

NACIS XVII CONFERENCE PROGRAM

*The Seventeenth Annual
Meeting of the*

*North American
Cartographic Information Society*

Oct. 1-4, 1997
Lexington, Kentucky
RADISSON PLAZA HOTEL

*Radisson Plaza Hotel
Lexington, Kentucky
October 1-4, 1997*

Greetings and welcome to NACIS XVII! This seventeenth annual conference finds us ready to survey the cartographic landscape from our vantage point here, deep in the heart of Bluegrass country. We have an excellent program and a busy schedule ahead of us, with papers, posters, workshops, round table discussions, and exhibits representing the diverse constituencies of our membership. There will also be opportunities to experience the cultural and geographical riches of this region.

Those of us who have been regular attendees at previous NACIS conferences over the years find them to be a congenial combination of scholarship, fellowship, and professional activities—all at a manageable scale and in a relaxed atmosphere. I hope that those of you who are newcomers to the organization will find the meeting equally agreeable. These conferences also provide an excellent venue for students to acquire experience in presenting papers and a two-way opportunity for students and older (experienced, that is) members to get to know each other. Thus, I extend a special welcome to the students in attendance.

A lot of people have put a lot of effort into bringing together the conference, and I'd like to thank some of them. First, the Local Arrangements Committee, chaired by Ruth Rowles and including Dick Gilbreath, Gyulus Pauer, and Susan Lambert. And, of course, there are the faithfuls at the Executive Office in Milwaukee: Sona Andrews, Chris Baruth, and Susan Peschel. All of these individuals contributed a great deal and made my job as Program Chair much easier. I would also like to recognize our two guest speakers, Dr. Karl Raitz and Dr. John Pickles, for sharing their insights and expertise with us and thank all the participants who organized paper sessions and panels for the program.

NACIS is a relatively small but hardy organization which publishes a first rate journal, *Cartographic Perspectives*. I find a level of commitment among NACIS members which I do not see in any of the other organizations to which I belong. Because we are rather small, we depend a great deal on ALL of our members to participate and share the responsibility involved in keeping the organization viable. I encourage you—especially if you are a new or nascent member—to take an active part in the organization. There is plenty of work to do—jobs both small and large. You will derive a lot of satisfaction from your participation, and the society will benefit immeasurably.

Welcome to the 1997 NACIS conference, and I look forward to seeing you next year in Milwaukee for NACIS XVIII.

Pat Gilmartin
Vice President and Program Chair

SCHEDULE AT A GLANCE

WEDNESDAY, OCTOBER 1

3:00 - 5:30 p.m. - Black Diamond Board Room
NACIS BOARD MEETING

3:00 - 7:30 p.m.
REGISTRATION

7:30 - 9:00 p.m. - Ballroom 12
OPENING SESSION

9:00 - 11:00 p.m. - Daniel Boone Room
POSTER SESSION / EXHIBITS AND RECEPTION

THURSDAY, OCTOBER 2

8:00 - noon - Daniel Boone Room
POSTER SESSION / EXHIBITS

✓ **8:30 - 10:00 a.m. - Ballroom IV**
A. PLENARY SESSION PANEL DISCUSSION:
SOFTWARE FOR DESIGNING PUBLICATION-QUALITY
MAPS: WHERE ARE WE NOW & WHAT CAN WE HOPE FOR?

10:30 - 12:00 a.m. - Ballroom IV
B. PAPER SESSION
DESIGNING MAPS WITH TODAY'S TECHNOLOGIES

* **10:30 - 12:00 a.m. - Ballroom III**
C. PAPER SESSION
THEORETICAL ISSUES IN CARTOGRAPHY & COGNITION

✓ **12:30 - 2:00 p.m. - Ballroom 12**
LUNCHEON AND ANNUAL BUSINESS MEETING

✓ **2:00 - 6:00 p.m.**
FIELD TRIPS AND TOURS

7:30 - 9:00 p.m. - NACIS Hospitality Suite
Map Collectors' Show and Tell

FRIDAY, OCTOBER 3, 1997

8:00 - noon - Daniel Boone Room

POSTER SESSION / EXHIBITS

8:15 a.m. - 9:30 a.m. - Ballroom IV

D. PANEL DISCUSSION

REVISE & RESUBMIT: THE FUTURE OF CARTOGRAPHIC RESEARCH PUBLICATIONS

8:15 a.m. - 9:30 a.m. - Ballroom III

E. PANEL DISCUSSION

IS THE VIRTUAL MAP LIBRARY IN SIGHT?

10:00 - 12:00 a.m. - Ballroom III

F. PAPER SESSION

MAP PRODUCTION AND DESIGN ISSUES

10:00 - 12:00 a.m. - Ballroom IV

G. PAPER SESSION

INTERACTIVE SOFTWARE IN THE CLASSROOM

12:00 - 1:30 p.m.

LUNCH BREAK

Editorial Board Meeting, Cartographic Perspectives

1:30 - 3:00 p.m. - Ballroom IV

H. PAPER SESSION

MAPPING ON THE WORLD WIDE WEB

1:30 - 3:00 p.m. - Ballroom III

I. PAPER SESSION

EVALUATING CARTOGRAPHIC ELEMENTS

3:30 - 5:00 p.m. - Ballroom IV

J. PAPER SESSION

PRODUCING MAPS WITH TODAY'S TECHNOLOGIES

3:30 - 5:00 p.m. - Ballroom III

K. PAPER SESSION

CARTOGRAPHY: PEDAGOGY & ANALYTICAL APPLICATIONS

3:30 - 5:30 p.m. - NACIS Hospitality Suite

L. POSTSCRIPT MAPPING ROUNDTABLE

3:30 - 5:30 p.m. – Black Diamond Board Room
NACIS BOARD MEETING

6:30 - 10:00 p.m. – Ballroom I
ANNUAL NACIS BANQUET

SATURDAY, OCTOBER 4, 1997

9:30 - 11:30 a.m. – Ballroom IV
M. PANEL DISCUSSION
MAPPING ON THE WEB: THE INTERNATIONAL DIMENSION

9:30 - 11:30 a.m. – Ballroom III
N. PAPER SESSION
MAPPING THE WORLD FOR CHILDREN

WORKSHOP I

8:30 a.m. - 12:30 p.m. – meet at NACIS Registration Desk
Photoshop fix for Cartographers

WORKSHOP II

8:30 a.m. - 4:30 p.m. – Daniel Boone Room
Thematic and Interactive Mapping with ArcView

SATURDAY AFTERNOON ACTIVITIES

- **Keeneland Race Course** •
- **Kentucky Horse Park** •
- **Shaker Village of Pleasant Hill** •

WEDNESDAY, OCTOBER 1, 1997

3:00 - 5:30 p.m. - Black Diamond Board Room
NACIS BOARD MEETING

3:00 - 7:30 p.m.
REGISTRATION

7:30 - 9:00 p.m. - Ballroom I
OPENING SESSION
Keynote Speaker: Karl Raitz, University of Kentucky
Kentucky's Places and Patterns

9:00 - 11:00 p.m. - Daniel Boone Room
POSTER SESSION / EXHIBITS AND RECEPTION
Organizer: Donna Schenstrom, Univ. of Wisconsin - Milwaukee

James R. Anderson, Jr.
Florida State University

Gregory Chu
University of Wisconsin-La Crosse

Will Fontenez
University of Tennessee

Harry Johnson & Elizabeth Nelson
San Diego State University
The Tijuana River Watershed

Jeff McMichael
Georgia State University
*A Hypsometrically Tinted,
Shaded Relief Map of Georgia*

James E. Meacham
University of Oregon
*Student creation of the Atlas of Maps to
Wineries of the Southern Willamette Valley:
A vehicle for learning map design for web
publication*

Henry Norris & Jonti Phillips
Florida Marine Research Institute
Benthic Habitats of the Florida Keys

Julsun Pacheco
University of Hawaii at Manoa
*Using GIS and computer graphics software
for general reference and thematic map
production*

Jim Robb
Univ. of Colorado

Donna Genzner Schenstrom
University of Wisconsin-Milwaukee

B.J. Stiff
Illinois State Geological Survey
*Combining Raster Imagery and Vector Data
to Produce Geologic Maps*

COMMERCIAL EXHIBIT
Idrisi Project

THURSDAY, OCTOBER 2, 1997

8:00 - noon - Daniel Boone Room

POSTER SESSION / EXHIBITS

Organizer: Donna Schenstrom,
Univ of Wisconsin - Milwaukee



8:30 - 10:00 a.m. - Ballroom IV

A. PLENARY SESSION PANEL DISCUSSION:

SOFTWARE FOR DESIGNING PUBLICATION-QUALITY

MAPS: WHERE ARE WE NOW & WHAT CAN WE HOPE FOR?

Organizer and chair, Arne E. Gibson, Manager, Clark University Cartography and
Information Graphics Service, Worcester, Mass.

Participants: David DiBiase, The Pennsylvania State University;
Mark Mattson, Temple University; Charlie Frye, ESRI; and others.

In 1989 Mark Mattson authored an article in *Cartographic Perspectives* in which he indicated the need for cartographers to utilize graphic design software in conjunction with mapping/GIS software to create publication-quality cartographic products. At the time, the design and output capability of mapping/GIS software was crude. On the other hand, graphic design software, while providing excellent design and output capabilities, did not allow the cartographer to link visual symbols with a spatial database.

The purpose of this session is two-fold. The first is to review the design and output capabilities of software currently used in the creation of publication-quality maps, from actual GIS/mapping software to graphic design software. The second purpose is to serve as a forum in which cartographers can share ways in which they use and combine various software packages in order to maximize design and output options.

In conjunction with this session, I would like to invite representatives from such major software products as IDRISI, ARC/INFO, MapInfo, Adobe, Corel, etc., to review the current design and output options of their respective software, and to provide information on how they hope to expand cartographic design-related capabilities.

B. PAPER SESSION

DESIGNING MAPS WITH TODAY'S TECHNOLOGIES

Session Chair: Elizabeth Nelson, Department of Geography, San Diego State University

**B1. Producing High Quality Maps from GIS Data:
The Water Resources Atlas of Florida**

James R. Anderson, Jr. and Louis Cross, Florida State University

More and more data sets are becoming available in ArcInfo or other GIS program formats. However, maps produced from these programs are often less than desirable for publication in professional journals, magazines, or books. Most cartography labs use a graphics program like Freehand or Illustrator to prepare professional quality maps in order to utilize strict control over map components such as line weight, line style, type style, and type placement.

The cartographer can now utilize data directly from the GIS and prepare quality graphics without recreating the map from hard copy GIS output. This presentation will examine techniques developed using MapPublisher and ArcView software to import data from ArcInfo files and then prepare final publication graphics for the forthcoming *Water Resources Atlas of Florida*.

B2. Problems of Cartographic Design in GIS-T

R. Gordon Kennedy, Washington State Department of Transportation

Geographic Information Systems for Transportation (GIS-T) is a ten-year-old specialty of GIS that focuses on networks, linear reference systems, travel demand modeling, intelligent transportation systems (ITS), and similar extensions of GIS for transportation problems. Analytical mapping software for linear phenomena has spawned a dramatic growth in the production of maps based on linear features and attributes. In this paper, recent developments in GIS-T are summarized, with particular emphasis on the graphical output of GIS-T software. Conventional cartographic treatment of linear features is reviewed in the context of the mapping challenges introduced by GIS-T. Problems in the visualization of complex linear data are identified and examined as cartographic design issues.

Functional cartographic requirements are specified for GIS-T mapping and major design issues are identified, including: overlay of multiple linear variables, symbol offsets from alignment, the treatment of point symbols on linear symbols, and intra-symbol linear variation. The effective visualization of complex linear data layers is posed as a yet unmet problem of cartographic design. Fundamental linear design principles—theoretical reference points for design decisions—are needed to enhance the rapidly growing analytical capabilities of GIS-T through effective visualization. Some of the issues involved in developing such fundamental principles are summarized and potential avenues of research are suggested.

**B3. Utilizing Adobe Acrobat PDF Technology to Support Multiple
Map Designs, Map Formats, and Media**

Scott C. Wilcox, U.S. Bureau of the Census, Geography Division

The United States Census Bureau Geography Division requires a tool that can produce maps in both hardcopy and electronic formats. Electronic versions allow for dissemination of maps, along with other information, on the Internet and on other media such as CD-ROMs. Adobe Acrobat's Portable Document Format (PDF) fulfilled both of these requirements.

Map requirements demand that maps are made available in color and black and white versions. Page-size dimensions are another requirement for the maps. These requirements directly impact map design and systems development.

The first implementation of PDF technology for census mapping was in support of the National Transportation Analysis Region (NTAR) maps that are used to complement the statistical data for a United States Department of Transportation report. This presentation addresses some of the technical issues that were encountered as well as lessons learned for future mapping needs.

C. PAPER SESSION

THEORETICAL ISSUES IN CARTOGRAPHY & COGNITION

Session Chair: Sona Andrews, Department of Geography,
University of Wisconsin-Milwaukee

*** C1. *Cartographic Metaphors for Browsing Very Large Data Archives***

Barbara P. Buttenfield, University of Colorado, Boulder

We are overwhelmed by the vast amounts of data accumulating daily. The extraction of information from on-line data sources is becoming more and more difficult. For example, if a query to a large archive returns hundreds of "hits", the most effective presentation is probably not a list of items, but some other type of graphical display. The concept of spatialization offers a promising potential to overcome the current impediments of retrieving items from large volume archives.

Spatialization involves effective combination of powerful scientific visualization techniques with spatial metaphors that represent data that are not necessarily spatial in nature. Familiar spatial concepts such as direction, distance, and scale, which are part of the human experience in everyday life, are applied to create two-dimensional digital representations of complex digital data. Compressed to two dimensions, one loses some of the richness of the information space. However, cartographic metaphors may be applied to generate information landscapes organizing a large catalog search into a navigable terrain.

This paper will demonstrate mechanics of generating landscapes for a large dataset, which are straightforward. The question then arises, how far does the cartographic metaphor extend? We are not certain how people comprehend spatialized views, or whether the components of distance, direction and so forth are understood by viewers in the context of a data archive. This paper will propose extensions to the metaphor, demonstrating graphically. Plans for empirical testing will be presented to open discussion and elicit reaction from the cartographic community.

C2. *An Examination of Various Neural Network Models for Use in Geographic Visualization*

David K. Patton, Department of Geography and Environmental Studies,
Slippery Rock University of Pennsylvania

This paper examines a variety of neural network models and their potential for generating information that could enhance geographic visualization. A key element of geographic visualization tools is the potential to present a user with the ability to see (i.e., explore) spatial information in various ways. For example, tools have been suggested that allow changes in perspective, changes in resolution, dimensional transformations, the simultaneous presentation of multidimensional information, and animated temporal views. While it could be argued that these methods existed prior to computers, it is with computers that these techniques have evolved into true visualization tools. For a geographic visual-

ization tool to be successful, it should allow the user to interactively make changes in real-time. Computer graphics permit real-time interactive participation from the user.

In addition to allowing users to alter the visual display of spatial information, there is the potential for computer techniques to help the user extract information in new and creative ways. Currently, most attempts at geographic visualization have concentrated on innovations in visual display, but have relied on traditional linear methods of data analysis. A possible alternative is data analysis through neural networks. It has been suggested that neural networks learn and produce information in a non-linear and intuitive manner - much as humans do. Within the visualization process, it is important that data be queried in a flexible and intuitive manner, interactively, in real-time. This is possible with neural networks. Several neural network models will be described and evaluated as potential tools for geographic visualization.

C3. Criteria of Formalization of the Process of Feature Selection

Georg Gartner, Technical University of Vienna

One of the most important discussions in scientific cartography deals with the possibilities of formalizing cartographic knowledge. The ability to formalize is a basic requirement for automating cartographic processes, not only for cartographic generalization, but also for defining expert-systems. So-called, reverse-engineering, attempts to analyze, to compare and to reproduce cartographic operations and processes, but we must first establish whether the cartographic knowledge can be characterized as structural and/or procedural. Otherwise we have to admit, that cartography works with a lot of individual solutions and with only a little clear and exact knowledge and a few formulas.

The paper will then focus on the selection and lettering of geographic localities. The selection and lettering of villages, towns and cities is a typical cartographic task. To solve the problem, some premises and preconditions- such as scale, purpose, theme, cartographic methods, graphic density- must be defined. Some answers to the questions "Can the problem be exactly defined?" and "Can the solution be subdivided into steps?" will be given. The main topic to be dealt with is the question "Which criteria have an influence on the problem?" The criteria have to be tested on their efficacy and validity. In addition to quantitative criteria (e.g. population) and qualitative criteria (e.g. importance of a geographic locality for orientation), the graphic criteria are also decisive in solving the problem.

Finally the composition and structure of a model of automated selection and lettering of spatial entities, considering perceptive feasibilities and the symbolization of all other elements of the map, will be analyzed and defined. The chances of developing an executable system, considering the described restrictions, will be given in a conclusion.



12:30 - 2:00 p.m. - Ballroom X2
LUNCHEON AND ANNUAL BUSINESS MEETING

2:00 - 6:00 p.m.

FIELD TRIPS AND TOURS

meet at registration desk unless announced otherwise

**•Kentucky Natural Resources & Environmental Protection
Cabinet's GIS Branch, Frankfort•**

The oldest GIS agency in state government will demonstrate some of its recent applications and conduct a tour of the office (includes a visit to the Kentucky Vietnam War Memorial).

•PlanGraphics, Inc., Frankfort•

A leading international consultant and systems integrator of geographic information systems and information technology. PlanGraphics' headquarters is in Frankfort, with regional offices located in Maryland, Texas, Colorado, Arizona, and the Middle East (includes a visit to the Kentucky Vietnam War Memorial).



•Labrot & Graham bourbon distillery•

Labrot & Graham has been restored to its 1840s operating condition and produces bourbon using the original Scottish "pot still" method.

•Self-guided walking tour of downtown Lexington•

7:30 - 9:00 p.m. - NACIS Hospitality Suite

Map Collectors' Show and Tell

An informal gathering where collectors of maps of all sorts are invited to discuss and show examples (maybe even negotiate some trades?) of their collections with similarly-addicted souls. Hosted by Pat Gilmartin, Univ. of South Carolina.

FRIDAY, OCTOBER 3, 1997

8:00 - noon - Daniel Boone Room

POSTER SESSION / EXHIBITS

Organizer: Donna Schenstrom,
Univ of Wisconsin - Milwaukee

8:15 a.m. - 9:30 a.m. - Ballroom IV

D. PANEL DISCUSSION

REVISE & RESUBMIT: THE FUTURE OF CARTOGRAPHIC RESEARCH PUBLICATIONS

Organizer and chair, Cynthia A. Brewer, The Pennsylvania State University

Participants: Pat Gilmartin, University of South Carolina; Barbara Battenfield, University of Colorado; Jeremy Crampton, George Mason University; Henry Castner, Pittsboro, N.C.

The primary English language cartographic journals are *Cartographic Perspectives*, *Cartography and GIS*, *Cartographica*, *The Cartographic Journal* and *Cartography*. These five journals altogether demand a manuscript flow to complete 15 issues a year. At the same time, there are now many more outlets for publishing our inherently cross-disciplinary work. Numerous other pressures that are unique to our professional associations or common to the changing responsibilities of scholars affect the enterprise of publishing research. This panel discussion will provide the impetus for a brainstorming session intended to encourage wide-ranging thinking about the possible futures of our journals and of cartographic scholarship. (Sorry, there will be no griping about details like individual rejections or typesetting debacles.)

8:15 a.m. - 9:30 a.m. - Ballroom III



E. PANEL DISCUSSION

IS THE VIRTUAL MAP LIBRARY IN SIGHT?

Organizer and chair: James O. Minton, University of Tennessee - Knoxville

Participants: Christopher Baruth, AGS Collection; Denise Stephens, University of Virginia - Charlottesville; John Sutherland, University of Georgia

E1. Panel Discussion: Is The Virtual Map Library in Sight?

Digital maps have become commonplace in libraries and are readily available on the World Wide Web. But is there sufficient variety and depth of cartographic materials available, with respect to format and themes, to form a virtual map library? Three map librarians will review what digital map materials are available, how these materials could/should be organized, and how reference assistance can be provided for these maps.

F. PAPER SESSION

MAP PRODUCTION AND DESIGN ISSUES

Session Chair: Charles Rader, Department of Geography,
University of Wisconsin-River Falls

F1. The UO InfoGraphics Lab Experiment: An Organic Approach to Cartographic Problem-Solving and Research Facility Development

James E. Meacham, Department of Geography, University of Oregon

This presentation is a comparative study of the InfoGraphics Lab's facility development and working relationships to the planning/architectural-based community development model: *The Oregon Experiment*, by Christopher Alexander and others, 1975. *The Oregon Experiment* serves as an alternative to a master plan for the University of Oregon campus. The framework laid out by Alexander is one that contains many similarities to the way the InfoGraphics Lab has operated since 1988 and could provide a planning strategy for continued success of the InfoGraphics Lab and other similar university facilities located elsewhere. Alexander's planning principles of implementation: (1)Organic Order, (2)Participation, (3)Piecemeal Growth, (4)Patterns, (5)Diagnosis, and (6)Coordination will be addressed from the perspectives of the InfoGraphics Lab's clients, staff, facilities, and capabilities as the community.

F2. Staircase Locks 3-D Model

Claudia James and Joseph W. Stoll, Department of Geography & Planning,
University of Akron, Ohio

We are hoping to present the results of a project that uses newly acquired stereolithography capabilities at the University of Akron to translate digital maps into 3-dimensional, plastic models. Elevation contours will be digitized from historic maps of downtown Akron and the Ohio & Erie Canal to depict the "staircase locks." This historic section of Akron (part of the Ohio & Erie Canal National Heritage Corridor) is well-suited to 3-dimensional modeling due to the drastic change in relief over a short horizontal distance. The digitized contours will then be modeled in plastic using stereolithography with the help of the Akron Institute of Polymer Science. The model will ultimately be painted and displayed at one of the canal interpretive centers as part of their educational exhibits to explain Akron's pivotal role in the construction of the canal in the early 1800s.



F3. *Abstracting Reality: Making Guidebook Maps*

Ren Vasiliev, Geneseo, New York

This paper examines the process to create maps for a guidebook of U.S. Route 6. These maps were to be the simple version of the story of what makes up the highway and what a traveler might see on it. They were to be simple, black and white maps that gave just the right amount of detail for the reader to be interested in staying on course and yet were produced from a mountain of information, including other maps, historical literature of the places on the route, and, especially, photographs taken of the road. Making these maps was an exploratory event, a distillation of reality by some means that, though cartographically recognizable as generalization, was a translation of what I saw and experienced, into a map abstraction.

The presentation will show several approaches used in decision-making and the map's content. Photographs of the road were extremely useful as memory-joggers, but were also a hindrance because of the tremendous amount of information that they carry, especially for the photographer. Previously published maps revealed information that was not available on the photographs, but these maps contradicted each other often enough that I questioned what was real. The final sketches represent different forms of the abstracted reality of U.S. Route 6.



F4. *Rapid Transit System Maps*

Dennis McClendon, Chicago CartoGraphics

The London Underground Diagram is the most widely revered example of the rapid transit "journey planner." These dramatically simplified maps often influence the public's perception of the transit service offered and offer intriguing challenges to the map designer, who must symbolize abstract concepts such as transfers and express service. The speaker, who recently completed a new rail system diagram for the Chicago Transit Authority system map, will discuss some of the challenges of symbolizing complex systems, the limits of generalization and simplification, and look at solutions used by systems around the world.

G. PAPER SESSION**INTERACTIVE SOFTWARE IN THE CLASSROOM**

Session Chair: Keith Rice, Department of Geography/Geology, University of Wisconsin-Stevens Point

G1. *The Virtual Internship: An Application of the Narrative Form in Computer-Assisted Learning*

David DiBiase, DEASY GeoGraphics Lab, The Pennsylvania State University

Educational software is often judged by the level of interactivity that it supports. A key feature of highly interactive software is frequent "decision points" at which students must make choices that affect the outcome of an activity. This manner of interaction provides students with crucial opportunities to construct understanding of unfamiliar topics. Unfortunately, interactive decision points also interrupt the flow of activities, potentially leading to confusion about how a particular decision relates to higher-order problems. Lydia Plowman (1996) suggests that the narrative form may provide a means to resolve conflicts between the needs of software users and the pedagogical goals of instructional designers. This presentation will include a demonstration of a "virtual internship" in physical geography that embodies the narrative approach advocated by Plowman.

Plowman, L. 1996. Designing interactive media for schools: a review based on contextual observation. *Information Design Journal*. 8/2:258-266.



G2. *An Interactive Multimedia Geography Lesson for Dyslexic Students*

Alison E. Philpots, Michigan State University

An interactive multimedia lesson will be created to aid dyslexic students. Dyslexia is a learning disability that the National Health Institute estimates is found in as many as fifteen percent of the United States population. Its outward signs include peoples' difficulty in reading, writing and spelling and the common sequencing reversal of letters and numbers. Teaching methods for dyslexic students involve multisensory techniques using all pathways to the brain to enhance memory. Multimedia may be an ideal method to teach dyslexic students geography because of its ability to store and retrieve text, graphics, video clips, animated maps, on-screen buttons, and sound. Four sections of an interactive multimedia lesson will be created on Macromedia DIRECTOR and will focus on Michigan coastal dunes. The first section will focus on basic definitions and locations of dunes within the state. The second section will discuss the formation, geology, geomorphology, and succession of the dunes. The third section will cover life on the dunes, explaining the plant, animal, and bird inhabitants throughout the year. The fourth section will explain the importance of dune protection and the need for sustainable maintenance. The completion of the four sections will expose the student to the holistic nature of geography by allowing them to explore the physical and cultural aspects of a dynamic system.



G3. *Cartography, GIS and the Web*

Jeremy Crampton, Department of Geography, George Mason University

This paper discusses the potentials and problems of the World Wide Web for delivery of interactive maps and other spatial data. User-defined, or "on demand" maps generated in GIS and cartographic environments constitute a major component of interactive maps because users determine, in part, the coverage, scale, and geographical attributes to be included. When coupled with the web's ability to deliver data to multiple users at their request it seems a likely area of expansion for both digital cartography and the web. However, some of the same problems that cartographers confronted with the rise of the early cartography software, that is, ensuring good design principles are followed, and meaningful data representation, arise even more significantly with maps via the web. The remainder of this paper discusses ways in which this author has used interactive maps via the web in the classroom, and the utility of various software and web components (plugins, Xtras, etc.) in a recent map animation class is discussed. Although software can have (moderate) learning curves, empowering students with good web content creation skills can be a potential solution to the above problems.



G4. *Perspectives on Integrating Interactive Cartography into an Introductory Human Geography Course.*

Charles P. Rader, Department of Geography,
University of Wisconsin - River Falls

Most introductory human geography courses have a component on mapping that is designed to introduce students to types of maps, issues of map scale and projections, and map reading. This paper presents a developmental perspective on the use of interactive cartography for teaching map use skills in the context of an introductory human geography course. Interactive cartography as defined by the use of computers, information technologies, and the Internet have the potential to change the way in which we teach this unit and may make it possible for students to learn to see relationships upon maps more effectively than with traditional teaching aids. This paper reviews the necessary pedagogic shifts that must accompany the use of these technologies and it presents an initial exploration of the use of interactive technologies for teaching map use skills, the development of interactive cartographic material, and the results of some initial student trials with this material. Finally, ideas for expanding the use of interactive mapping technologies into other units of the course are presented.

12:00 - 1:30 p.m.

LUNCH BREAK

Editorial Board Meeting, Cartographic Perspectives

H. PAPER SESSION

MAPPING ON THE WORLD WIDE WEB

Session Chair: Jeremy Crampton, Department of Geography, George Mason University

**H1. Interaction, Animation, Multimedia, Visualization, and the Web:
Mapping Out a "New Cartography"**

✂ Michael P. Peterson, University of Nebraska, Omaha

Various forms of dynamic mapping have emerged in the past decade. Since 1993, the World Wide Web has dramatically changed how maps are delivered to the map user. It is now estimated that over 10 million maps are sent via the web every day. The combination of the dynamic forms of mapping and the web are contributing to a renaissance for cartography. In particular, these technological developments have led to a renewal of interest in how spatial information is presented and communicated. At the same time, there is a lack of direction about what the new forms of mapping mean and how we should approach them. All forms of dynamic cartography are examined in the era of the Web.

H2. VRML: Three-Dimensional Mapping on the Web

James M. Swanson, University of Nebraska at Omaha

The Virtual Reality Modeling Language (VRML) is the World Wide Web standard for the description of 3D objects and scenes. The creators of VRML intended it to bring an overtly spatial metaphor to browsing the World Wide Web. While reifying information space would be an interesting topic in itself, this paper concentrates on using VRML as the first easily distributable means for 3D mapping. Paper maps are inherently instrumental, characterized by the deliberate search for information. 3D maps, however, make map use an experiential activity. Besides the freedom of movement in a VRML "world", the ability to incorporate imagery, animations, sounds, and motion physics promise to make map reading an enriching participatory experience. Mapping with VRML raises a number of interesting issues ranging from labeling to levels of detail, and it begs the ultimate question: does a 3D map convey spatial information any better than a 2D map?

413. *Shocking the Map: Using Shockwave to Create Interactive Maps for the World Wide Web*

Rex Cammack, Department of Geography, Geology & Planning,
Southwest Missouri State University

Cartographers for years have been trying to develop mapping media that let the user interact with spatial data. Many have examined this issue and/or attempted to create interactive mapping software (see Hodler et al., 1994; DiBiase et al., 1992; Peterson 1995; Yoder and Slocum, 1996). Many of these early attempts focused on writing an independent computer program that read specialized databases. With the exponential growth of the Internet and the World Wide Web (WWW), cartographers must consider these avenues for interactive cartography.

With enhanced WWW browsers, display capabilities have increased and many WWW sites are already delivering interactive information. One method for enhancing WWW browsers is by adding special plugins to programs like Internet Explore and Netscape Navigator. One of the most popular plugins for advanced media is Shockwave by Macromedia. With Shockwave installed a WWW browser can display some additional file formats. Shockwave has already been used at the National Geographic Society WWW site to display high resolution scans of historic maps.

Shockwave technology can be used to move closer to an interactive form. Two important aspects of this interactive cartography can be improved by using Shockwave: user interface and data updating. The centralized location of the Shockwave data structure gives the developer a quick method of upgrading the user interface without releasing a software upgrade. Secondly, developers/cartographers can create databases that can be updated and expanded at any time.

I. PAPER SESSION

EVALUATING CARTOGRAPHIC ELEMENTS

Session Chair: Cynthia Brewer, Dept. of Geography, The Pennsylvania State University

11. Revisiting the Poly-Centered Orthographic World Projection: Changes and Revisions, and the Importance of Shape

Borden D. Dent, Department of Geography, Georgia State University

The study of map projections continues to attract many cartographers. Detailed descriptions from mathematical ones to less rigorous presentations appear steadily in the literature. Composite map projections, however, have received relatively little attention. Perhaps the most famous is Goode's interrupted Mollweide and sinusoidal which he called homolosine. Ten years ago this author explored the possibility of yet another "composite" projection — several different views of an orthographic projection positioned together to form a relatively fair view of the whole world. The preservation of shape was the central strength of this projection, but the discontinuous nature and the awkward graticule were less than ideal. This paper provides a revisit of that attempt, with a new version that continues to stress the importance of continental shapes, with what is viewed as an improved version of the graticule. Shape remains an important concern, although the quality of equivalency is an important feature of this new version. Exploration of new map projections is fostered.

12. Visualizing Flow Lines Through Time:

A Comparison between Animated and Chess Maps

Harry Johnson & Elisabeth Nelson, Department of Geography,
San Diego State University

Visualizing temporal data has traditionally been accomplished by the use of Chess maps, multiple maps representing separate snapshots in time. With the continued advance in computer technology, a new visualization tool has emerged. The process of animation can now be utilized to incorporate temporal change directly into the map. However, if animated maps are not as effective as static maps in communicating spatial data over time, then animating the data serves no purpose. Though there has been recent research conducted on the effectiveness of the animation of spatial data, one area that has been overlooked has been the linear movement from one geographic area to another. The graduated flow line is the primary symbol utilized in cartography to illustrate from-to quantity relationships across space. The research will examine and compare the visualization of time-series graduated flow lines using two techniques, the traditional chess map and computer animation. Test subjects will be divided into three groups and asked to perform two map tasks: learn the amounts of flow at specific points over a number of years, and learn the trend

patterns at those same points. The subjects will use either paper Chess maps, a static map displayed on-screen, or an animation sequence to perform the tasks. Animation is expected to improve subject cognition of trend patterns but not quantity recollection over static maps. Accuracy rates and reaction times will be used to determine the comparisons.

13. An Evaluation of Motion in the Recall of Landmarks from an Animated Map Display

Keith Rice & Aaron Weier, Department of Geography/Geology,
University of Wisconsin-Stevens Point

The usage of computer map animation has dramatically increased over the last few years. Logically, the change from static to dynamic maps is partially driven by the supposition that animated maps will facilitate cartographic communication. Recent studies have shown, however, that although animated displays are aesthetically appealing they may not increase the user's ability to read, comprehend or recall multimedia map displays. Predicated by these concerns, a study was conducted to test map users abilities to recall landmark features from a series of animated maps. Six maps depicting a recreation trail were designed in Macromedia Freehand and encoded with an animated sprite in Macromedia Director. The sprite (walking footprints) were designed to encounter several static landmark features along the trail. Other comparative landmarks were included on non-trail areas within the map boundaries. Test maps were presented to two groups of thirty-one students. One witnessed the animated map display, the other was shown the same map without the sprite. Viewing duration was the same for both groups. Participants were all asked the same test questions about landmark features after the map viewing session. An analysis of variance revealed that no significant difference existed in the overall accuracy between the two test groups in answering the test questions. There were noticeable increases, however, in test accuracy for simple identification questions in the animated display, while subjects viewing the non-animated map showed an increased accuracy for questions involving spatial interpretation.

J. PAPER SESSION

PRODUCING MAPS WITH TODAY'S TECHNOLOGIES

Session Chair: David DiBiase, DEASY GeoGraphics Lab, The Pennsylvania State University

J1. Constructing Surface Cartograms Using ArcInfo

Nikolas H. Huffman, Department of Geography & David A.J. Ripley,
Department of Meteorology, The Pennsylvania State University

This presentation discusses the use of ArcInfo GIS in the development of a method for generating surface cartograms that show actual areas for surfaces in a transformed plan view. While traditional cartograms scale area enumeration units in relationship to their associated data values, a surface cartogram is a map in which the areas of the surface polygons in plan view are transformed so that they are scaled to match the actual surface area values in the 3-D TIN model space. This process involves generating a polygon coverage from a TIN surface model. The resulting coverage includes items that report the coverage polygon areas, as well as the slope, aspect and surface area of original TIN polygons. The project involves the development of various functions that can be used to describe the behavior of the polygon scaling under varying slope and aspect conditions, and the tentative development of an algorithm for transforming the node topology to approximate the surface areas with the polygon areas. In conclusion, applications for surface cartograms will be discussed, such as cost surface cartograms and population surface cartograms, as well as potential applications of this method to general cartogram mapping situations.

J2. Combining Raster Imagery and Vector Data to Produce Geologic Maps

B.J. Stiff, Illinois State Geological Survey

Previously, geologists have developed working/field maps by manual transfer of historical data of U.S. Geological Survey (USGS) 7.5' minute quadrangle maps. Because of scale differences among the many resources (National Resources Conservation Service soil maps, archived field notes, figures from publications, driller's records, etc.) map compilation has been a time consuming, frequently repetitive process. The Illinois State Geological Survey (ISGS) is developing new methods, using GIS technology, to automate production of working/field maps. These methods will expedite production of 'on demand' geologic maps and expand the ISGS statewide database.

The ISGS maintains an extensive tabular database that includes spatial coordinate and geologic information from water wells, oil and gas wells and coal, structural and engineering test borings. Other geologic and cultural data (such as bedrock geology, bedrock aquifers, Quaternary geology, coal resources, the public land survey grid, municipal boundaries, etc.) are stored in vector-format. For a pilot geologic mapping project in southeastern Illinois, field maps were produced by plotting existing data over raster imagery obtained from USGS Digital Raster Graphics (DRG), Digital Orthophoto Quadrangles (DOQ), and

other raster format data. The same DRG and DOQ raster format data/imagery were used for interactive extraction of new vector-based map data at the 1:24,000 scale.

Various combinations of raster and vector data have been used to produce preliminary maps, slides and posters for presentations, and 'on demand' geologic maps. At the completion of each mapping project, maps and research data may be archived on CD, placed on the Web for data transfer, and interactively updated during future research.

J3. Interactive Cartographic Animation of Temporally Discrete Epidemiological Data

Francis P. Boscoe, Alan M. MacEachren and Daniel B. Haug,
Department of Geography, The Pennsylvania State University

Most cartographic animations to date have lacked interactivity or exploratory data analysis (EDA) capabilities. This paper describes a prototype interactive software environment for visualizing changes in enumerated data over discrete time intervals using choropleth maps. The prototype was created using the Lingo programming language in Macromedia Director version 5.01. Users may animate either conventional 5- or 7-class maps or specify class breaks for binary or cross maps using focusing. Focusing allows users, through the use of a slider bar, to specify the threshold value of a binary map. Cross map or bivariate focusing, allows users to set threshold values for two variables. Other interactive controls permit users to manipulate animation speed and various aspects of screen appearance. The prototype uses mortality and risk factor data compiled by the National Center for Health Statistics (NCHS) for 5 time intervals between 1979 and 1994. We also report on a qualitative evaluation of the prototype conducted by 5 expert users. More formal quantitative testing is anticipated via an 'event recorder' built into the program code that records the time and nature of every mouse click by the user.

J4. GPS/GIS Integrated Systems to Benefit All Phases of Aircraft Navigation

Ronald M. Bolton, Chief, Aeronautical Chart Division,
National Oceanic and Atmospheric Administration

Global Positioning System (GPS) users are aware of its extraordinary capability for navigation. When used alone, the GPS basic signal provides very accurate navigation positioning. Used with assistance from geostationary satellites, local area differential systems, and wide area augmentation systems, GPS can provide sufficient integrity and accuracy to support enroute, landing and departure aircraft operations.

Navigators worldwide are demanding full GPS implementation. Expected benefits are reduced travel time, more efficient routes, and reduced delays—all of which are made possible by flight procedures supported by more accurate navigation systems, airborne and ground-based databases, and more reliable surveillance equipment augmented by GPS.

Augmented GPS could mean the end of ground-based navigation and landing systems. The Department of Transportation's (DOT) Strategic Plan is built around GPS as the cornerstone of future aircraft navigation. The Secretary of

Transportation is accelerating the application of GPS technology and is supported in this effort by NASA, the Coast Guard, Federal Aviation Administration (FAA), and DOT Volpe Transportation Center research efforts, which will make full GPS-based navigation happen in the next 2 to 5 years.

FAA has already developed and published over 800 GPS instrument approaches and implemented 3,400 instrument approaches that allow pilots to use GPS or a conventional navigation system. In addition, the FAA has instructed the U.S. Department of Commerce/DOT/Department of Defense (DoD) Inter-agency Air Cartographic Committee (IACC) to initiate plans for Free Flight Enroute Charts, which will allow pilots to use GPS for direct flight in the National Airspace System (NAS).

GIS databases will be required for all-weather utilization of GPS for navigating in the NAS. Airborne Flight Management Systems (FMS), Air Traffic Control Systems (ATC), and Cartographic Chart Production and Display Systems (CCPDS) databases are being developed to support aircraft navigation in all phases of flight: enroute; approach/landing; takeoff/departure. These data systems are being integrated with GPS for aircraft guidance, navigational displays, and ATC graphic monitor and control stations.

Integrated GPS/GIS systems will provide cost savings to the aviation industry. Not only will ground-based equipment be eliminated eventually, but more accurate aircraft navigational capability will be available in all types of weather with enhanced ATC monitoring; thus, integrated GPS/GIS will also increase safety for the entire aviation community.

K. PAPER SESSION

CARTOGRAPHY: PEDAGOGY & ANALYTICAL APPLICATIONS

Session Chair: Valerie Krejcie, Cartographic Consultant

K1. *Lessons from Past Masters: A Pedagogical Tribute to the Late*

Robert C. Kingsbury and John C. Sherman

Peter R. Calvin, Department of Geography, Indiana University Southeast

The year 1996 marked the passing of two master cartographers. Robert C. Kingsbury (late Associate Professor Emeritus at Indiana University, Bloomington) and John C. Sherman (late Professor Emeritus at the University of Washington) were both my teachers. I did not become a cartographer, but the tutelage of these men tempted me into a world of maps where I remain a willing captive. To Kingsbury, I owe my cartographic initiation and subsequent choice of a career in geography. To Sherman, I am obliged for most of what skills I have managed to acquire as a map maker. To both, I am indebted for the fine examples of craftsmanship they offered as cartographers and as teachers.

A cultural geographer faced with teaching cartography for the first time this very year, I have had much cause to reflect on the lessons given by my former tutors. Their passing provokes me to express among their colleagues a small token of gratitude. I will offer a short retrospective of their work and careers, and explain how I have attempted to pass on their legacy to my own students.

K2. *Cartographing of Disturbed Landscapes in Regions*

Felix N. Ryansky, Prof. of Natural Sciences, Far-Eastern Branch of
Russian Academy of Sciences

The modern landscape of a territory can be considered in a historical view in order to gain a deep understanding of its physical-geographical features. This paper promotes a geographical principle that takes into account the original and varied development of different territories. In order to reveal an oblast's disrupted landscape, this author has analyzed different cartographic materials. These materials permit judgment about the native sub-localities and facets of prehistoric and early-historical times. They may also provide reliable information of their current state.

Information about the prehistoric and early historic times were obtained from published historical documents (paleogeographical, archeological, chronicle materials, old maps analysis). Modern landscapes were analyzed from the most recent topographical and applied maps (geological, agricultural, meliorative and others), cosmic graphs of different detail, and air photos of previous years. Maps

of landscape district sub-localities (1:1,000,000 scale for oblast, 1:5,000,000 - 1:2,000,000 scale for large districts and 1:1,000,000 scale for small administrative districts) were also analyzed. Landscape state and its vulnerability to technological loads was determined by different natural landscape vulnerability and its disruption. An ecological coefficient (K) was determined in order to apply sub-localities with equal natural vulnerability. The coefficient for oblast-scaled landscape districts was calculated as a middle arithmetic coefficient of sub-localities with account of areas with different disruption categories.

Every cultural strategy in each region is a result of some real disruption in landscape structure. Project elaboration must include the making of maps of ecological-landscape and ecological-social-economic territory divisions of districts. Landscapes with different degrees of disruption require different forms of cultural development.

3:30 - 5:30 p.m. - NACIS Hospitality Suite

L. PostScript Mapping Roundtable

Organizer and chair, Dennis McClendon,
Chicago CartoGraphics.

The annual PostScript Mapping Round Table is a time set aside on the program, without speakers or presentations, as a forum for attendees to exchange ideas and help with the production problems of microcomputer PostScript illustration programs.

3:30 - 5:30 p.m. - Black Diamond Board Room

NACIS BOARD MEETING

6:30 - 10:00 p.m. - Ballroom I

ANNUAL NACIS BANQUET

Guest Speaker, John Pickles, University of Kentucky

Mapping Space: Constructing Identities

SATURDAY, OCTOBER 4, 1997

9:30 - 11:30 a.m. - Ballroom IV

M. PANEL DISCUSSION

MAPPING ON THE WEB: THE INTERNATIONAL DIMENSION

Organizer and chair: Michael Peterson, University of Nebraska - Omaha.

Participants: William Cartwright, Royal Melbourne Institute of Technology;
Georg Gartner, Technical University of Vienna;
Michael Peterson, University of Nebraska - Omaha

M1. Panel Discussion: Mapping on the Web: The International Dimension

The World Wide Web has made the international distribution of maps through computer networks more feasible. It has been observed that web traffic, even on small servers, extends to at least 70 countries. A large number of maps exist on web servers, including interactive forms of mapping that adapt to the needs of the map user. This panel discussion will examine the international aspects of map distribution on the Web, including access, differences in technology, language, map format, and map use. The participants from foreign countries will also share their views on web development in their particular countries.

MAPPING THE WORLD FOR CHILDREN

Session Chair: Borden Dent, Department of Geography, Georgia State University

***N1. An Analysis of Pre-School Children's Mapping
Abilities in a Familiar
Environment***

Amy Lobben, Department of Geography, Michigan State University

This study focused on the mapping abilities of pre-school children. More specifically, the research was designed to determine pre-school children's abilities to both create and read a map of a familiar environment, their classroom.

The level of development of pre-school children's spatial thinking has been an issue of debate since Piaget first formulated his theories on this subject over 40 years ago. Many researchers still agree with Piaget and believe that pre-school children do not possess the skills needed to create and read maps. Other researchers, such as Blaut, believe that pre-school children can both create and read simple maps.

The subjects for this study were four-year-old children from a local pre-school who were tested individually. Using pre-constructed mimetic symbols of objects in their classroom and a piece of paper with an outline of the room, subjects were asked to create two maps, one while their view was obstructed and one without an obstructed view of the room. The children were then shown a pre-constructed version of the map and were asked to place a sticker in the classroom that corresponded to a specific location shown to them on the map.

The results of this study do not provide clear support for either side of the debate. Rather, the results indicate that the children could place only 40% of the objects in their correct absolute location. But, results improved to 61% placement accuracy when objects were analyzed according to their correct relative location.

N2. American Images of the World: Nineteenth Century School Atlases

Jeffrey Patton, Department of Geography,
University of North Carolina-Greensboro

This paper explores how the world was presented, via cartographic design, to nineteenth century American school children. Maps designed specifically for children were rare until the nineteenth century when the policy of universal public education in the United States created a lucrative market for school atlases and geographies.

Initially American publishing houses borrowed heavily from British, French, and German geographies designed for adults. However, by the end of the nineteenth century there had developed a unique style and set of conventions for children's maps that still influence map makers today. Specific characteristics of children's maps reviewed include the type of global projections utilized, level of generalization, placement and use of the graticule, extent and detail of geographic coverage, and the forms and evolution of thematic symbolization. This paper also addresses how school atlas design was influenced by new printing methods, the rise of a few dominant map publishers, and the nature of the nineteenth century geographic education curriculum.

**N3. *Searching For Maps That Bridge Reality and
Thought in Geographic Education***
Henry W. Castner, Pittsboro, NC

For maps to bridge the gap between reality and thought, they must act as an interface between what we see (reality) and what we know or are told (thought). Information about the former (the environment) is visually complex, and consists of both explicit and implicit forms. Information about the latter, which is often recorded in maps and atlases, has usually been grouped or classified under such abstract topics as climate, natural vegetation, and land use.

This presentation examines the case of physiography and the relief maps that can perform as bridges by defining land form regions in non-abstract ways. Some other kinds of maps are also considered which might form the same bridging function for the other abstract topics mentioned above.

**N4. *The ICA/Petchenik Children's Map Competition:
Exploring Ways of Linking It To the Curriculum***
Henry W. Castner, Pittsboro, NC

A short announcement to explore and solicit ideas about ways that the ICA/Petchenik Map Competition, for children under the age of 16, can be linked to curricula in geographic education.

BACKGROUND: Every other year, The International Cartographic Association sponsors an international map competition for children 15 years old or younger. The competition coincides with the ICA's biennial international congress. Stockholm, Sweden was host to this summer's meeting; the next one will be in Ottawa, Canada in August of 1999. For teachers to be in a position to plan have their children contribute to the 1999 meeting, they should have some detailed ideas about the competition, and ways to implement it, by late summer of 1998. At the Stockholm meeting, more comprehensive guidelines for the competition will be drawn up; these will affect, to a certain degree, the nature of the maps that are produced but not the mapping and geographic concepts that might underlie their creation. There is an opportunity here to make a connection between the competition and school curricula in areas we as cartographers (and geographers) might think valuable for children to be more familiar with.

WORKSHOP I

8:30 a.m. - 12:30 p.m. - meet at NACIS Registration Desk

Photoshop flx for Cartographers

Tom Patterson, National Park Service

Have your map designs pushed the limits of what drawing software can deliver, and do you yearn to bring a higher level of graphic sophistication to map design? Then consider adding Adobe Photoshop 4.0 to your map production tool box. This workshop will introduce you to the powerful raster techniques commonly used in graphic design and advertising, but with the subtlety, control and precision required for cartography.

The workshop will focus on the design and production of a small map derived from free USGS Digital Elevation Model (DEM), Digital Line Graph (DLG), and Digital Orthophoto Quadrangle (DOQ) data downloaded from the Internet. Emphasis will be placed on techniques for using Photoshop in conjunction with drawing software while maintaining perfect registration. The workshop will progress in four stages: 1) Production and manipulation of shaded relief and hypsometric tints from DEM data, 2) Placement of the relief in an Adobe Illustrator map file/exporting vector data to Photoshop, 3) Compositing rasterized vector data in Photoshop, and, 4) Artistic embellishment using convolution filters, painting tools, and blending modes. As a precaution against participants falling behind, default data sets will be provided at each production stage, if necessary.

Techniques to be covered will include: Conversion between grayscale, RGB, duotone, and CMYK color modes; creating and modifying selections; working with layers, layer masks, and channels; color adjustments using curves, HSB controls, and levels; image touchup; and texture generation.

Participation requirements: Some familiarity with Postscript drawing software, Adobe Photoshop, and Mac OS. A willingness to share a computer.

Anticipated time: four hours.

WORKSHOP II

8:30 a.m. - 4:30 p.m. - Daniel Boone Room

Thematic and Interactive Mapping with ArcView
Charlie Frye, Environmental Systems Research Institute

The ArcView Workshop will cover:

- I. Tips and insider knowledge about thematic mapping in ArcView for both vector and GRID data sets.
- II. Creating cartographic/cosmetic data layers using Shape Algebra and Avenue.
- III. Making the most of the Layout document's capabilities.
- IV. Using Sample scripts and Extensions to make easy work out of common cartographic tasks.
- V. Labeling, what you can do with Avenue.
- VI. Authoring Interactive Maps for the Internet or Kiosks.
- VII. A surprise (ESRI is acquiring a really neat product / company that produces some high end cartographic output—but I'm not at liberty to say more yet). [gee, I wonder what that could be?]

SATURDAY AFTERNOON ACTIVITIES



•Keeneland Race Course•

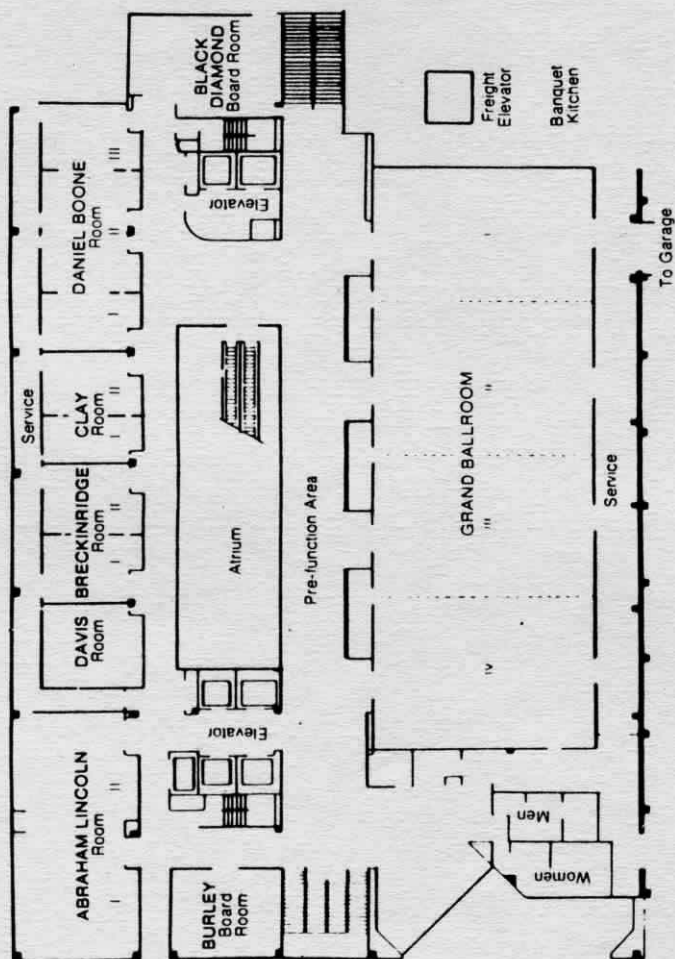
•Kentucky Horse Park•

•Shaker Village of Pleasant Hill•

It is a NACIS tradition that our meetings be informative, thought provoking, and reflect the cutting edge in the field of mapping. It is also a tradition that conference participants take the time to engage in informal conversations with their colleagues.

In order to facilitate the later, we welcome everyone to join us during the conference in the NACIS Hospitality Suite.

Please check at the NACIS Registration Desk for the room number.



Upcoming NACIS meetings:

October 6-10, 1998

Milwaukee, WI

Hyatt Regency Hotel

October 20-23, 1999

Williamsburg, VA

Magruder Inn