorical" sense, but as well that several such languages exist, and that their structure is dependent primarily on the function of the map.

Spatial Knowledge Acquired from Narrative

Scott M. Freundschuh

Memorial University of Newfoundland

The objective of this research is to investigate the acquisition of spatial knowledge from narrative. Current research indicates that the source of spatial knowledge plays a significant role in the form of the resulting spatial cognitive model. Some studies suggest that the two-dimensional, geometrically correct "cognitive maps" result from reading narrative, whereas other studies indicate that similar cognitive models do not result from map reading, navigation experience, nor from reading narrative. The hypothesis investigated is that while subjects read narratives, they use descriptions from the narrative coupled with previous perceptions and experiences, to create their own cognitive representation of the story world, and that *it is unlikely that the resulting cognitive representation will necessarily be a geometrically correct, two-dimensional map*. To explore this hypothesis, an experimental design employing human subjects compares spatial knowledge about a story world acquired from various sources, including maps and narrative. Upon acquiring this knowledge, subjects read a narrative about the story world, during which they are presented with a number of spatial queries concerning the story world. Reaction times and accuracy of responses to the spatial queries are recorded and compared. The Natural Sciences and Engineering Research Council of Canada (NSERC) have provided a grant for this study to be completed during July and August of 1992. At a minimum preliminary results are presented. The significance of this research is to identify sources of spatial knowledge, and to provide information on how this knowledge is acquired and integrated into spatial cognitive models.

Possible Perceptual and Cognitive Advantages of Map Animation

Riley Jacobs

University of Nebraska - Omaha

Map animation has been propelled into the modern age by a virtual technological revolution. As a technique, animation makes the map viewing and map analysis tasks more exciting and even fun. But other than making these tasks more interesting, what else can be said for map animation? What are the benefits of map animation?

The possibility that animation may enhance the map viewers ability to perceive and understand the material presented on a map lends justification to the development and increasing interest in map animation. The study of the benefits of map animation draws on groundwork in two areas: 1) psychological studies pertaining to the perception and cognition of static maps provide a foundation for the study of how the addition of animation affects these visual and analytical processes; and 2) although visualization, a branch of computer graphics, is most often used to study form and process, map animation may be thought of as a type of visualization, therefore, some of the principles of visualization can be applied to map animation studies.

Visualization scientists have suggested that the viewing environment should contain as many elements of the natural world as possible to facilitate analysis. Apparent motion, in the form of animation, is an element of the natural world and when added to the elements of color, line, pattern, texture and/or depth, animation may ameliorate the map viewing environment to the extent that perception is heightened and cognition is improved.

Project Report G: (Ramsey Room West)
10:30 - Noon Friday, October 16

Interactive Videodisc Mapping Project

Sona K. Andrews
University of Wisconsin - Milwaukee

Chris Baruth
American Geographical Society Collection

Yvonne Bode
American Geographical Society Collection

David Tilton
University of Wisconsin - Milwaukee

This session will report on a project currently underway at the University of Wisconsin - Milwaukee to design and produce an interactive videodisc on mapping. We will introduce the concepts and components of the project, explain how the materials are imaged and cataloged, and demonstrate how the user interface will be designed and operate. The project is funded by the United States Department of Education and has four main components: 1) maps, 2) information about maps, 3) a user interface, and 4) instructional information. Hundreds of maps, charts, globes, and photographs (primarily from the American Geographical Society Collection) will be photographed and transferred onto a videodisc. In addition to imaging each object in its entirety, thousands of detailed frames in the form of tiles (systematic enlargements of the item), and close-ups (specific areas of the item that illustrate an example or theme) will be imaged. Twenty minutes of short 1 - 3 minute motion video segments will be included on the videodisc. These are designed to highlight and explain the processes involved in mapping and will offer examples on how to use the videodisc and database. The information about the maps will be stored in a digital database and accessed via personal computer. The database will contain traditional bibliographic information about each image as well as comments and relevant cartographic themes. The user interface will link the images on the videodisc with the information in the database and allow the user a range of access and search capabilities.

Panel Discussion H: (Ramsey Room East)
10:30 - Noon Friday, October 16

Accessing Map Library Services

Organizers:

Nancy Kandoian, New York Public Library
Nancy Ryckman, University of North Carolina - Greensboro

Participants:

Brent Allison, University of Minnesota
Ron Grim, Library of Congress
Nancy Kandoian, New York Public Library
Nancy Ryckman, University of North Carolina - Greensboro
Susan Peschel, American Geographical Society Collection
Jon Walstrom, Minnesota Historical Society

Map librarians from university, public, private, historical and federal libraries will discuss services available to other librarians and to geographers and cartographers. Panelists will cover topics such as printed and electronic access to the collections, reference services, interlibrary loan and copying services, and any special facilities and services typical of their particular type of library.

Paper/Panel Discussion I: (Ramsey Room West)
2:00 - 3:30 Friday, October 16

The Need for Curriculum Rejuvenation in Cartography
Keith Rice, University of Wisconsin - Stevens Point

Discussion on Cartographic Education

Participants:

Sona Andrews, University of Wisconsin - Milwaukee
Robert McMaster, University of Minnesota
Don Larson, Mapping Specialists Ltd., Madison, Wisconsin
Ron Bassler, Kansas Geological Survey
Keith Rice, University of Wisconsin - Stevens Point
Jay Tappen, West Central Regional Planning Commission, Eau Claire, Wisconsin
Jeffrey Harris, Rand McNally, Skokie, Illinois
Representative from the Environmental Systems Research Institute (ESRI)

Representatives from academia, government and private business will discuss the current status, trends, and potential directions of cartographic education in North America. Panelists will react to a compendium paper that describes modern cartographic curricula, its history, and possible future alternatives. The paper, entitled *The Need for Curriculum Rejuvenation in Cartography*, will be presented by the session organizer. Key issues of discussion will center on: 1) the persistent debate on the balance between cartographic education versus training, 2) the need to reclaim and revitalize the cartographic identity, 3) the requirements of potential employers of cartographers, 4) integrating new map forms in the curriculum, and 5) a challenge to devise a cartographic curriculum that will both promote and advance cartography as a discipline into the next century.

Panel Discussion J: Ramsey Room East
2:00 - 3:30 Friday, October 16

The Map Librarian's Dilemma with Digital Data
In Honor of the Memory of John Schroeder

Organizer's:

James O. Minton, University of Tennessee
John Sutherland, University of Georgia

A roundtable discussion on the explosion of digital cartographic information and the problems this information presents librarians.

NOTES

