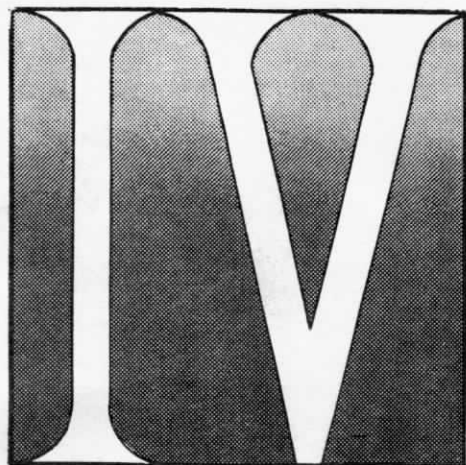


CONFERENCE PROGRAM AND ABSTRACTS

NACIS



CARTOGRAPHIC INFORMATION SHARING

**NORTH AMERICAN
CARTOGRAPHIC INFORMATION
SOCIETY**

FOURTH ANNUAL MEETING

PITTSBURGH

HARLEY HOTEL

OCTOBER 17-20, 1984



NORTH AMERICAN

CARTOGRAPHIC INFORMATION SOCIETY

143 Science Hall • University of Wisconsin • Madison, WI 53706

1984 EXECUTIVE BOARD

Officers:

Ronald M. Bolton <i>President</i>	National Oceanic and Atmospheric Administration/National Ocean Service (NOAA/NOS)
John D. Stephens <i>Vice President</i>	Indiana University of Pennsylvania
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NORTH AMERICAN
CARTOGRAPHIC INFORMATION SOCIETY

NACIS IV
FOURTH ANNUAL MEETING

HARLEY HOTEL
PITTSBURGH

17 - 20 OCTOBER 1984

CONFERENCE THEME

CARTOGRAPHIC INFORMATION SHARING

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Compiled by
J.D. Stephens
for the
North American Cartographic Information Society

1984

N A C I S I V

Fourth Annual Meeting of the
NORTH AMERICAN CARTOGRAPHIC INFORMATION SOCIETY

W E D N E S D A Y , O C T O B E R 1 7

1:00 - 8:00 PM REGISTRATION - Assembly Area

1:15 - 3:00 PM NACIS COMMITTEE MEETINGS

MONONGAHELA SUITE ● NACIS Board of Directors
Room 102

ALLEGHENY SUITE ● NACIS IV Local Arrangements and Registration
Room 226 Subcommittees

3:00 - 3:15 PM BREAK - Assembly Area

3:15 - 5:00 PM NACIS COMMITTEE MEETINGS

MONONGAHELA SUITE ● Membership and Awards Committees
Room 102

OHIO SUITE ● Publications Committee
Room 202

OPEN DINNER

7:30 - 9:00 PM OPENING SESSION - Center Ballroom

- WELCOME
Ruth A. Rowles, Local Arrangements Director,
West Virginia University
 - NACIS IV: CARTOGRAPHIC INFORMATION SHARING
John D. Stephens, Conference and Program
Director, Indiana University of Pennsylvania
-

W E D N E S D A Y , O C T O B E R 1 7

7:30 - 9:00 PM OPENING SESSION - Center Ballroom (continued)

- GREETINGS FROM THE INTERNATIONAL CARTOGRAPHIC ASSOCIATION
Joel L. Morrison, ICA President, U.S. Geological Survey
 - PRESIDENT'S ADDRESS
Ronald M. Bolton, NACIS President, U.S. National Oceanic and Atmospheric Administration/National Ocean Service
-

9:00 PM - RECEPTION - Allegheny Suite - Room 226

T H U R S D A Y , O C T O B E R 1 8

8:00 - NOON
6:00 - 8:00 PM REGISTRATION - Assembly Area

8:15 - 10:00 AM CONCURRENT SESSIONS

- CENTER BALLROOM ● General Paper Session A
Chair: Alan A. DeLucia, University of Idaho
- PITFALLS OF MAP PROJECTIONS
John P. Snyder, U.S. Geological Survey
- CARTOGRAPHIC ADVENTURE
Robert E. Lyons, Hecla Mining Company
- REMOTELY SENSED IMAGES ON MAPS
Ruth A. Rowles, West Virginia University
- NICOLET TILL NOW
Mark J. Steuer, Green Bay-Brown County Planning Commission
-

THURSDAY, OCTOBER 18

8:15 - 10:00 AM

CONCURRENT SESSIONS (continued)

 PENNSYLVANIA SUITE
 Room 126

 ● SEMINAR: National Cartographic Information Center (NCIC) Affiliate Network

Organizer: Christine Reinhard, Wisconsin State Cartographer's Office

Speakers:

William P. Graff, New Jersey Geological Survey

Alan R. Stevens, NCIC-National Headquarters, U.S. Geological Survey

Walter Wagner, NCIC-Eastern Mapping Center, U.S. Geological Survey

10:00 - 10:15 AM

BREAK - Assembly Area

10:15 - NOON

CONCURRENT SESSIONS

CENTER BALLROOM

 ● General Paper Session B

Chair: Allen Feldman, U.S. National Oceanic and Atmospheric Administration/National Ocean Service

GEOGRAPHIC INFORMATION SYSTEMS: A TOOL FOR LOCAL GOVERNMENT DECISION-MAKERS

Jack J. Ford and Daniel P. DeVitis, Shipensburg University

CARTOGRAPHIC UPDATE USING MAP-GUIDED IMAGE INTERPRETATION

David M. McKeown, Jr., Carnegie-Mellon University

DIGITAL DATABASE DEVELOPMENT ACROSS THE UNITED STATES

Alan M. MacEachren, University of Colorado-Boulder

 PENNSYLVANIA SUITE
 Room 126

 ● SPECIAL SESSION: Inter-American Cartographic Cooperation / Cooperación Cartográfica Inter-Americana

Chair: Angel David Cruz Baéz, Universidad de Puerto Rico

T H U R S D A Y , O C T O B E R 1 8

10:15 - NOON

CONCURRENT SESSIONS (continued)

PENNSYLVANIA SUITE
Room 126

CARTOGRAPHY AND GEOPOLITICS: AN INTER-AMERICAN PERSPECTIVE

✓ Carlos B. Hagen, University of California,
Los Angeles *lead by Dick Stephens*

✓ COOPERATIVE MAPPING PROGRAMS IN LATIN AMERICA
Robert L. Senter, Inter-American Geodetic Survey

NOON - 1:15 PM

● CASH BUFFET - Rivers Three Lounge

1:15 - 5:15 PM

CONCURRENT FIELD TRIPS

● A. Field Trip to Export, PA

Leader: Ruth A. Rowles, West Virginia University

GREENHORNE & O'MARA, INC., PHOTOGRAMMETRIC DIVISION

Host: Bernard Solomon

✓ ● B. Field Trip to the Oakland District of Pittsburgh

Leaders: Christine Reinhard, Wisconsin State
Cartographer's Office

Paul F. Rizza, Slippery Rock University

GRAPHIC ARTS TECHNICAL FOUNDATION (GATF)

Host: Thomas Clifton

DARLINGTON LIBRARY, UNIVERSITY OF PITTSBURGH

Host: Dennis Lambert

● C. Field Trip to Beaver, PA

Leader: Jonathan Zell, St. Francis Health Center

MICHAEL BAKER, JR., INC. (Consulting Engineers)
COMPUTER GRAPHICS AND PHOTOGRAMMETRIC DIVISIONS

OPEN DINNER

EXHIBITS PROGRAM

6:00 - 7:15 PM

PENNSYLVANIA SUITE
Room 126

● Special Exhibits (continued on next page)

T H U R S D A Y , O C T O B E R 1 8

EXHIBITS PROGRAM (continued)

6:00 - 7:15 PM

PENNSYLVANIA SUITE
Room 126● Special Exhibits

MAPPING, CHARTING, AND GEODESY CAREERS
Steven Handwerk, U.S. Defense Mapping Agency

CARTOGRAPHIC LEGEND
Robert E. Lyons, Hecla Mining Company

7:00 - 9:00 PM

BALLROOM
EAST & WEST SECTIONS● Commercial and Non-Commercial Exhibits
Exhibits Committee:

John Sutherland, University of Georgia
Howard J. Diamond, NOAA/NOS
Susan L. Nelson, NOAA/NOS

7:15 - 9:00 PM

CONCURRENT SESSIONS

PITTSBURGH ROOM
Rooms 369-371● General Paper Session C

Chair: Mary G. Galdner, University of
Wisconsin-Madison

CARTOGRAPHIC PROGRESS AT THE NATIONAL GEO-
GRAPHIC SOCIETY

John B. Garver, Jr., National Geographic
Society

THE BRITISH CARTOGRAPHIC SOCIETY: A COMING
OF AGE?

Ian Mumford, British Liaison, U.S. Defense
Mapping Agency

EL ATLAS NACIONAL DE PUERTO RICO

Angel David Cruz Baéz, Universidad de Puerto
Rico

ATLAS OF PENNSYLVANIA UPDATE

Mark Mattson, Temple University

BALLROOM
CENTER-EAST SECTIONS● Display Session: Products and Resources of
University Cartographic Laboratories
Organizer: Ellen White, University of
Oklahoma

Participants:

● James R. Anderson, Jr.
Florida State University

● Onno Brouwer
University of Wisconsin-Madison

● Abbey Curtis
Pennsylvania State University

● Alan A. DeLucia
University of Idaho

T H U R S D A Y , O C T O B E R 1 8

7:15 - 9:00 PM CONCURRENT SESSIONS (continued)

BALLROOM • Display Session: Products and Resources of
 CENTER-EAST SECTIONS University Cartographic Laboratories (continued)

Participants (continued):

- | | |
|---|--|
| • Frank Drago
Georgia State University | • Gyula Pauer
University of Kentucky |
| • J. Pat Farrell
Northern Michigan University | • Joseph Poracsky
Portland State University |
| • James D. Ingram
University of Georgia | • Donna Schoenstrom
University of Wisconsin-Milwaukee |
| • Deborah P. King
University of Akron | • Jefferson L. Simpson
University of North Carolina-Charlotte |
| • J. Michael Lipsey
Michigan State University | • Ray B. Squirrel
Simon Fraser University |
| • Alan D. Long
University of Kansas | • Eugene J. Turner
California State University-Northridge |
| • Gayle Maxwell
Oklahoma State University | • Ronald M. Welch
University of Windsor |
| • Christopher Mueller-Wille
Texas A & M University | • Ellen White
University of Oklahoma |

The materials of Cartographic Laboratories
 will remain on display in the East Ballroom
 through Friday afternoon.

9:00 PM - RECEPTION - Assembly Area

F R I D A Y , O C T O B E R 1 9

8:00 - NOON
 1:00 - 7:00 PM REGISTRATION - Assembly Area

9:00 - NOON
 1:00 - 4:00 PM EXHIBITS - East and West Ballroom

FRIDAY, OCTOBER 19

8:15 - 10:00 AM CONCURRENT SESSIONS

- CENTER BALLROOM • Special Session: Cartographic Education
Chair: John Schroeder, Library of Congress
- LASERS IN CARTOGRAPHY AND THEIR IMPACT ON
 CARTOGRAPHIC EDUCATION
 Ronald M. Bolton, U.S. National Oceanic and
 Atmospheric Administration/National Ocean
 Service
- GOALS AND ACTIVITIES OF THE "CARTOGRAPHIC
 USERS ADVISORY COUNCIL" (CUAC)
 HelenJane Armstrong, University of Florida
- MAPPING CAPABILITIES OF SAS/GRAPH AND CARTO-
 GRAPHIC EDUCATION
 Grady B. Meehan, Consultant, and James R.
 Carter, University of Tennessee

- RIVERS THREE LOUNGE • Workshop: Microcomputer Mapping Systems
 Organizers: Mary K. Davis and Richard
 Schroeder, National Planning Data Corporation

10:00 - 10:15 AM BREAK - Assembly Area

10:15 - NOON CONCURRENT SESSIONS

- CENTER BALLROOM • Special Session: Metropolitan Mapping
Chair: Brian P. Holly, Kent State University
- USE OF GLOBAL POSITIONING SATELLITE RECEIVERS
 (MACROMETERS) TO PROVIDE GEODETIC CONTROL IN
 PITTSBURGH
 Ed Wells, Department of City Planning, City
 of Pittsburgh
- THE REGIONAL MAPPING AND LAND RECORDS (RMLR)
 PROJECT
 Edward Plocha, Mayor's Office of Information
 Management, City of Philadelphia
-

FRIDAY, OCTOBER 19

10:15 - NOON

CONCURRENT SESSIONS (continued)

WILLIAM PENN ROOM
Room 326

- Special Session: Map Libraries
Chair: Marsha Selmer, University of Illinois at Chicago

THE RESEARCH LIBRARIES INFORMATION NETWORK AS
A MEDIUM FOR SHARING CARTOGRAPHIC INFORMATION
Nancy A. Kandoian, The New York Public
Library

DEVELOPMENTAL CONSIDERATIONS FOR UNIVERSITY
MAP LIBRARIES: MONEY VS. DESIRES
Jeffrey C. Patton and Nancy B. Ryckman,
University of North Carolina at Greensboro

THE AMERICAN GEOGRAPHICAL SOCIETY COLLECTION
IN MILWAUKEE A DECADE LATER: A RETROSPECTIVE
ASSESSMENT
William C. Roselle, University of Wisconsin-
Milwaukee

NOON - 1:15 PM

- CASH BUFFET - Rivers Three Lounge

1:15 - 3:00 PM

CONCURRENT SESSIONS

CENTER BALLROOM

- Special Session: Digital Cartographic Data Sources and Standards
Chair: Alan M. MacEachren, University of Colorado-Boulder

ACTIVITIES OF THE U.S. NATIONAL COMMITTEE ON
DIGITAL CARTOGRAPHIC DATA STANDARDS
Harold J. Moellering, Ohio State University

THE "TIGER" SYSTEM: AUTOMATED GEOGRAPHIC AND
CARTOGRAPHIC SUPPORT FOR THE 1990 CENSUS
Robert LaMacchia, U.S. Bureau of the Census

PENNSYLVANIA ROOM
Room 126

- Workshop: Map Preservation
Organizer: Christopher Baruth, University of Wisconsin-Milwaukee

Participants:

James O. Minton, University of Arizona
John Schroeder, Library of Congress

F R I D A Y , O C T O B E R 1 9

1:15 - 3:00 PM	CONCURRENT SESSIONS (continued)
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PENNSYLVANIA ROOM	● <u>Workshop: Map Preservation</u> (continued)
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Participants (continued):

Douglas Stone, Fulkerstone Paper Restoration, Milwaukee

Norman J.W. Thrower, University of California, Los Angeles

3:00 - 3:15 PM	BREAK - Assembly Area
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3:15 - 5:00 PM CENTER BALLROOM	● ANNUAL BUSINESS MEETING Ronald M. Bolton, NACIS President
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7:00 - 7:30 PM	CASH BAR - Assembly Area
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7:30 - 9:30 PM	● ANNUAL BANQUET - Center-East Ballroom (*)
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Banquet Address: MAPPING OF THE AMERICAN
SOUTHWEST FROM THE EARLIEST SURVEYS THROUGH
LANDSAT

Norman J.W. Thrower, University of California, Los Angeles

9:30 PM -	RECEPTION - East Ballroom
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S A T U R D A Y , O C T O B E R 2 0

8:00 - NOON	REGISTRATION - Assembly Area
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8:15 - 10:00 AM	CONCURRENT SESSIONS
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EAST BALLROOM	● <u>Seminar: Growth and Development of Cartographic Information Networks</u> Organizer: James O. Minton, University of Arizona
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SATURDAY, OCTOBER 20

8:15 - 10:00 AM	CONCURRENT SESSIONS (continued)
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EAST BALLROOM

- Seminar: Growth and Development of Cartographic Information Networks (continued)
Organizer: James O. Minton, University of Arizona
- Participants:
 - Nancy A. Kandoian
The New York Public Library
 - Elizabeth U. Mangan
Library of Congress
 - Karl H. Proehl
Pennsylvania State University
 - Alan R. Stevens
NCIC-National Headquarters, U.S. Geological Survey

CENTER BALLROOM

- Special Session: Centers of Cartographic Education
Chair: Alan J. Woods, Kent State University
- Participants:
 - Barbara Farrell
Carleton University
 - Thomas L. Nash
University of Akron
 - William Hamilton and Robert Arnold
Salem State College
 - Mark B. Lindberg
George Mason University
 - Douglas Dudycha
University of Waterloo

10:00 - 10:15 AM	BREAK - Assembly Area
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10:15 - NOON	CONCURRENT SESSIONS
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CENTER BALLROOM

- Special Session: Centers of Cartographic Education
(continued on next page)
-

S A T U R D A Y , O C T O B E R 2 0

10:15 - NOON

CONCURRENT SESSIONS (continued)

CENTER BALLROOM

- Special Session: Centers of Cartographic Education (continued)
Chair: Alan J. Woods, Kent State University
Participants:
 - Judy M. Olson
Michigan State University
 - Patricia Gilmartin
University of South Carolina
 - Phillip C. Muehrcke
University of Wisconsin-Madison

Panel: Future Directions in Cartographic Education

Panel comprised of session participants.

EAST BALLROOM

- General Paper Session D
Chair: Barbara Hartmann, Texas Bureau of Economic Geology

MICROCOMPUTER-BASED LAND RESOURCE INFORMATION OF MICHIGAN

William R. Enslin, Michigan State University

APPLICATIONS OF THEMATIC CARTOGRAPHY IN URBAN AND REGIONAL PLANNING

Richard Greene, University of Pittsburgh

CHILDREN'S BELIEFS ABOUT MAPS: A METACARTOGRAPHIC EXPLORATION

Roger M. Downs and Lynn S. Liben,
Pennsylvania State University

NOON - 2:00 PM

- LUNCHEON - West Ballroom (**)

Luncheon Address: THE MARKETING OF CARTOGRAPHIC PRODUCTS: FANTASY OR REALITY?

Barbara Adele Fine, The Map Store, Inc.,
Washington, D.C.

S A T U R D A Y , O C T O B E R 2 0

2:15 - 3:30 PM CONCURRENT SESSIONS

CENTER BALLROOM ● Workshop: Relational Database for Carto-graphic Applications
 Organizer: Robert Niedermair, U.S. National Oceanic and Atmospheric Administration/
 National Ocean Service

EAST BALLROOM ● Seminar: Marketing Cartographic Information
 Participants:
 Warren Schmidt, Rand McNally - Infomap
 Barbara Adele Fine, The Map Store, Inc.,
 Washington, D.C., for Hammond, Inc.

ROOM 302 ● Seminar: Goals and Activities of Related Professional Organizations
 Moderator: Jeffrey C. Patton, University of
 North Carolina at Greensboro

4:30 - 5:00 PM Travel from Harley Hotel to Station Square
 on Pittsburgh's South Side

5:00 - 6:30 PM ● Walking tour:
 ● The Monongahela Incline
 ● Pittsburgh from Mount Washington
 ● Tour of Station Square
 ● Board the Gateway Clipper

7:00 - 10:00 PM ● Gateway Clipper Dinner Cruise

- (*) Annual Banquet: The costs of the annual banquet and the banquet address are included in the full registration package. Individual tickets may be purchased at the Registration Desk until Noon, Thursday.
- (**) Saturday Luncheon: The costs of the Saturday luncheon and the luncheon address are included in the full registration package. Individual tickets may be purchased at the Registration Desk until 8:00 PM, Thursday.

The Harley Hotel
Pittsburgh, Pennsylvania
17-20 October 1984

Conference Participants:

Welcome to Pittsburgh, site of NACIS IV--the fourth annual meeting of the North American Cartographic Information Society. The goal of NACIS IV is to bring together specialists from leading private, government, and academic organizations throughout North America to display and present reports on timely topics and the latest research developments.

The theme of this year's meeting, CARTOGRAPHIC INFORMATION SHARING, is reflected in the various special sessions, workshops, and seminars, as well as in several contributions to the general paper sessions. A few of the highlights of this year's conference include the first exhibits program, field trips and technical tours, and special sessions on "Inter-American Cartographic Cooperation," "Cartographic Information Networks," and "Centers of Cartographic Education."

I wish to thank the members of the 1984 Conference Committee who have assisted in the planning and organization of NACIS IV. Thanks are also due the many speakers and participants in this year's program for sharing their insights and expertise. Finally, I wish to acknowledge the generous support offered by Indiana University of Pennsylvania.

I hope that you will have the opportunity to enjoy Pittsburgh and the beautiful autumn scenery of Western Pennsylvania.

Thank you for being a part of NACIS IV.

John D. Stephens
NACIS IV Conference Director

The Harley Hotel
Pittsburgh, Pennsylvania
17-20 octubre 1984

Participantes al IV Congreso:

Bienvenidos a Pittsburgh, sede del IV Congreso anual de la Sociedad de Información Cartográfica. El objetivo de nuestro IV Congreso es el de reunir a especialistas de las principales organizaciones privadas, gubernamentales y académicas de las Américas, para intercambiar experiencias, así como, los más recientes adelantos científicos en el área de la cartografía.

El tema del congreso es el INTERCAMBIO DE INFORMACION CARTOGRAFICA, el cual será analizado, en profundidad, a través de sesiones especiales, mesas de trabajo y seminarios. El congreso de este año presenta importantes innovaciones como: la sala de exhibiciones, que incluye materiales del sector público, privado y académico; visitas a agencias cartográficas; y sesiones especiales, como por ejemplo las referentes a "Cooperación Cartográfica Inter-Americana," "Redes de Información Cartográfica" y "Centros de Educación Cartográfica."

Quiero expresar mi agradecimiento a los miembros del Comité Organizador por su valiosa colaboración en la puesta en marcha de este proyecto. Al mismo tiempo, quiero dar las gracias a los ponentes y participantes al congreso de este año por compartir con nosotros sus conocimientos y sus más recientes trabajos. Finalmente, quiero hacer un especial reconocimiento a la desinteresada colaboración prestada por Indiana University of Pennsylvania.

Espero que tengan la oportunidad de disfrutar de la ciudad de Pittsburgh y de la belleza de los paisajes que ofrece el otoño en esta región del Estado de Pennsylvania.

Gracias por su interés en participar en nuestro IV Congreso.

John D. Stephens
Director del Congreso

CONFERENCE NOTES

Registration Hours

The Registration Desk is located in the Assembly Area of the Harley Hotel's lower lobby. Registration hours are:

Wednesday, October 17	1:00 - 8:00 PM
Thursday, October 18	8:00 - NOON 6:00 - 8:00 PM
Friday, October 19	8:00 - NOON 1:00 - 7:00 PM
Saturday, October 20	8:00 - NOON

We are pleased to offer NACIS IV registrants a generous registration package which includes:

- Conference folder
- Conference program and abstracts
- Admission to commercial and non-commercial exhibits
- Admission to all formal sessions, including paper and display sessions, workshops, and seminars
- Choice of one field trip/technical tour combination
- Annual banquet with speaker
- Saturday luncheon with speaker
- Refreshment breaks

Individuals are responsible for their own expenses for the cash buffets, cash bar, and dinner cruise which appear on the NACIS IV program.

Exhibits Program

We are pleased to welcome the following exhibitors to NACIS IV and to the Society's first organized exhibits program:

- W.J. Faupel
- The GeoCenter
- University of Kansas, Space Technology Center
- Marshall Penn-York Co.
- New York State Department of Transportation
- Alfred B. Patton, Inc.
- U.S. Bureau of Land Management, Division of Cadastral Survey

C O N F E R E N C E N O T E S

Exhibits Program (continued)

U.S. Defense Mapping Agency
 U.S. Geological Survey
 U.S. National Oceanic and Atmospheric Administration/
 National Ocean Service
 The Washington Ear
 V.H. Winston & Sons, Inc.
 Wisconsin State Cartographer's Office

The preceding list includes exhibitors confirming their participation in NACIS IV on or before 5 October 1984.

Exhibit Hours - East and West sections of the Ballroom

Thursday, October 18	7:00 PM - 9:00 PM
Friday, October 19	9:00 AM - NOON 1:00 PM - 4:00 PM

Representatives of Related Professional Organizations

Inter-organizational cooperation and information sharing is an important aspect of the NACIS IV conference theme. Officers of closely related societies and associations (see list below) were invited to attend NACIS IV and to participate in a special seminar, entitled "Goals and Activities of Related Professional Organizations." Formal presentations were not solicited, nor was there proposed an agenda for discussions. Instead, the goal is to provide a forum in which representatives of other organizations can exchange views and information. Therefore, representatives are encouraged to identify themselves and their organizations at the Registration Desk and to indicate whether or not they wish to participate in the Saturday afternoon seminar to be held in Room 302, 2:15 - 3:30 PM.

The list of organizations below does not include the various metropolitan, state, or regional associations and societies. The primary objective of the seminar is to bring together representatives of societies and associations with national or international scope and membership.

ACSM/ACA	American Congress on Surveying and Mapping. American Cartographic Association.
AGS	American Geographical Society.

C O N F E R E N C E N O T E S

ALA/MAGERT	American Library Association. Map and Geography Round Table.
ASP	American Society of Photogrammetry.
AAG/CSG	Association of American Geographers. Cartography Specialty Group.
	Association of Canadian Map Libraries / Association de bibliothèques canadiennes.
	Canadian Association of Geographers / Association canadienne de géographes.
	Canadian Cartographic Association / Association cartographique canadienne.
GIS	Geoscience Information Society.
IPGH/PAIGH	Instituto panamericano de geografia e historia. Comisión de cartografía / Pan American Institute of Geography and History. Commission on Cartography.
ICA/ACI	International Cartographic Association / Association cartographique internationale.
IMDA	International Map Dealers Association.
NCGE	National Council for Geographic Education.
NGS	National Geographic Society.
	Sociedad mexicana de fotogrametría, fotointerpretación y geodésia.
	Sociedad mexicana de geografia y estadística.
SORSA	Spatially-Oriented Referencing Systems Association.
SLA/G&M	Special Libraries Association. Geography and Map Division.
URISA	Urban and Regional Information Systems Association.
WAML	Western Association of Map Libraries.

BIOGRAPHICAL NOTES AND ABSTRACTS

OPENING SESSION - Center Ballroom
 7:30-9:00 PM, Wednesday, October 17

- Ruth A. Rowles
 Department of Geology and Geography
 West Virginia University

Ruth Anderson Rowles teaches cartography at West Virginia University in Morgantown. She received the M.S. in Geography from the University of Wisconsin-Madison in 1976. She is the cartographer for the United States Congress Bicentennial Atlas Project, with one atlas on congressional districts completed and another on political party representation throughout congressional history in progress. She is interested in cartographic design and production, and the application of computer technology to those processes. She is a member of the AAG, ACSM/ACA, and NACIS.

- John D. Stephens
 Department of Geography and Regional Planning
 Indiana University of Pennsylvania

John D. Stephens received his Ph.D. in Geography from Michigan State University in 1975. He is currently Associate Professor of Geography at Indiana University of Pennsylvania, where he is responsible for instruction in cartography. Prior to his appointment at IUP, he served on the faculties at Virginia Tech and UCLA, and as a Fulbright-Hays Professor in Finland. His research interests include analytical cartography, bibliography of cartography, and geo-processing systems, topics on which he has presented and published papers. He is a member of the AAG, ACSM/ACA, and NACIS.

- Joel L. Morrison
 National Mapping Division
 U.S. Geological Survey

Joel Morrison received the Ph.D. from the University of Wisconsin-Madison in 1968. He currently holds the position of Senior Advisor on Geography in the National Mapping Division of the United States Geological Survey. For many years he served on the geography faculty at the University of Wisconsin. He is a past president of the American Congress on Surveying and Mapping. In August, 1984, he was elected president of the International Cartographic Association. Dr. Morrison has published numerous research articles and reports on cartography. He is a senior editorial consultant for Goode's World Atlas, a co-editor of Elements of Cartography, now in its fifth edition, and the new editor of Mapping Sciences and Remote Sensing.

- Ronald M. Bolton
Aeronautical Chart Branch
National Oceanic and Atmospheric Administration/National Ocean Service

Ronald M. Bolton is the Chief of the Aeronautical Chart Branch of the Aeronautical Charting and Cartography Office at the National Ocean Service (NOS), in Silver Spring, MD; he also serves as the Project Officer for the Aeronautical Chart Automation Project. He received the B.S. from the District of Columbia Teachers College in 1963. He served as a computer specialist and cartographer in the Navy Oceanographic Office, Suitland, MD, from 1963 until 1974. He joined NOS in 1974 as a computer specialist and cartographer. He was an instructor in programming and computer science at the U.S. Department of Agriculture Graduate School, Washington, DC, from 1966 until 1972. He was also an instructor at George Washington University from 1979 until 1982. Since then, he has been an instructor of computer science at Montgomery College. He is a member of the Institute of Navigation, ACSM, and NACIS.

* * * * *

GENERAL PAPER SESSION A - Center Ballroom
8:15-10:00 AM, Thursday, October 18

- John P. Snyder
U.S. Geological Survey

John P. Snyder received degrees in chemical engineering from Purdue University and Massachusetts Institute of Technology. He retired in 1980 as a chemical project engineer. Since then, he has been a Research Physical Scientist with the U.S. Geological Survey, specializing in cartographic research. He is the author of several papers and four books about map projections and New Jersey historical mapping. His most recent book, Map Projections Used by the U.S. Geological Survey, was published in 1982. He is a member of the ACSM and ASP.

PITFALLS OF MAP PROJECTIONS

To many map users, map projections are complicated devices which they find difficult to live with or without. The computer has made map projections far easier to compute and plot, but the cartographer must still make subjective decisions which require proper basic understanding. In some cases, this is hampered by conflicting or incomplete information in the published literature. For example, a mathematically secant conic projection cannot be equal-area or conformal in the conventional sense, although the concept is used to help understand an Albers or a Lambert projection with two standard parallels. A conformal sphere may be used to simplify transformation of an ellipsoid to a flat conformal map projection, but only in certain instances. To digitize data from an existing map, the original central meridian should be known for one based on the Transverse Mercator but not for a map based on the Lambert Conformal Conic. Confusion about the origin and design of certain projections has led to long-term incorrect identification in some atlases. Some misunderstandings are cosmetic, but others lead to inaccurate plots and measurements.

- Robert E. Lyons
Hecla Mining Company

Robert E. Lyons is presently the manager of the Geologic and Engineering Design Department of Hecla Mining Company. He studied at the Cranbrook Institute in Bloomfield Hills, MI, the University of New Mexico, and the University of Albuquerque in the field of Urban Studies and Development. He has over 40 years of experience as a cartographer in the private sector. He taught cartography and beginning photogrammetry at the Technical Institute in New Mexico. He is preparing for publication a technical manual, entitled "Cartographer! What the Heck is That?" (in progress). In conjunction with this book, he has undertaken a number of reconstructions of rare maps with contributions to the Golda Meir Library-AGS Collection, University of Wisconsin-Milwaukee. He has also contributed to the cartographic works in the Library of Congress, the U.S. National Archives, and some 50 private collections and university libraries throughout the United States, Canada, and Mexico.

CARTOGRAPHIC ADVENTURE

(Abstract not available at time of publication.)

- Ruth A. Rowles
Department of Geology and Geography
West Virginia University

(The biographical notes for Ruth Rowles appear under an earlier session.)

REMOTELY SENSED IMAGES ON PRINTED MAPS

One of the major advances in cartography in the twentieth century has been the use of continuous tone images of remotely sensed data as a component of the map. Imagery has been adapted to offset lithographic printing, which can produce a large number of copies in monochrome or multicolor at a reasonable cost. In the last fifteen years government agencies have experimented and produced maps incorporating imagery with the goal of preserving and enhancing as much as possible the resolution and tonal variation present in the original data. Obviously, there have been great advances in the type and quality of imagery available--aerial photography in black and white, infrared, and color; multispectral imagery; satellite imagery; and radar imagery. However, this paper will focus on advances in image manipulation, cartographic enhancement, and platemaking. Image manipulation for reproduction includes processes such as mosaicking, maintaining and enhancing tone or density control, making phototones and photolines, using equidensity film for density slicing, and making separations for process color. Cartographic enhancement includes the addition of lines and lettering, masking imagery from those areas, and masking for flat color. There are different ways to prepare for platemaking by converting the continuous tone to halftone or random dots, or to use the method of screenless lithography. Each of these processes will be described and discussed with examples which will be primarily printed maps from the U.S. Geological Survey. If the maps are viewed in chronological order, the advances in the application of imagery to the printed map are readily apparent. Consequently, the technology exists to print such maps in quantity, if there is a demand for them. Education and exposure to these map products are necessary to generate that demand.

- Mark J. Steuer
Green Bay-Brown County Planning Commission

Mark Steuer received the B.S. in Cartography from the University of Wisconsin-Madison in 1976. For the past three years he has held the position of Cartographer with the Green Bay-Brown County Planning Commission in Green Bay, Wisconsin. Previously, he was employed by the Milwaukee Map Service as a cartographer. This year he organized a major map exhibit as part of the Green Bay Heritage Festival, which conveyed through maps nearly 350 years of the history of European settlement in the Green Bay area. Mark is a charter member of NACIS.

NICOLET TILL NOW

Modern cartographers have numerous sophisticated tools they use in their craft. Nearly every square foot of the earth has been surveyed, photographed, examined, and reduced to maps of one form or another. This was not true even a generation ago. This paper examines the exploration and mapping of the Great Lakes in the seventeenth century during which the first European explorers gained and expanded their knowledge of this Inland Sea. One of these explorers was Jean Nicolet, who arrived in this area of Wisconsin in 1634, just a few years after the arrival of the Pilgrims at Plymouth Rock. The history of the City of Green Bay and the surrounding area is documented through maps from the time of Nicolet till now.

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Seminar: National Cartographic Information Center (NCIC) Affiliate
Network - Pennsylvania Suite (Room 126)
8:15-10:00 AM, Thursday, October 18

- Christine Reinhard
Wisconsin State Cartographer's Office

Christine Reinhard is the Assistant State Cartographer with the Wisconsin State Cartographer's Office. She received the B.A. from the University of Wisconsin-Oshkosh in 1971, and the Master of Library Science from the University of Wisconsin-Madison in 1972. She worked for the Wisconsin Geological Survey as an Information Specialist before assuming her current position in 1975. She subsequently earned the M.S. in Cartography and finished the Bibliography and Index of Wisconsin Geology 1698-1977, begun while at the Wisconsin Geological Survey. Christine is active within the ACSM and the ASP; she has served as an officer for regional divisions of these organizations. She has been a member of the Geography and Map Division of the Special Libraries Association for 10 years. She established the first liaison between SLA-G&M and ACSM. Christine co-founded NACIS and served as president during its first two years. She is currently a director.

- William P. Graff
New Jersey Geological Survey

William Graff has served as a cartographer during the past five years for the New Jersey Geological Survey. He is also the NCIC State Affiliate representative for New Jersey. He received the B.A. in Geography from Clark University in 1979. His professional affiliations include the AAG, ACSM/ACA, and NACIS.

- Alan R. Stevens
NCIC-National Headquarters
U.S. Geological Survey

Alan Stevens is Chief of the National Cartographic Information Center. His educational background is in Civil Engineering, with advanced study in surveying, mapping, photogrammetry, remote sensing, and forestry. He holds the Ph.D. from the University of Wisconsin-Madison. He served for seven years with the Tennessee Valley Authority, where his responsibilities included aerial photo acquisition, photogrammetric compilation, geodetic computation, and remote sensing applications. He joined the U.S. Geological Survey in 1978, and became Chief of NCIC in 1979.

- Walter Wagner
NCIC-Eastern Mapping Center
U.S. Geological Survey

Walter Wagner is Chief of the National Cartographic Information Center within the Eastern Mapping Center of the U.S. Geological Survey. He received the B.S. from the University of Maryland. Following 10 years of experience in aerial photo-interpretation with the Central Intelligence Agency, he joined the Map Information Office of the Geological Survey's former Topographic Division in 1973. He has served NCIC since its creation in 1976, and as Chief of Eastern-NCIC since 1980.

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GENERAL PAPER SESSION B - Center Ballroom
10:15-NOON, Thursday, October 18

- Jack J. Ford and Daniel P. DeVitis
Department of Geography-Earth Science
Shippensburg University

Jack J. Ford is currently an Associate Professor in the Geography-Earth Science Department at Shippensburg University. He received the Ph.D. from Michigan State University in 1974. His research interests are in local government planning, remote sensing information transfer, and environmental assessments. His teaching interests include: remote sensing, computer graphics, transportation geography, and planning techniques. Jack is a member of the AAG, ASP, and the American Planning Association.

Daniel P. DeVitis received his Ph.D. in Geography from the University of Pittsburgh in 1975. Currently, he serves as Professor of Geography in the Geography-Earth Science Department at Shippensburg University. His teaching and research interests have been in the areas of developing geographic field techniques, terrain analysis, and geographic information systems. He has developed advanced courses in these areas as well as conducting research, consulting, and presenting papers on geographic-environmental applications.

GEOGRAPHIC INFORMATION SYSTEMS: A TOOL FOR LOCAL GOVERNMENT DECISION-MAKERS

Needed environmental information for local government decision-makers is sometimes lacking or incomplete. Often a comprehensive array of environmental factors influencing local planning decisions is excessively complex to analyze and too cumbersome to cartographically display without utilizing a geographic information system. This research describes a geographic information system developed to assess the quality of groundwater for a small rural municipality in Pennsylvania. The study was conducted prior to the final evaluation of whether or not to proceed with a municipal sewer system. Data collection involves the determination of the dominant physical properties of five acre cells for a study consisting of 1500 cells. Data influencing groundwater quality, such as soils, topographic position, dominant land use, downslope land use, age of housing and housing density, are collected. Distance and direction plumes guided by groundwater flow are developed from the following: (a) pollution source map; (b) groundwater surface map; (c) geologic structure map. Four probability zones of groundwater pollution are delineated based on the source map as the origin of flow. A final product of the study is a map indicating areas where residential growth needs some degree of public control in order to preserve an acceptable level of groundwater quality.

- David M. McKeown, Jr.
Computer Science Department
Carnegie-Mellon University

David McKeown is a Senior Project Scientist in the Computer Science Department at Carnegie-Mellon University and has been a member of the research staff since 1975. He received the B.S. degree in Physics and the M.S. degree in Computer Science from Union College, Schenectady, New York. Prior to joining the research staff, he was a Research Associate at George Washington University, a member of the Technical Staff at Goddard Space Flight Center, Greenbelt, MD, and an instructor in Computer Science and Electrical Engineering at Union College. His research interests in computer science are in the areas of image understanding for aerial photo-interpretation, digital mapping and image/map database systems, computer graphics, and artificial intelligence. He is the author of over 20 papers and technical reports and is an active consultant for government and industry in these areas. He has presented invited papers at recent International Society of Photogrammetry and Remote Sensing (ISPRS) Symposia.

CARTOGRAPHIC UPDATE USING MAP-GUIDED IMAGE INTERPRETATION

This presentation considers current research in the area of spatial databases and their applications to automating image interpretation for cartographic update. Our research in the use of map descriptions to guide the extraction of man-made and natural features from aerial imagery is motivated by the observation that the mapping process is ongoing. In order to begin to automate feature extraction and change detection activities, we must investigate the representation and use of previously acquired map data to guide and refine the feature extraction process, and to evaluate the kind and significance of these changes.

Although databases for geographic information systems (GIS) have been developed to manage digital map data, the integration of aerial imagery and collateral information is rarely performed. For the most part, the use of sophisticated and intelligent spatial databases, in which a user can query interactively

about map, terrain, or associated imagery, is unknown in the cartographic community. In standard GIS systems, the ability to formulate complex queries requiring dynamic computation of factual and geometric properties is severely limited, often reflecting its origin as collections of thematic map overlays. Spatial database research requires the integration of ideas and techniques from many areas within computer science such as computer graphics, image processing, artificial intelligence, and database methodology as well as from the traditional area of photogrammetry.

We will discuss an approach to map-guided image analysis using a region-based segmentation system. This system has been used to search a database of images that are camera correspondence with a spatial database to find occurrences of known buildings, roads, and natural features. The map predicts the approximate appearance and position of a feature in an image. The map also predicts the area of uncertainty caused by errors in the image-to-map correspondence. Some preliminary results and prospects for future research are presented.

- Alan M. MacEachren
Department of Geography
University of Colorado - Boulder

Alan M. MacEachren (Ph.D., Kansas, 1979) is currently an Assistant Professor in the Department of Geography at the University of Colorado - Boulder. Since joining the department last year (after four years at Virginia Tech), he has been developing cartography and GIS as a graduate level concentration. The program is supported by a new Spatial Data Analysis Laboratory and a remodeled photographic laboratory. Current research interests include database characteristics for modeling continuous geographic surfaces, accuracy and effectiveness of thematic maps, the role of maps in regional images, and past and present applications of strip format maps.

DIGITAL DATABASE DEVELOPMENT ACROSS THE UNITED STATES

Recent years have seen rapid improvement in computer technology for cartographic display and analysis of spatial data. These developments have led in increasing numbers of government agencies and private organizations to develop facilities for computer mapping and information analysis. As a result, digital geographic databases are being generated by a variety of public and private organizations.

At present, little is known concerning aspects of digital database development such as the extent of development in the U.S., the kinds of data being digitally encoded, and the scales at which databases are being generated. In addition, little or no knowledge exists concerning spatial variability of database development around the country. The purpose of the paper presented here is to address these questions.

Information presented is based on results of a nationwide survey conducted by Rand McNally-Infomap under the direction of the author. Two goals of the survey were to determine which organizations in the U.S. are producing and using digital geographic databases and to obtain information on specific characteristics

of those databases. Included in the survey were agencies at all levels of government, public utilities, university research programs, and private companies. Organizations that did use or generate digital geographic data were asked several questions concerning characteristics of the data used. Three of these are reported here: (a) what is the geographic reference system used, (b) what is the geographic coverage of the database(s), and (c) what attributes are contained in the databases. Particular attention is directed to spatial differences in both the attributes emphasized and the level of detail available.

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SPECIAL SESSION: INTER-AMERICAN CARTOGRAPHIC COOPERATION /
COOPERACION CARTOGRAFICA INTER-AMERICANA - Pennsylvania Suite
10:15-NOON, Thursday, October 18

- Carlos B. Hagen
 UCLA Map Library
 University of California, Los Angeles

The author was born and raised in Chile. He completed his undergraduate studies in Chile, earning degrees in Geography and Engineering, and credentials for a license in Surveying. Continuing his education in the United States, he earned graduate degrees in Geography (University of Washington) and in Information Science (UCLA). He has done extensive field work in the desert regions of Northern Chile, in cooperation with academic and military agencies. In the state of Washington, he helped to establish the Bureau of Surveys and Maps, one of the first state agencies of its kind in the U.S. He is presently Director of the UCLA Map Library. With over one-half million maps and related items, the UCLA Map Library is one of the largest academic cartographic information centers in the U.S.

CARTOGRAPHY AND GEOPOLITICS: AN INTER-AMERICAN PERSPECTIVE

The author, from the vantage point of being a Latin American geographer and cartographer, discusses briefly some of the currents affecting the relationship between geography and cartography in the United States. He points out the dislike of American geographers and cartographers for geopolitics, something that can be traced to the passions of World War II. He distinguishes the sharp differences of thought and approach between American and Latin American geography and cartography. He mentions some impressive areas of cartographic research and writing undertaken in the last decades by Latin American cartographers and laments the fact that most of these research accomplishments and activities are unknown in the United States. He makes a plea to the North American Cartographic Information Society to recognize this situation and to expand the horizons and scope of the Society so as to include Latin American cartography.

GEOPOLITICA Y CARTOGRAFIA: UNA PERSPECTIVA INTER-AMERICANA

El autor, cartógrafo y geógrafo latinoamericano, analiza desde una perspectiva diferente alguno de los aspectos que caracterizan la relación entre geografía y cartografía en los Estados Unidos. Así mismo, señala el rechazo que existe, por parte de geógrafos y cartógrafos norteamericanos hacia la geopolítica, hecho que puede ser considerado como una consecuencia de la Segunda Guerra Mundial. El autor hace énfasis en las profundas diferencias que existen, a nivel filosófico y pragmático, entre la concepción norteamericana y la concepción latinoamericana referente a geografía y cartografía. Por otra parte, resalta el impresionante trabajo realizado por cartógrafos y geógrafos latinoamericanos en las áreas de investigación y publicación, y lamenta el hecho de que este valioso aporte sea desconocido en los Estados Unidos. Finalmente, hace un llamado a la Sociedad de Información Cartográfica para que tome en consideración el esfuerzo que han venido haciendo los profesionales latinoamericanos durante estos últimos diez años y se incluyan sus puntos de vista dentro de la Sociedad de Información Cartográfica.

- Robert L. Senter
PAIGH Coordinator
DMA - Inter-American Geodetic Survey

Robert L. Senter holds the Bachelor of Science degree in Geography from East Tennessee State University, has done graduate work in Geodetic Science at Ohio State University, and graduated in 1981 from the Inter-American Defense College in Washington, DC. His mapping experience spans thirty-two years, eighteen of which were spent in Latin America. Since mid-1981, he has been the coordinator of the Unified Hemispheric Mapping Program for the Pan American Institute of Geography and History.

COOPERATIVE MAPPING PROGRAMS IN LATIN AMERICA

The presentation includes a synopsis of the objectives and activities of the Inter-American Geodetic Survey. Emphasis is given to the educational mission of the IAGS. The second part of the presentation reports on the activities and products of the 1:250,000 scale Unified Hemispheric Mapping Program for the Pan American Institute of Geography and History.

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GENERAL PAPER SESSION C - Pittsburgh Room
7:15-9:00 PM, Thursday, October 18

- John B. Garver, Jr.
Chief Cartographer
National Geographic Society

CARTOGRAPHIC PROGRESS AT THE NATIONAL GEOGRAPHIC SOCIETY

- Ian Mumford
British Liaison
U.S. Defense Mapping Agency

Ian Mumford is Principal Map Research Officer in the Ministry of Defense, United Kingdom, and currently British Liaison Officer at the U.S. Defense Mapping Agency in Washington, DC. He received the B.S. in Economics, with a concentration in Geography, from the London School of Economics in 1951. He was the founding Honorary Secretary, and later, President, of the British Cartographic Society. He has authored numerous articles on map librarianship and the history of cartography, and recently co-authored "The Ordinance Survey--A History," which appeared in a collection edited by W. Seymour and published in 1981.

THE BRITISH CARTOGRAPHIC SOCIETY: A COMING OF AGE?

The British Cartographic Society is 21 years old, having been founded on 23 September 1963. At that time with over 4,000 people engaged in making and professionally using maps there was no common ground for them to discuss standards of work qualification or content. Most workers were technicians and craftsmen without external qualifications, and employed mainly in government service, principally with one organization. The setting up of the International Cartographic Association had highlighted the lack in Great Britain of a representative national society where cartography, in the broadest sense, was the main concern. On the initiative of a trio of academics in Scottish universities, a weekend cartographic symposium was organized in 1963 at Leicester University during which the desirability of establishing a Cartographic Society was acclaimed.

A policy of monthly technical meetings, an annual symposium, and a prestige journal was established. Despite pressures, education and not qualifications was to be the main concern; the society was to be a "learned" society and not an examining institution. Special interest groups have been established, the most successful of which, the Map Curators Group, has been instrumental in embracing map users to the benefit of the Society and the spreading of interest generally in cartography.

Despite its established prestige and vigor, the Society is still not the representative organization with the International Cartographic Association. It is relatively small, with low membership fees, and depends on dedicated volunteers for management and administration. Current issues debated in the Society are the need for a differentiated honorific membership, and the desirability of joining up with a larger organization in order to increase administrative stability and professional clout.

- Angel David Cruz Baéz
Departamento de Geografía
Universidad de Puerto Rico

Angel David Cruz Baéz is Associate Professor of Geography and Department Chairman at the University of Puerto Rico. He received the B.A. in Social Sciences from the University of Puerto Rico (1969), the M.S. in Geography (1971), and the Ph.D. in Geography (1977) from the University of Wisconsin-Madison. His main interests are agricultural and economic geography, cartography, and computer programming. He has written various papers in Spanish on the agricultural geography and the geography of cancer in Puerto Rico. He is currently director of the "Atlas Nacional de Puerto Rico" Project, a project funded mainly by the University of Puerto Rico, Rio Piedras Campus. He is a member of various scientific and professional associations in the United States, Latin America, and Puerto Rico.

THE NATIONAL ATLAS OF PUERTO RICO PROJECT

The "Atlas Nacional de Puerto Rico," or the National Atlas of Puerto Rico, will be a multicolored atlas which will include at least 120 maps, graphs, tables, photographs and explanatory text. It will be the end product of a project which began around 1975, suffered some interruptions thereafter, but resumed in February, 1983. The pre-printing phase is expected to be completed by December, 1984, and the finished product will hopefully be available by mid-1985.

The Atlas has four main parts: Historical Geography, Physical Geography, Socio-economic Geography, and Infrastructure. Most of the maps included have been prepared by the project members and cartographic technicians using positive artwork for reduction during printing. A smaller number of maps--historical ones made centuries ago and some contemporary geologic maps--will be reproduced photographically.

The Atlas project has been funded almost entirely by the Rio Piedras Campus of the University of Puerto Rico, except for minimal contributions made by the private sector. The project has been an excellent learning experience for members of the department who, without cartographic experience but with a great desire to provide Puerto Rico with a much needed National Atlas, embarked on a magnanimous project without knowing what they were getting into.

EL PROYECTO "ATLAS NACIONAL DE PUERTO RICO"

El "Atlas Nacional de Puerto Rico" será un atlas a colores que incluirá por los menos 120 mapas, gráficas, tablas, fotografías y texto explicativo. Será el producto final de un proyecto que comenzó más o menos para el 1975, sufrió varias interrupciones

posteriormente, pero fue reiniciado en febrero del 1983. Se espera que la fase de pre-impresión sea terminada para diciembre del 1984 y que el producto final esté disponible para mediados del 1985.

El Atlas tiene cuatro partes principales: Geografía Histórica, Geografía Física, Geografía Socioeconómica e Infraestructura Nacional. La mayoría de los mapas han sido preparados por nuestro personal y las técnicas cartográficas mediante la técnica de separación de colores en positivo para luego reducirlos en la imprenta. Un número reducido de mapas - los históricos hechos hace varios siglos y algunos contemporáneos de naturaleza geológica - serán reproducidos fotográficamente.

El proyecto del Atlas Nacional ha sido sufragado casi en su totalidad por el Recinto de Río Piedras de la Universidad de Puerto Rico, con excepción de unas contribuciones mínimas hechas por sectores privados. El proyecto ha sido una experiencia de aprendizaje excelente para los miembros del Departamento que, con muy poca experiencia cartográfica pero con un deseo inmenso de proveer a Puerto Rico de un Atlas Nacional, se embarcaron en un proyecto magnánimo sin saber en lo que se estaban envolviendo.

- Mark Mattson
Department of Geography
Temple University

Mark Mattson is Principal Cartographer and Adjunct Instructor of Geography at Temple University. As Director of the Temple University Cartography Laboratory, Mattson has supervised the production of numerous maps for cartographic and historic tasks. Mattson is currently project director and chief cartographer for the "Atlas of Armenia" and head cartographer for the "Atlas of Pennsylvania." Among his academic contributions, Mattson co-authored Thematic Maps: Their Design and Production, published in 1982 by Methuen, Inc.

ATLAS OF PENNSYLVANIA UPDATE

The "Atlas of Pennsylvania" is a cooperative venture involving Pennsylvania State University, University of Pittsburgh, and Temple University. This update is an introduction to the project. The Atlas project is divided into tasks of design, editing, and production. The Atlas update explains how each task is accomplished singularly and their coordination with one another.

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DISPLAY SESSION: PRODUCTS AND RESOURCES OF UNIVERSITY CARTOGRAPHIC
LABORATORIES - East Ballroom
7:15-9:00 PM, Thursday, October 18

- Organizer: Ellen White
Department of Geography
University of Oklahoma

Ellen White received the M.S. degree in Geography from Virginia Polytechnic Institute and State University in 1983. She is currently an Instructor and Staff Cartographer in the Department of Geography at the University of Oklahoma. Her research interests, when she is not teaching or compiling maps, are in computer cartography, map production techniques, and cognitive mapping. Ellen is a member of the Oklahoma Academy of Science, AAG, ACSM/ACA, and NACIS.

PRODUCTS AND RESOURCES OF UNIVERSITY CARTOGRAPHIC LABORATORIES**

Participants in Display Session:

- James R. Anderson, Jr.
Associate in Research
Florida Resources and Environmental Analysis Center
Florida State University
- Onno Brouwer*
Head of Design and Production
Cartographic Laboratory, Department of Geography
University of Wisconsin-Madison
- Abbey Curtis
Staff Cartographer
Deasy Geo-Graphics Laboratory, Department of Geography
Pennsylvania State University
- Alan A. DeLucia
Director
Cart-O-Graphics Laboratory, Department of Geography
University of Idaho
- Frank Drago*
Staff Cartographer
Department of Geography
Georgia State University
- J. Pat Farrell*
Assistant Professor and Director
Cartographic Laboratory, Department of Geography
Northern Michigan University
- James D. Ingram
Cartographic Shop Manager
Department of Geography
University of Georgia

Participants in Display Session (continued):

- Deborah P. King*
Supervisor
Laboratory for Cartographic and Spatial Analysis
University of Akron
- J. Michael Lipsey
Coordinator, Cartographic Center
Center for Cartographic Research and Spatial Analysis
Department of Geography
Michigan State University
- Alan D. Long
Staff Cartographer
Department of Geography and Meteorology
University of Kansas
- Gayle Maxwell
Director, Cartographic Service
Department of Geography
Oklahoma State University
- Christopher Mueller-Wille
Lecturer and Production Supervisor
Cartographics, Department of Geography
Texas A & M University
- Gyula Pauer
Director
Cartographic Laboratory, Department of Geography
University of Kentucky
- Joseph Poracsky
Assistant Professor
Department of Geography
Portland State University
- Donna Schoenstrom
Staff Cartographer
Department of Geography
University of Wisconsin-Milwaukee
- Jefferson L. Simpson
Lecturer and Staff Cartographer
Department of Geography and Earth Sciences
University of North Carolina at Charlotte
- Ray B. Squirrel*
Chief Cartographer
Department of Geography
Simon Fraser University
- Eugene J. Turner*
Assistant Professor
Department of Geography
California State University-Northridge

Participants in Display Session (continued):

- Ronald M. Welch
Coordinator of Cartographic Services
Department of Geography
University of Windsor
- Ellen White
Staff Cartographer and Instructor
Department of Geography
University of Oklahoma

* Materials displayed without representative present.

** Materials will remain on display during Friday's exhibit hours.

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SPECIAL SESSION: CARTOGRAPHIC EDUCATION - Center Ballroom
8:15-10:00 AM, Friday, October 19

Chair: John Schroeder, Geography and Map Division, Library of Congress

- Ronald M. Bolton
Aeronautical Chart Branch
National Oceanic and Atmospheric Administration/National Ocean Service

(Biographical notes appear under an earlier session.)

LASERS IN CARTOGRAPHY AND THEIR IMPACT ON CARTOGRAPHIC EDUCATION

Lasers are not as futuristic in the field of cartography as many may believe. In fact, laser devices are currently installed at the U.S. Geological Survey, the Hydrographic/Topographic Center of the Defense Mapping Agency, Jeppesen-Sanderson Company (Aeronautical Charts), and the Nautical Chart Division of the National Ocean Service. Laser system studies indicate that these systems are capable of producing plate-ready color-separated overlays on film utilizing a combination of analog and digital inputs. These systems are economically attractive when combined with an interactive map or chart compilation system. Such a combination allows the following production activities to be greatly reduced: drafting, negative engraving, photographic contact and compositing, and photographic screening and masking. As the cost of computers, storage media, and lasers continue to decrease and the cost of manual cartographic and pre-press operations increase, the place of laser systems in the cartographic production process seems assured.

The impact of the laser technology on university cartographic programs over the next 10 years will be dramatic. Major adjustments will be required in curriculum concepts and laboratory equipment inventories. Since colleges and universities are the major source of technically qualified, entry-level employees

for government and industry, educators must address the problems of laser technology. Let us not leave our students unprepared; the place of laser systems in the cartographic product seems assured.

- HelenJane Armstrong
University Library and Department of Geography
University of Florida

HelenJane Armstrong is a member of the geography faculty and of the library staff at the University of Florida. She is in charge of the University Library's Map Collection, which is one of the larger collections in North American universities and known for its extensive materials on Latin America. Her teaching and research interests include map use and interpretation and geographical bibliography. She holds the Ph.D. from Oregon State University.

GOALS AND ACTIVITIES OF THE "CARTOGRAPHIC USERS ADVISORY COUNCIL" (CUAC)

(Abstract not available at time of publication.)

- Grady B. Meehan
Consultant
Chapel Hill, North Carolina

Grady B. Meehan has held positions in the Department of Geography, University of North Carolina at Greensboro; the Institute for Research in the Social Sciences, University of North Carolina at Chapel Hill; and the Department of Geography, Villanova University. He holds a B.S. in Business Administration and an M.S. in Geography from Pennsylvania State University. He is also a Ph.D. candidate in Geography at the University of North Carolina at Chapel Hill. He has made presentations on computer-assisted cartography at meetings of the ACSM, AAG, and Harvard Graphics Week '80. His interests include computer-assisted statistical mapping and microcomputer applications.

- James R. Carter
Department of Geography
University of Tennessee

James R. Carter is an Associate Professor of Geography and affiliated with the Graduate Program in Ecology at the University of Tennessee. He has the A.B. in Geology from Indiana University, the M.A. in Geography from the University of Maryland, and the Ph.D. in Geography from the University of Georgia. Carter has recently served as a visiting professor at the Universidad de Santiago de Chile and at Temple University. He has worked as a geographer in the National Mapping Division of the U.S. Geological Survey. He is the author of Computer Mapping: Progress in the '80s, published in 1984 by the Association of American Geographers. He is the current Chair of the Committee on Education of the American Cartographic Association, a member of the U.S. National Committee to the International Cartographic Association, and a member of the Board of Directors of the ACSM. Carter is also a member of the AAG and NACIS.

MAPPING CAPABILITIES OF SAS/GRAPH AND CARTOGRAPHIC EDUCATION

SAS/GRAPH, the graphics companion to SAS, a widely used statistical analysis and data management package, provides cartographic capabilities as powerful as most thematic mapping systems. Unlike many mapping systems, it was not created by cartographers and cartographers are not involved in its continuing development. With over 5,000 installations world-wide, it is now readily available to many people who are not trained in the art and science of map making. Present and future challenges in cartographic education are evolving from the creation of this new class of map makers. They will need to know how to employ accepted cartographic principles in order to make good maps with these packages. Professional cartographers also need to learn about the capabilities of this system, and similar packages that will be forthcoming. They they will be in a better position to evaluate these packages and to suggest improvements. At present, opportunities for cartographers to contribute their expertise in areas such as cartographic communication, as well as the creation, application, and management of spatial databases are growing as evidenced by two recently announced academic cartography programs emphasizing spatial data management. Finally, SAS/GRAPH can be a valuable teaching tool to demonstrate the linkages between spatial data management, analysis, and computer-assisted cartography.

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WORKSHOP: MICROCOMPUTER MAPPING SYSTEMS - Rivers Three Lounge
8:15-10:00 AM, Friday, October 19

- Organizers: Mary K. Davis and Richard Schroeder
Marketing Analytical Services
National Planning Data Corporation (NPDC)

The workshop is intended to familiarize participants with the MAXpc Software Series. The MAXpc mapping program brings state-of-the-art thematic mapping capabilities to the IBM PC. MAXpc incorporates virtually all of the advanced features of mainframe mapping packages. It delivers a full range of analytic and graphic design functions to the professional seeking to analyze the distribution of census demographics, sales figures, patient origination data--literally any geographically aggregated data item.

The MAXpc software enables users to choose the type of map best suited to the kind of data being displayed--and choose the data classification method most appropriate to your particular analysis. And because MAXpc offers complete control over design considerations, like the placement of titles and legends, the line width of borders, and font type for lettering, MAXpc allows for the production of high-quality graphic displays.

Finally, NPDC offers the MAXlink connection. With MAXlink communications software, MAXpc users can tap into NPDC's mainframe MAX database to access national coverage, state, county, census tract, and zipcode cartographic and demographic data. MAXlink downloads the data to the user in the format MAXpc requires for mapping. This unique integration with a mainframe system is a powerful innovation in microcomputer mapping and was developed by NPDC.

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SPECIAL SESSION: METROPOLITAN MAPPING - Center Ballroom
10:15-NOON, Friday, October 19

Chair: Brian P. Holly, Department of Geography, Kent State University

- Ed Wells
Department of City Planning
City of Pittsburgh

Ed Wells is a Principal Planner in the City of Pittsburgh's Department of City Planning. He is currently managing the implementation of the City of Pittsburgh Land Records Management Program. After graduating with the B.A. in Human Biology from Stanford University in 1972, Mr. Wells spent three years as a volunteer English teacher in Indonesia, one year in Seattle as an environmental impact analyst, four years as a graduate student of City and Regional Planning at Cornell University, and two years in Thailand as an economics researcher and refugee camp administrator. Since coming to Pittsburgh he has worked on studies of mortgage foreclosure, municipal bankruptcy, neighborhood image, and regional economics.

USE OF GLOBAL POSITIONING SATELLITE RECEIVERS TO PROVIDE GEODETIC CONTROL IN PITTSBURGH, PENNSYLVANIA

In 1984, the City of Pittsburgh began implementing a seven-year, \$1 million program to integrate all city real property and public facilities records in a single computer database and mapping system. The first step was to replace the city's 20 year old maps with new maps drawn from aerial photographs taken in 1984.

By using the Macrometer Global Positioning Satellite receivers, the city was able to obtain full photogrammetric survey control (55 points positioned and monumented) in two months at a cost of about \$1,250 per point. The full analysis is not yet completed, but the initial closures have proven accurate to one part in 325,000 (compared to the National Geodetic Survey standard of 1:100,000 for first-order surveying).

Macrometer technology has permitted the City of Pittsburgh to obtain rapidly and at a manageable cost, the survey control necessary to establish a true-to-ground image on which to base our computer mapping system. As an unexpected benefit, by virtue of its accuracy and independence of local reference points, the Macrometer measurements have provided a means for evaluating the accuracy of all previous city monument positioning, and for tying to the state plane coordinate system the old local plane system to which the city monuments are referenced.

- Edward Plocha
Mayor's Office of Information Management
City of Philadelphia

Edward Plocha is currently the Director of Integrated Geo-Processing Systems, a division of the Mayor's Office of Information Management in the City of Philadelphia. Previously, he served in the office of Records Commissioner for the city government. With that background he went on to become involved in the Regional Mapping and Land Records Project for the City of Philadelphia, which has been a leader in the development of metropolitan geo-processing systems in North America.

THE REGIONAL MAPPING AND LAND RECORDS (RMLR) PROJECT

(Abstract not available at time of publication.)

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SPECIAL SESSION: MAP LIBRARIES - William Penn Room
10:15-NOON, Friday, October 19

Chair: Marsha Selmer, University of Illinois at Chicago

- Nancy A. Kandoian
Map Division, The Research Libraries
The New York Public Library

Nancy A. Kandoian has been employed since 1978 in the Map Division of the New York Public Library; she became Map Cataloger in 1982, and began cataloging maps for the Research Libraries Information Network later that year. She continued to serve in a reference capacity in the Map Division as well. Her career combines education in Library Service at Rutgers University (M.L.S., 1977) and Geography at Mount Holyoke College (B.A., 1974). She is a member of NACIS, the American Library Association (ALA), and ALA's Map and Geography Round Table (MAGERT).

THE RESEARCH LIBRARIES INFORMATION NETWORK AS A MEDIUM FOR SHARING CARTOGRAPHIC INFORMATION

The benefits of the Research Libraries Information Network (RLIN) are unknown to many outside the communities of the Research Libraries Group (RLG) member libraries. With two components of this automated information system devoted to map information, the NACIS IV meeting presents an opportunity to share with map enthusiasts the nature of RLIN, what kinds of map information RLIN provides, and how one can have access to it.

The databases and technical systems of RLIN have been developed by RLG, an association of major research institutions in the United States, to support its cooperative programs. RLIN's central bibliographic database contains a file of records exclusively for maps. With almost 100,000 records giving bibliographic descriptions of maps and their library locations, this file serves as a shared-cataloging system and a union catalog of map holdings for RLG membership libraries and the Library of Congress. On-line access to records is provided by, among other things, subject, personal and corporate name, title, and geographic classification. Examples of RLIN searches in the map file and their results can serve as indicators to NACIS members of the kinds of questions that might be answered by RLIN's cartographic information sharing capability.

The second component of RLIN devoted to maps is the currently developing Conspectus for Cartographic Materials. This segment of the special Conspectus database will show in coded form the relative strengths of member libraries' collections of maps for specific geographic areas. More general than a catalog, this database can point a researcher toward the appropriate library for a strong collection of maps of, say, Canada.

The locations and policies of the RLG map collections, and specifically how one can access RLIN's cartographic information through RLG member libraries, will provide a practical conclusion to this presentation for NACIS members.

- Jeffrey C. Patton
Department of Geography
University of North Carolina at Greensboro

Jeffrey C. Patton is currently an Assistant Professor of Geography at the University of North Carolina at Greensboro. He received his Ph.D. (1980) from the University of Kansas and his M.A. (1976) and B.S. from Bowling Green State University. His research interests include cartographic communication, map design for children, and geographic education. His work has appeared in various professional journals including the Cartographic Journal and the Annals of the Association of American Geographers. He has been an active member of NACIS for four years and presently serves as secretary of the Society.

- Nancy B. Ryckman
Jackson Library
University of North Carolina at Greensboro

Nancy B. Ryckman has been an Assistant Reference and Map Librarian at the University of North Carolina-Greensboro since 1977. Earlier she was Reference Librarian at the University of Nebraska at Omaha (1971-1977). She received the B.A. (1980) in Geography from the University of Michigan, the M.A. in Library Science (1971) from the University of Michigan, and the M.Ed. (1982) in Counseling and Guidance from the University of North Carolina at Greensboro. She is a member of the American Library Association and the North Carolina Library Association.

DEVELOPMENTAL CONSIDERATIONS FOR UNIVERSITY MAP LIBRARIES: MONEY VS. DESIRES

This paper focuses on the development of a map collection policy and the implementation of such a policy at a mid-size university. The paper is divided into two sections. The first deals with identifying the types of materials required by faculty and students. Contained in this section is a report on the findings of a university-wide questionnaire designed to determine faculty usage of and desires for a map library. The second section details some practical approaches for obtaining these items from commercial and government sources. Particular attention is paid to cost and time-saving methods.

- William C. Roselle
Golda Meir Library
University of Wisconsin-Milwaukee

William C. Roselle holds his B.A. degree from Thiel College and his Master of Library Science degree from the University of Pittsburgh. A native of western Pennsylvania, he has held teaching and library appointments at Milton Hershey School, Carnegie-Mellon University, the State Library of the Commonwealth of Pennsylvania, Pennsylvania State University, and the University of Iowa. For the past 14 years, he has served as Professor and Director of the Golda Meir Library, home of the American Geographical Society Collection, at the University of Wisconsin-Milwaukee.

THE AMERICAN GEOGRAPHICAL SOCIETY COLLECTION IN MILWAUKEE A DECADE
LATER: A RETROSPECTIVE ASSESSMENT

Ten years ago this month, the University of Wisconsin-Milwaukee's Department of Geography faculty and Golda Meir Library administrative personnel initiated discussions regarding the possibility of acquiring the American Geographical Society Collection and moving it from New York City to Milwaukee. Those investigations led to monumental effort that resulted in the saving of an international resource and a national treasure. The details of the physical move of the collection in 1978 are well known. This paper recounts the 75 months of litigation, the administrative decisions, and the budget architect involved in the allocation of nearly \$3.2 million to this extraordinary effort.

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SPECIAL SESSION: DIGITAL CARTOGRAPHIC DATA SOURCES AND STANDARDS--
Center Ballroom

1:15-3:00 PM, Friday, October 19

Chair: Alan M. MacEachren, Department of Geography, University of Colorado-Boulder

- Harold Moellering
Department of Geography
Ohio State University

Harold Moellering received his Ph.D. from the University of Michigan and is currently Professor of Geography at Ohio State University. He is also Director of the Department's Numerical Cartography Laboratory. He is the past Chairman of the ACSM Committee on Automation in Cartography and Surveying. He is Chairman of the National Committee for Digital Cartographic Data Standards in cooperation with ACSM, the U.S. Geological Survey, and the U.S. National Bureau of Standards. He is a member of the U.S. National Committee for the ICA and travel chairman for the recent meetings in Australia. He has presented papers at the ICA Congresses in Maryland in 1978; Tokyo, 1980; Perth, 1984; and at the IGU Regional Congress in Rio de Janeiro, in 1982. His research specialties include numerical, analytical, and dynamic cartography. Professor Moellering is currently a member of the Committee on Cartography of the U.S. National Academy of Sciences/National Research Council.

ACTIVITIES OF THE U.S. NATIONAL COMMITTEE FOR DIGITAL CARTOGRAPHIC DATA STANDARDS

The National Committee for Digital Cartographic Data Standards is now in the third cycle of work, that of developing an interim proposed standard. Prior work included the defining of the issues and the examination of the alternatives involved. This work is taking place as a result of a mandate given by the U.S. Bureau of Standards via the U.S. Geological Survey to develop standards for digital cartographic data. The Committee operates under the auspices of the American Congress on Surveying and Mapping.

Interim proposed standards are now being developed in four primary areas: data organization, data set quality, cartographic features, and terms and definitions. The work in data organization centers on the specification of a superstructure that includes a data definition language for data exchange. The superstructure then contains the data exchange modules for several broad categories of data structures. The effort in data set quality operates under the rubric of "truth in labeling" where the work is focused on specifying the list of information that the procedure of the database should provide to the prospective user. The fundamental task for the work on cartographic features is to reconcile and coordinate the three major systems of such feature definitions from the Geological Survey, National Ocean Service, and Defense Mapping Agency. Finally, the work in terms and definitions is twofold: the first is to develop a systematic set of definitions for cartographic objects, and the second is to coordinate the work of the other three Working Groups in developing definitions to terms identified by them.

- Robert LaMacchia
Geography Division
U.S. Bureau of the Census

Prior to joining the Census Bureau in 1976, Mr. LaMacchia administered the Water Quality Management Planning Program for the Southwestern Pennsylvania Regional Planning Commission. As a practicing planner for 10 years, Mr. LaMacchia developed population and employment forecasting and allocation models, was active in environmental planning, and taught transportation planning. At the Census Bureau, he was responsible for the creation and update of the GBF/DIME System for the 1980 census, the Master Reference File which controlled census tabulations, and geographic operations in the 1980 Census Processing Centers. He is currently responsible for the geographic plan for the 1990 census, including the development of the TIGER system, and is the Census Bureau liaison with the U.S. Geological Survey for the joint project to develop a digital cartographic database using the USGS 1:100,000-scale maps. He holds A.B. and Sc.B. degrees in Civil Engineering from Brown University and the M.C.P. degree from Yale University.

THE TIGER SYSTEM'S AUTOMATED GEOGRAPHIC AND CARTOGRAPHIC SUPPORT FOR THE 1990 CENSUS

The geographic and cartographic support of the 1980 census consisted of three separate, clerically produced products which were inconsistent. To meet the needs of the 1990 census, the Geography Division is building an improved

system where all relevant information about an area will be recorded in a single computer file, the "TIGER" file. The design for the TIGER file has been created by adapting the theories of topology, graphs, and associated fields of mathematics. The TIGER file structure is a series of interlocked files (lists and directories) and programs accessible through a master control program. As coded into TIGER, the United States will consist of areas bounded by lines which are in turn terminated by points. To create this digital map of the United States, we start by enlisting the help of the U.S. Geological Survey in converting to digital format selected information from their 1:100,000-scale maps. The Bureau of the Census will update this cartographic database by adding new features, feature names, and political and statistical geography.

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WORKSHOP: MAP PRESERVATION - Pennsylvania Room
1:15-3:00 PM, Friday, October 19

- Organizer: Christopher Baruth
AGS Collection
University of Wisconsin-Milwaukee Library

Christopher Baruth is a member of the Map and Imagery Library staff of the American Geographical Society Collection. Though a native of Wisconsin, Mr. Baruth moved from Oregon in 1979 to join the AGS Collection staff. He received his B.S. in Geography and M.A. in Library Science from the University of Wisconsin-Madison, and his M.S. in Geography from the University of Wisconsin-Milwaukee, where he is currently a doctoral candidate. Mr. Baruth's interest in cartography and the preservation of cartographic materials is a natural outgrowth of his research in the history of cartography, and is sustained by his daily contact with aging and antique maps and atlases.

WORKSHOP ON MAP PRESERVATION

Participants will discuss map and atlas preservation and restoration. Various perspectives on the problems and technology of map preservation will be expressed by representatives of a national collection, a specialized and antiquarian collection, a large, formerly private research collection, and a working university research collection. In addition, technical aspects of paper conservation will be explained by a professional conservator.

Participants:

- James O. Minton
Map Collection
University of Arizona Library
- Douglas Stone
Fulkerstone Paper Restoration
Milwaukee
- John Schroeder
Geography and Map Division
Library of Congress
- Norman J.W. Thrower
William Andrews Clark Memorial
Library
University of California, Los
Angeles

ANNUAL BANQUET AND ADDRESS - Center-East Ballroom
7:30-9:30 PM, Friday, October 19

- Norman J.W. Thrower
 University of California, Los Angeles

Norman J.W. Thrower is currently Professor of Geography and Director of the William Andrews Clark Memorial Library at the University of California, Los Angeles. He received the B.A. in Geography from the University of Virginia, and the M.A. and Ph.D. degrees in Geography from the University of Wisconsin, Madison. Professor Thrower has published some one hundred articles in such journals as the International Yearbook of Cartography, the Cartographic Journal, The American Cartographer, and the Annals of the Association of American Geographers. He is the author or editor of several books. His most recent works include The Three Voyages of Edmond Halley in the 'Paramore' 1698-1701, published in two volumes in the Hakluyt Society series (London, 1982), and Sir Francis Drake and the Famous Voyage, 1577-1580, published in 1984, by the University of California Press. His two books in press include A Buccaneers Sea Atlas: The 1680 Waggoner of Basil Ringrose (co-authored with Derek Howse) and The United States/Mexico Borderlands: A Satellite Imagery Atlas (co-authored with Ronald Wasowski).

Professor Thrower is the past President of the Society for the History of Discoveries and past President of the Sir Francis Drake Commission, State of California. From 1964 to 1973, he served as Map Supplement Editor, Annals of the Association of American Geographers. Professor Thrower is presently a member of the Joint Working Group on Environmental Atlases of the International Geographical Union and the International Cartographic Association. He was a 1963-64 Guggenheim Fellow and is in his second four-year term as a Member of the Guggenheim Foundation Educational Advisory Board.

Professor Thrower will address the Society at its fourth annual banquet on a topic closely related to one of his current research projects--

MAPPING OF THE AMERICAN SOUTHWEST FROM THE EARLIEST SURVEYS THROUGH LANDSAT.

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SEMINAR: GROWTH AND DEVELOPMENT OF CARTOGRAPHIC INFORMATION
NETWORKS - East Ballroom
8:15-10:00 AM, Saturday, October 20

- Organizer: James O. Minton
 Map Collection
 University of Arizona Library

James Minton received the B.S. and M.S. degrees in Geography from the University of Tennessee. In 1972, he completed the M.S. degree in Library and Information Science at the same institution. Jim has served as Map Librarian at the University of Kentucky (1972-74) and at the University of Michigan (1974-84). He is currently the Head of the Map Collection at the University of Arizona in Tucson. Jim remains active in several professional organizations including

the ACSM, Special Libraries Association-Geography and Map Division, the Western Association of Map Libraries, the Association of Canadian Map Libraries, the International Map Dealers Association (charter member), and NACIS (charter member).

Jim has worked with both the OCLC and RLIN library networks and believes that map librarians and their users have much to gain from these systems, as well as taking advantage of other new technologies in order to strengthen the communication among cartographic information specialists. Jim has assembled a group of experts for this seminar who will discuss the growth and development of cartographic information networks.

Participants:

- Nancy A. Kandoian
Map Division, The Research Libraries
The New York Public Library

(Biographical notes appear under an earlier session.)

- Elizabeth U. Mangan
Geography and Map Division
Library of Congress

After receiving her B.A. in mathematics and geology/geography from the College of Wooster, Wooster, OH, and her M.L.S. in Information Science from the University of Pittsburgh, Elizabeth went to the Library of Congress as a Special Recruit (now called Interns). Following the six-month program, she joined the staff of the Geography and Map Division as a map cataloger and assisted in the development of the MARC Maps format. Currently, she is Head of the Data Preparation and Files Maintenance Unit of the Geography and Map Division, and responsible for all automation activity in the Division. She has just completed the MARC Conversion Manual--Maps which will be published by Cataloging Distribution Services of the Library of Congress in 1985.

- Karl H. Proehl
Map Section, Pattee Library
Pennsylvania State University

Karl holds the B.A. in History from Southwest Missouri State University, and the M.A. in Geography and the M.A.L.S. in Library and Information Science from the University of Missouri-Columbia. He has been Map Librarian at Pennsylvania State University since 1977. Earlier he served in a similar post at the State University of New York-Stony Brook (1974-77). His recent publication, Long Island Gazetteer, was co-authored with Barbara Shupe and published in 1984 by LDA Publishers. Karl currently serves as the editor of the NACIS quarterly newsletter, entitled Map Gap.

- Alan R. Stevens
NCIC-National Headquarters
U.S. Geological Survey

(Biographical notes appear under an earlier session.)

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SPECIAL SESSION: CENTERS OF CARTOGRAPHIC EDUCATION - Center Ballroom

8:15-10:00 AM, and 10:15-NOON, Saturday, October 20

Chair: Alan J. Woods, Department of Geography, Kent State University

Participants (first session):

- Barbara Farrell
University Library and Department of Geography
Carleton University
- Thomas L. Nash
Department of Geography
University of Akron
- William Hamilton and Robert Arnold
Department of Geography
Salem State College
- Mark B. Lindberg
Department of Public Affairs
George Mason University
- Douglas Dudycha
Department of Geography
University of Waterloo

Participants (second session):

- Judy M. Olson
Department of Geography
Michigan State University
- Patricia Gilmartin
Department of Geography
University of South Carolina
- Phillip C. Muehrcke
Department of Geography
University of Wisconsin-Madison

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GENERAL PAPER SESSION D - East Ballroom

10:15-NOON, Saturday, October 20

Chair: Barbara Hartmann, Texas Bureau of Economic Geology

- William R. Enslin
Center for Remote Sensing
Michigan State University

William R. Enslin is the Manager of the Center for Remote Sensing at Michigan State University, where he conducts research and manages contract and grant activities in remote sensing of natural resources. He received his M.A. degree in

Geography from Eastern Michigan University and has been active for 14 years in the applications of remote sensing and geographic information systems (GIS) for land use planning and wetland analysis. He is currently developing microcomputer-based GIS programs and conducting research in assessing land surface change using remotely-sensed data from satellite sensors.

MICROCOMPUTER-BASED LAND RESOURCE INFORMATION OF MICHIGAN

The Center for Remote Sensing at Michigan State University is developing microcomputer-based geographic information system programs (GIS) and a statewide database of land-surface information. The GIS supports ongoing research in the analysis of land surface temperature data acquired by satellite sensors.

Each information layer in the database is a grid (raster) file containing 633 columns and 733 rows representing 1 km² cells. The Soil Association Map of Michigan and general land cover data derived by visual interpretation of diazo-enhanced Landsat images have been digitized and converted from a polygon format to a raster. Using data from the Soil Conservation Service, the 78 soil associations in the soil data layer have been recoded to create five additional layers showing average available water capacity of the soil in one-foot increments to a depth of five feet. Several topographic layers, including elevation, slope, and aspect information, are being prepared from reformatted digital terrain data produced by the Defense Mapping Agency.

Computer mapping programs are being developed on an IBM PC/XT equipped with a higher resolution color video board than IBM supplies. Current software includes a map digitizing program with interactive color display of polygon data captured in the UTM or State Plane coordinate system. Polygon files can be windowed, scaled, and drawn on a pen plotter. A map display program allows redisplay of polygon or raster data on a color monitor and text annotation capabilities. Color images can be copied to an ink-jet printer at several magnifications. Future efforts will involve developing analytical software and technology transfer and data dissemination to local user groups such as county offices of the Michigan Cooperative Extension Service.

- Richard Greene
Graduate School of Public and International Affairs
University of Pittsburgh

Richard Greene is a Research Associate in the Graduate School of Public and International Affairs at the University of Pittsburgh. Mr. Greene has degrees in History and Information Science, and has been developing thematic cartography at the University. His current work focuses on analysis of fiscal conditions in Allegheny County's municipalities.

APPLICATIONS OF THEMATIC CARTOGRAPHY IN URBAN AND REGIONAL PLANNING

Recent efforts by the University of Pittsburgh to participate in local planning activities have brought new cooperative arrangements with outside agencies. The University Computer Center's support of thematic cartography software has enabled us to explore a few possibilities for the spatial display of planning

data--particularly statistical aggregates suitable to choropleth mapping. This discussion will consider both the organizational setting (e.g., who does mapping, who supports software, and who designs maps) and the issue of where and why thematic cartography has proven helpful.

- Roger M. Downs
Department of Geography
Pennsylvania State University

Roger M. Downs is Professor of Geography at the Pennsylvania State University, and has taught at John Hopkins University, Colgate University, and the University of Washington. He received the Ph.D. in Geography from the University of Bristol in 1970. His interests include urban and behavioral geography in general, and the cognition and representation of space in particular. The current paper is based on work in progress under a N.I.E. grant focussing on the relation between graphic literacy and map skills. He is Associate Editor of Environment and Behavior and a member of the editorial board of The Professional Geographer.

- Lynn S. Liben
Department of Psychology
Pennsylvania State University

Lynn S. Liben is currently Professor of Psychology at the Pennsylvania State University. She received her Ph.D. in Developmental Psychology at the University of Michigan in 1972, where she began studying the development of spatial concepts from the perspective of the Piagetian theory. Her research has continued to focus on children's and adults' ability to use horizontal and vertical axes in spatial tasks, and their knowledge of large-scale environments. She is currently Associate Editor of the Journal of Experimental Child Psychology, and past President of the Jean Piaget Society.

CHILDREN'S BELIEFS ABOUT MAPS: A METACARTOGRAPHIC EXPLORATION

Graphic literacy is essential for success in contemporary society. The ability to generate and read graphic representations is relevant for virtually every facet of life. Not surprisingly, therefore, educational curricula are being revised to incorporate a greater emphasis on the development of greater graphic literacy. Central to these efforts is a concern with mapping activities: map making, reading, interpretation, and appreciation. The success of map curricula depends on many factors: materials, sequencing of activities, the training of teachers, etc. This paper focusses on one vital component that is often overlooked: the child's own view of the nature, functions, range, and power of maps. We are interested in the ways in which children comprehend the properties of graphic representations of space. Using parallels from work on metalanguage and metamemory, we call this metacartography.

Children between the ages of three and six years, enrolled in a pre-school program, were asked to respond to a series of six graphic presentations. These included an aerial photograph of Chicago (vertical black-and-white with an approximate scale of 1:12,000); a similar photograph of State College, Pennsylvania (scale approximately 1:20,000); a Rand McNally road map of Pennsylvania; a tourist map of the Mall area in Washington, DC; an isometric view of central Philadelphia, with buildings in perspective; and a matched aerial photograph-map

of Chicago, scale 1:20,000. The children were asked to identify what they thought they were looking at, how it was made, what it showed; what it was used for, how it could be changed, and how one would get from place to place. Sessions were videotaped and the videotapes analysed by raters to produce coded protocols. These protocols are interpreted in the light of cartographic theory and developmental theory to understand the Child's conception of a map. The findings are related to existing work by researchers such as Blaut and Stea, Kulhay, and Spencer.

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SATURDAY LUNCHEON AND ADDRESS - West Ballroom
NOON-2:00 PM, Saturday, October 20

- Barbara Adele Fine
 The Map Store, Inc.
 Washington, DC

Barbara Adele Fine is President of The Map Store, Inc., Washington, DC, a Director of the International Map Dealers Association, and a Director of the Capital Area Map Alliance. Fine is a member of the National Association of Women Business Owners, and the American Booksellers Association.

THE MARKETING OF CARTOGRAPHIC PRODUCTS: FANTASY OR REALITY?

The past five years have witnessed a burgeoning of associations, symposiums, and forums specific to or related with the marketing of cartographic products. Yet this new activity may exist exclusively in the rarified atmosphere of those who work with cartographic products: dealers, publishers, distributors, librarians, cartographers and surveyors, and geographers. There are, at best, less than two hundred map dealers in the United States, a nation of over 230,000,000 people with a relatively high standard of living and a concern for education, and an interest in travel. This dichotomy of the invigorated cartographic world and the rather small cartographic marketplace may well have created a situation in which the demand for cartographic products may have to be created. The creation of a demand for such material may in great part depend upon the ultimate reintroduction or revitalization of geographic education and map-reading skills in primary and secondary schools.

WORKSHOP: RELATIONAL DATABASE FOR CARTOGRAPHIC APPLICATIONS
2:15-3:30 PM, Saturday, October 20

- Organizer: Robert Niedermair, U.S. National Oceanic and Atmospheric Administration/National Ocean Service

SEMINAR: MARKETING CARTOGRAPHIC INFORMATION - East Ballroom
2:15-3:30 PM, Saturday, October 20

- Participants: Warren Schmidt
 Rand McNally - Infomap
 Barbara Adele Fine
 The Map Store, Inc., for Hammond, Inc.

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NACIS IV CONFERENCE COMMITTEE

John D. Stephens <i>Conference and Program Director</i>	Indiana University of Pennsylvania
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Howard J. Diamond <i>Exhibits</i>	NOAA/NOS
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Susan L. Nelson <i>Exhibits</i>	NOAA/NOS
Karl H. Proehl <i>Program</i>	Pennsylvania State University
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