cartographic perspectives

bulletin of the
North American Cartographic Information Society

Number 6, Summer 1990-91

bulletin of the North American Cartographic Information Society

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Number 6, Summer 1990

in this issue

cartographic perspectives on the news

SCIENTISTS EXCHANGE NEW VIEWS OF SOLAR SYSTEM

At the 21st Lunar and Planetary Science Conference held March 12-16 at NASA's Johnson Space Center in Houston, new views of the solar system from its origin as a gas-dust nebula to the current state of Venus, Mars, Earth's moon and other solid bodies, attracted more than 700 planetary scientists. The conference occurred at a time when data from a host of planetary spacecraft missions are being analyzed and at a time of preparation for a new generation of extraterrestrial mapping missions and experiments.

Future activities include the Magellan mission to Venus to complete the surface map of that planet; Galileo, the Jupiter-bound spacecraft that will aim its instruments at the moon as it swings by Earth this winter to pick up energy for its outward journey; the Mars observer, to be launched in 1992 to obtain global geochemical and geophysical data; and the Hubble Space Telescope, which will be aimed mainly at objects of astrophysical interest, but which will make new planetary observations as best it can with its defective

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ISSN 1048-9058
Cartographic Perspectives
is published quarterly

optics. Looking further into the future, the new moon and Mars missions associated with the emerging Space Exploration Initiative announced by President Bush on July 20, 1989, began to focus the conference.

In the absence of direct samples or close-up study of comets, interplanetary dust and primitive meteorites are the best source of data on the earliest period of solar system formation. Study of interplanetary dust still largely involves classification, focusing on identifying groups of particles that can be associated with either comet or asteroid sources. Papers at the conference focused on studies and technical development of the Cosmic Dust Collection Facility, planned for flight on Space Station Freedom in the late 1990s. That facility will capture intact dust particles with known velocities and orbital parameters and allow the comet/asteroid characterization to be made.

The Magellan Radar Mapper mission will arrive at Venus August 10, and will be able to map the entire surface of Venus at resolutions as fine as one hundred meters. Previous data on venusian surface morphology have been obtained through ground based radar and the images from the Soviet Venera 15 and 16 missions.

Activity related to the moon has increased with the announcement of President Bush's Space Exploration Initiative, which would establish a permanent facility there. Also, money was requested in the 1991 NASA budget submission for the Lunar Observer, a remote-sensing spacecraft to be launched in late 1996. Work reported at the conference is beginning to define the content of a lunar outpost geoscience program and the environmental and resources aspects of lunar development.

Michael Duke, Geotimes, 35:7, July 1990

OMB CONSIDERS DATA COMMITTEE, A-16 REVISIONS

The Office of Management and Budget (OMB) is considering the establishment of a new interagency group, the Federal Geographic Data Committee (FGDC), as a vehicle to coordinate spatial data and related activities. Federal mapping, surveying and related activities currently are coordinated interdepartmentally through the Federal Interagency Coordinating Committee for Digital Cartography (FICCDC).

The FICCDC was mandated in 1983 and rechartered in 1989 to facilitate the coordination of federal agency digital cartographic activities. It consists of a steering committee and working groups on user applications, technology exchange, requirements, standards and reports. The FICCDC is chaired by the Department of Interior's U.S. Geological Survey, National Mapping Division (NMD).

Since its establishment, more and more of the group's activities have been GIS oriented. Most new activities in the federal mapping community are related to GIS and digital spatial data. In recognition of this evolution from mapping to spatially oriented decision support systems, the group was asked in 1989 to analyze its own mission.

In its report to OMB this spring, the committee recommended that the FGDC be established to address the need for a national group to provide coordination, standards and guidelines for the production and exchange of digital spatial data and a forum for exchange of information and education on GIS and related spatial data processing technologies. Additionally, the FICCDC recommended treating digital spatial production requirements the same way the federal government establishes priorities for mapping and surveying requirements.

If the recommendation is approved, the OMB will formally recognize locationally tied resource and environmental data, cultural demographics and ground transportation data as part of NMD's responsibility. These data currently are collected and stored by a variety of federal agencies scattered across numerous departments. If OMB accepts the committee proposal, as expected, the current FICCDC will disband, and its responsibilities will transfer to the FGDC. If the OMB rejects the proposal, the current charter for FICCDC will remain active until 1992.

In a related move, the FICCDC recently sent a proposal to the OMB to revise circular A-16,

(continued on page 33)

featured article

Maps in Children's Literature

Jeffrey C. Patton
Nancy B. Ryckman

This paper reports the findings of a survey conducted to determine the frequency and use of maps in two categories of children's fiction books: those aimed at children just beginning to read and those intended for readers at the third to sixth grade level. The number of maps, type, purpose and general scale were noted. Results from the two samples were compared to similar information gathered for the Newbery and Caldecott award and honor winning books. While books for older children had twice as many maps as those for beginning readers the Newbery and Caldecott books had the highest percentage. Large scale maps were used more frequently than small scale maps and the number of fantasy maps and real maps was about equal. Maps tended to be used to explain the spatial events of the story but also many were employed as props or as general locational illustrations with little reference to the story.

INTRODUCTION

During the past 40 years cartographers, along with their colleagues in psychology and education, have focused their investigations of children and maps on three interrelated issues: first, how and when map skills should be taught (Rushdoony 1968, Freundschuh 1987); second, what cognitive abilities children possess for understanding spatial concepts and map reading (Siegel and White 1975, Blaut, McCleary, and Blaut 1970, Downs and Liben 1986); and third, what map types and symbols are appropriate for children (Bartz 1965, Patton, 1980). While this research has aided greatly in our understanding of the theoretical aspects of map use and provides a strong foundation for cartographers designing maps for children, virtually no work has been published which examines those maps to which children are most frequently exposed, that is, the maps found in children's literature. This paper seeks to answer three fundamental questions concerning maps published for children:

1. How often are maps used in children's literature?
2. What types of maps are used?
3. For what purposes are these maps intended?

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THE SURVEY

To answer these questions a survey of children's fiction was undertaken. As we wished to study those books most read by children we chose to confine our survey to fiction. According to circulation statistics compiled by the Greensboro Public Library Staff, children's fiction books circulate nearly three times as frequently as do non-fiction books.

Our sample was drawn from nearly 10,000 children's fiction books housed in a separate room of the main building of the Greensboro Public Library. The public library serves the city of Greensboro, North Carolina which has a population of approximately 180,000 and is the largest city in a metropolitan area of nearly one million people. The holdings of the main library and its seven branches exceed 671,000 volumes. We felt the collection would be typical of the titles available in most public libraries in the country.

The Greensboro Public Library children's fiction collection has two basic divisions: Easy Reading, that is, those books which are considered appropriate for beginning readers through the second grade, and the Third to Sixth Grade collection for children a few years older. These two

divisions seemed appropriate and were thus utilized in our survey. In addition, for use as a comparison group, it was decided to survey both the Caldecott and Newbery Award and Honor Books. These are undoubtedly the most prestigious awards given in the United States for excellence in children's literature and are available in virtually every public and school library.

For the Easy Reading and the Third to Sixth Grade books the survey was completed by selecting every tenth book on the shelves. For the Caldecott and Newbery volumes all of the fiction award winners and available honor award books were used in the survey. Books in the sample were checked to determine if they had color or black and white illustrations and if so whether any were maps. Books containing a map or maps were pulled from the shelves for further review. This review procedure proved to be the most difficult and in some ways the most interesting aspect of the project. As we paged through book after book we found ourselves repeatedly asking the question, "Is this a map?" In the end we were faced with three stacks of books, those with no maps, those with illustrations which by most definitions were maps, and the largest pile, those with illustrations that we considered "maplike." The most common of these maplike images were the "bird's-eye" views of landscapes. These perspective views ranged from slightly oblique to nearly vertical. One of the strongest conventions we found in children's book illustrations was the inclusion of a bird or an airplane to reinforce the idea that the observer was looking down on the landscape (Figure 1). For the purpose of this study only illustrations which we felt were specifically intended to show spatial location were included as maps. Usually these illustrations contained some cartographic elements such as lettering or symbols. For example, Figure 1 was not considered a map even though it could be used to understand the spatial relationships of the San Francisco Bay Area. If the Golden Gate Bridge, Alcatraz Island, or other sites had been labeled, we would have counted the illustration as a map. Using this admittedly subjective process the vast majority of illustrations in the maplike category were not considered to be maps for the purpose of this survey.

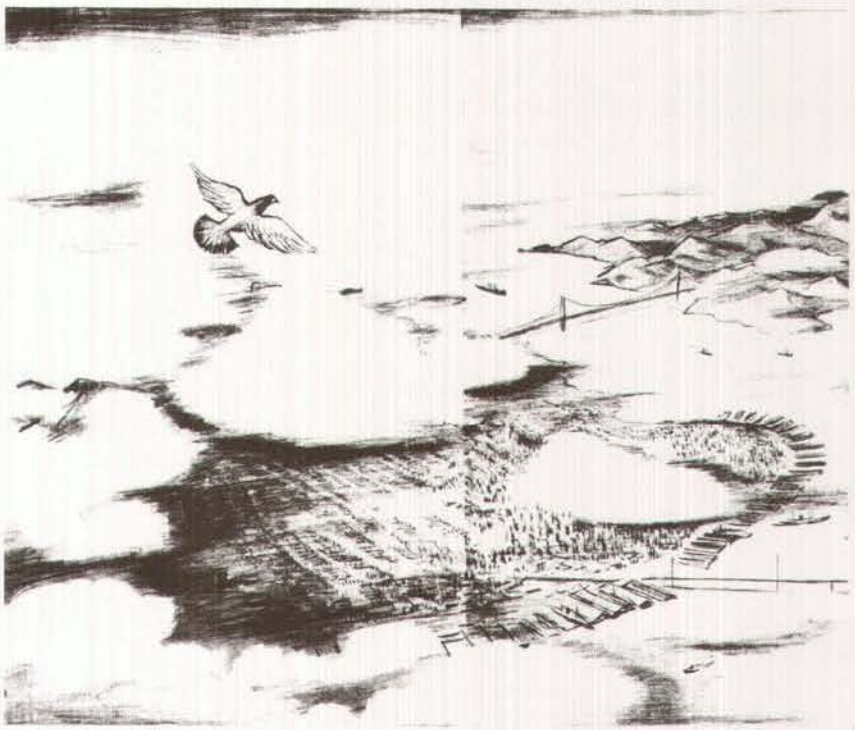

Figure 1: Example of a maplike image of San Francisco (Freeman 1957)

While maplike images were not counted as maps in the statistics shown in Figure 3 their importance for understanding spatial concepts should not be ignored. Many of these maplike images could function as maps, that is, as spatial surrogates, and they may represent bridges for children between their own personal perspective of the world and that view offered by maps.

It should be noted that the designation of what was or was not a map was made by two adults; if children had made those determinations there is convincing evidence to indicate that far fewer of the illustrations would

have been selected as maps. Downs, Liben, and Daggs (1988) questioned forty children between three and six years of age as to whether or not a series of slides were maps. They found that

> "Children and adults were almost unanimous in identifying a prototypical map form. It is a small-to medium-scale, colored representation which depicts the world from directly overhead and which employs conventional cartographic symbols. Deviations from this profile led to an increased likelihood of 'no' or 'not sure' responses, particularly among younger children. . . . On the other hand, with increasing age, the map concept expands to encompass a wider range of spatial representations."

While this important study clearly shows that children have a narrower concept than do adults of what illustrations are maps, the purpose of our study was to determine the number and type of maps to which children are exposed whether they identified the images as maps or not.

Figures 2 and 3 summarize the results of the initial stage of the survey. Figure 2 shows that all books at the Easy level had illustrations with the vast majority of the books (85 percent) utilizing color. The Third to Sixth Grade level sees the introduction of books with no illustrations (18 percent) and a dramatic reduction in the number of books using color for illustrations (down from 85 percent at the Easy level to only 12 percent at the Third to Sixth Grade reading level). The statistics for the Caldecott titles closely parallel the Easy reading books, while the Newbery statistics mirror those of the Third to Sixth Grade books. Although reading level is not a criteria *per se* for these awards, traditionally the Caldecott medals have gone to the Easy reading books while Newbery medals have been given to books at the Third to Sixth Grade reading level.

Figure 3 depicts the use of maps in the books surveyed. Five percent of the Easy reading books contained at least one map; the percentage of

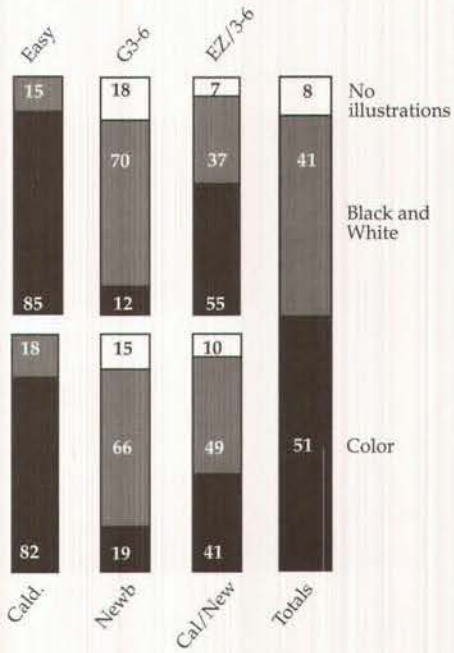

Figure 2: Percentage of books having color, black and white or no illustrations. Total sample size 898 books

Easy 5%	G3-6 10%	EZ/3-6 7%	Totals 8%
Cald. 9%	Newb 13%	Cal/New 12%	

Figure 3: Percentage of books using maps. Total sample size 898 books

books utilizing maps doubled for books written for children at the Third to Sixth Grade reading level. While this dramatic increase in the number of maps in books for the older children might have been predicted, the increased usage of maps in the award-winning books was a somewhat gratifying surprise. The difference in map usage between the Caldecott Award books and the general Easy reading books is considered statistically significant at the .05 level as were the combined totals for maps in the Caldecott and Newbery Award winners when compared to the combined totals for Easy and Third to Sixth Grade level books.

The second portion of this survey involved a more detailed examination of the maps discovered during the survey in order to determine the types of maps being produced for children and the purposes for which they were intended.

SURVEY RESULTS

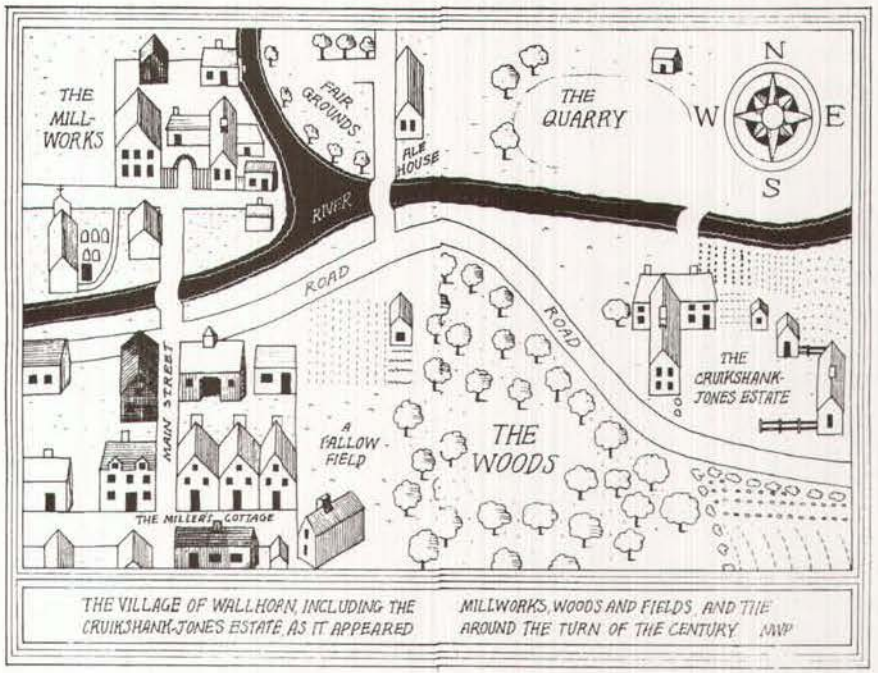

Figure 4: An example of a large scale village map appearing in The Spotted Dog, written and illustrated by Nancy Winslow Parker, Dodd Mead and Company, NY 1980

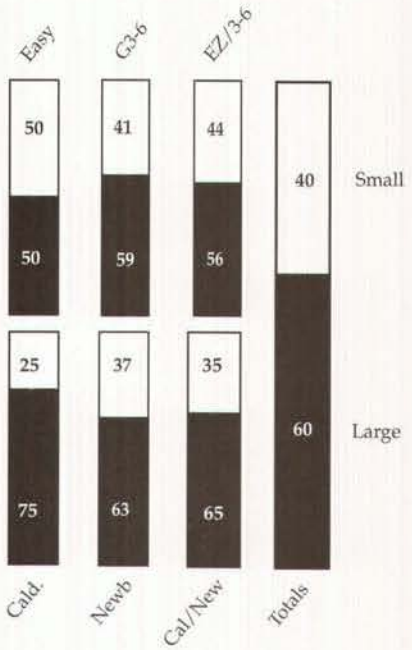

Figure 5: Percentage of maps drawn at a large scale and at a small scale

CLASSIFICATION BY TYPE

Three criteria which proved useful in categorizing maps by type included scale, real versus fantasy locations, and level of symbolic abstraction. In the case of map scale the most frequently employed maps were large scale; these we dubbed "village" maps (Figure 4). Any map which symbolized cities as a dot was considered a small-scale map (Figure 11). Fewer small-scale maps were found (Figure 5).[1] The preponderance of large-scale "village" maps may be an important contrast to the maps to which children are exposed in elementary textbooks and classrooms where according to Downs and Liben (1989), "Most common are political maps, usually of the United States and/or the world . . . small wonder that when shown a wide variety of place representations, children confidently and consistently recognize a small-scale, colored, political map as a map." Some research indicates that large-scale maps may be easier for young children to comprehend because they encompass far smaller environments. Children may be familiar with the concept of "town" or "neighborhood" since these landscapes are part of their everyday world while "Michigan" or "The United States" are merely words to most of them (Cox 1977).

Maps were also divided into those portraying real places and those showing imaginary locations. In light of popular concern about "geographic illiteracy" this division was included to see how many of the maps might aid in learning simple "place name geography." There was remarkable consistency across categories — in every case the division between real and fantasy maps was nearly equal. Often it was difficult to ascertain whether portrayal was imaginary without reading the text, and even then it was not always clear. Some of the most detailed maps were those accompanying fantasy stories (Figure 6). These fantasy maps could be just as revealing of imaginary landscapes as "real" maps could be of actual places and thus just as important to the story. Certainly many of the skills necessary to effectively use these maps are the same.

We expected that an interesting categorization could be based on the level of symbolic abstraction utilized, but we found very little range in symbol abstraction. Robinson and Petchenik (1976) describe a continuum along which all map symbols can be placed ranging from the very mimetic to the highly abstract or arbitrary (Figure 7). Haber and Hershenson (1973) report that the development of cognitive representations of the environment proceeds along a similar continuum beginning with highly eidetic images and evolving toward abstract representation. If children's cognitive representation of the environment is iconic (mimetic) then perhaps the cartographic representations of the environment intended for children should also be iconic. Indeed we found all but a few maps at the

[1]Only maps intended to be used by children reading the story were included in the statistics portrayed in Figure 5. Maps used as props and the two instances of maps included as notes to parents were not used.

Figure 6: An example of a detailed fantasy map (Kendall 1959)

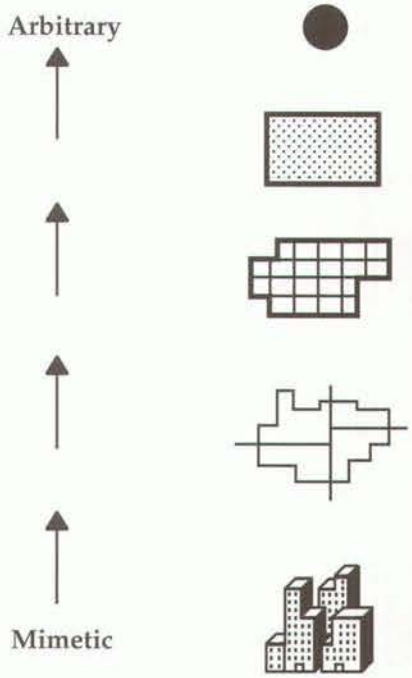

Figure 7: An example of the mimetic to arbitrary range of symbols in the representation of cities. From Robinson and Petchenik 1976

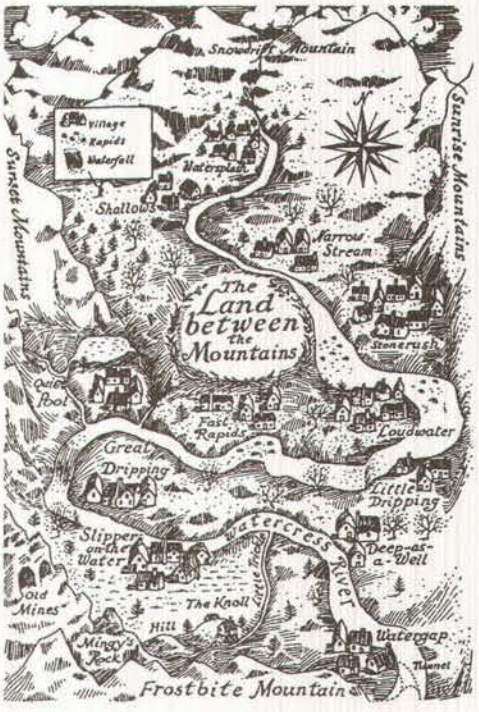

Figure 8: A map utilizing highly mimetic symbols (Kendall 1959)

mimetic end of the continuum (Figure 8). Figure 9, which could be placed near the middle of the continuum, was one of the most abstract, large-scale, maps encountered. Symbols on large-scale maps generally appeared to be correctly scaled, but as the scale of the map decreased, realistic relationships between symbol size and map scale were lost. The result was maps of the U.S. where cities were shown by clusters of buildings or the Rocky Mountains were portrayed as a series of individual peaks. While these overly large symbols may more easily be perceived as representing cities or mountain ranges their use may present a confusing image of the size of areas.

CLASSIFICATION BY PURPOSE

We found three general purposes for children's maps. Like map symbols, these can be arranged along a continuum. The distinction between simple or limited and complex or powerful seems to provide a useful description of the range of purposes we identified.

At the very limited end are those maps which were used simply as props to identify a particular setting. These maps were included with no intention of being utilized as maps (Figure 10). Typical uses of maps as props included wall maps in a school classroom or a globe in a professor's office.

Representing an intermediate point along the continuum are those maps designed to show where a story occurred or whence characters came, but not particularly useful in explaining the events of the story (Figure 11). For example, in a story taking place in Bulgaria there is a map of the country showing only its location in southeast Europe. The map is neither referred to in the story nor were any of the specific actions occurring in the story portrayed on the map (Shannon 1934).

At the more complex or powerful end of the continuum are those maps which help explain or communicate the spatial events of the story. A good example is the use of maps in a mystery story to illustrate where various events occurred, thus furnishing the reader an analytic tool for solving the crime. In another example a map shows where an inquisitive kitten had a series of adventures. The purpose of these maps was to provide a spatial structure to the stories not readily apparent from the text alone. This graphic representation of spatial structure is frequently used to organize or arrange the events of the story or in some cases to provide information not described in the text (Figure 12).

Figure 13 portrays the relative percentages of maps used for each of the three purposes. As might be expected a change was noted in the percentage of maps found in each category, when comparing the Easy books to the Third to Sixth Grade books. The books for the older readers included far more maps classified at the higher end of the spectrum and far fewer maps which were used simply as props. It is interesting to note the same shift when comparing the award-winning books to the books selected from the general collection.

Though only one book which directly attempted to explain map usage to children was found in our survey, several titles were found in the fiction card catalog which were designed to promote an understanding of what a map is or map reading skills. For example, the tale "Old Scudder" describes the compilation of a map by an old mountain man who wanders about plotting a variety of local phenomenon such as a buffalo-shaped butte and a tree shaped like a large nose (Gammell 1983). The primary purpose of the story is to teach the concept of what a map is and how maps use symbols to represent real places. Other educational stories were discovered which explained the use of scale and perspective change (Showers 1975, Schneider and Schneider 1946).

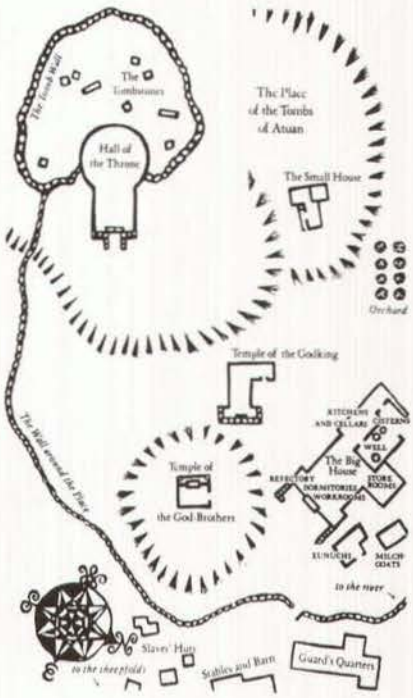

Figure 9: This map in comparison to the map shown in Figure 8 uses a far more abstract symbology. Notice, particularly, the absence of any attempt to show the third dimension. Reprinted with permission of Atheneum Publishers, an imprint of Macmillan Publishing company from The Tombs of Atuan by Ursula K. LeGuin, illustrated by Gail Garraty. Copyright © 1971, Ursula K. LeGuin

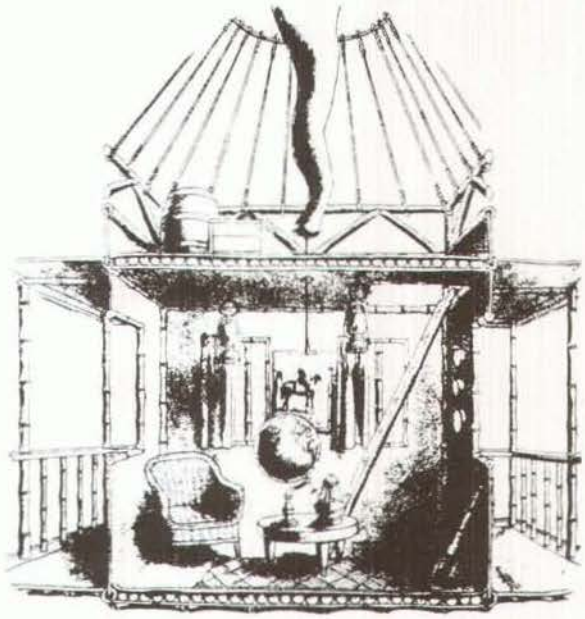

Figure 10: An example of the map as prop. The globe is included to complete a setting, not to be used (DuBois 1947)

Figure 11: A small scale view of Bulgaria used to show the location of the story (Shannon 1934)

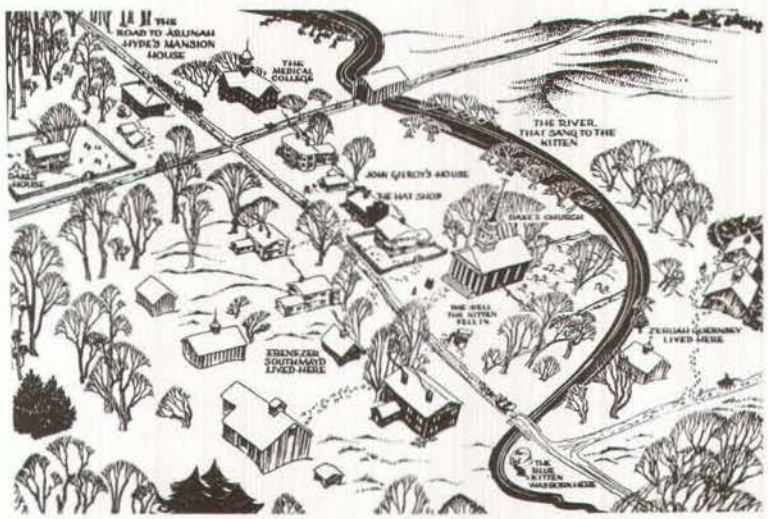

Figure 12: Example of a map whose purpose is to help explain or organize the events of the story appearing in The Blue Cat of Castle Town, The Countryman Press, Woodstock, VT 1987

CONCLUSIONS AND REMARKS

Approximately five percent of books written for children just beginning to read include maps. At the third to sixth grade level the number increases to ten percent. The use of color for illustrations including maps is quite common at the Easy reading level (85 percent), while only 12 percent of the Third to Sixth Grade books employ color. A significantly higher percentage of the Newbery and Caldecott Award and Honor books contained maps than did the general collection. Most maps designed to be used (that is, not used simply as props) were not of real geographic areas.

After reviewing nearly one thousand children's books we have some subjective observations which go beyond the statistics already presented. First, only one book from the sample includes written instructions on how to use maps. While some cartographers and educational psychologists may question the underlying assumption by illustrators that beginning readers can understand maps, the reality is they are commonly used in children's literature.

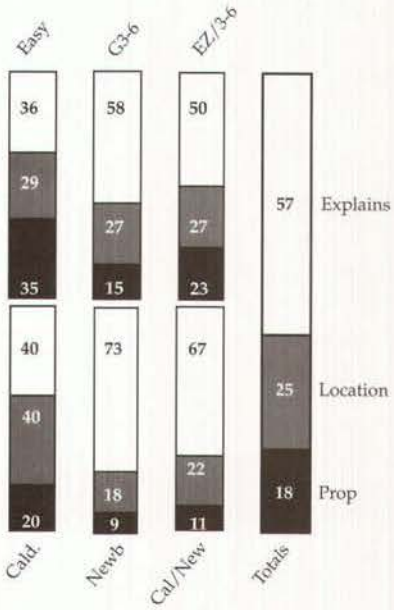

Figure 13: Map purpose: as prop, to show location or to explain events of the story.

Second, we found numerous examples of maps which did not seem appropriate for children. Sometimes maps clearly designed for an older audience are inserted unchanged into children's books. For example, one map employs the rather sophisticated technique of using contour lines to show topography. Other maps failed to match their map symbology to the educational development of children, as in the case of a map using cursive lettering in a book explicitly aimed at the Easy reading level.

Third, we found books which could have benefited greatly by the inclusion of maps, such as a fictitious story based on a historical sailing race around the world which fails to include a map showing the route. Or the innumerable books about children living or traveling in foreign lands which contained no maps.

Finally, some maps and many of the maplike images we surveyed are very innovative and constructed in such a way as to aid in the comprehension of those changes which occur in the transformation of the real environment to a map. To have a child understand that a particular view of a portion of the earth's surface is from above, illustrators include a bird or plane in the sky. The inclusion of these familiar flying objects may make it easier for a child to recognize what a perspective other than his own would look like by tying that view to a concrete object. Scale changes are illuminated by using nested images. For example, the village of Slipper on the Water is shown in considerable detail in Figure 6 and then as a much smaller and less detailed portion of The Land between the Mountains in Figure 8.

SUGGESTIONS FOR FUTURE RESEARCH

Like many investigations this one is preliminary. With each book pulled from the shelves new ideas and new questions kept coming to mind. Some of those questions caused us to revamp what we were doing; others we decided to leave for another day or other researchers. Clearly researchers need to look at non-fiction literature written for children. It is reasonable to assume that there are far more maps available to children on these shelves than on the fiction shelves. Also much more work needs to be done in determining what map types are most effective for different purposes. We would also like to urge more collaboration between children's authors, illustrators, and cartographers.

Many times a map is the only illustration in a book, particularly at the older reading level. In quite a few cases the map was the frontispiece, end sheet, or in some way set apart from other illustrations. This fact coupled with the higher percentage of maps used in the prestigious Newbery and Caldecott books suggests a level of importance attached to maps not given

to other illustrations. Why that should be so is not readily apparent, but perhaps illustrators like cartographers realize the unique and powerful ability of maps to bring something as large as a town, nation, or planet into the child's view. Once brought into the field of vision the child is provided a framework for the comprehension of spatial relationships and for the understanding of place. ⌀

ACKNOWLEDGEMENT

The authors would like to thank Elizabeth Hurd and her staff of the Greensboro Public Library Children's Department for their help and cooperation.

REQUEST

The authors would appreciate receiving copies and/or citations of exceptional or unusual maps in children's literature. Please send any correspondence to Jeff Patton, Dept. of Geography, University of North Carolina-Greensboro, Greensboro, North Carolina 27412.

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El Uso de Mapas en la Literatura Infantil

Extracto

Este escrito expone las encuentras de un reconocimiento producido para determinar la frequencia de el uso de los mapas en dos categorias de la literatura novelesca infantil: esos diseñados para ninos que empiezan a leer y esos disenados para los lectores a el nivel del tercero al sexto grados. La frenquencia de uso, el tipo, el propósito, y la escala general de los mapas fueron notados. Los resultados de las dos pruebas fueron comparado con informaciòn similar buscada en los libros aclamados de Newbery y Caldecott. Mientras los libros diseñados para los niños mayores contenián el doble de los mapas que esos diseñados para los niños menores, generalmente los libros de Newbery y Caldecott contienen un gran por ciento. Mapas con escalas grandes fueron utilizados con más frequencia que esos conteniendo escalas pequeñas y el uso de mapas de fantasia y de mapas efectivos fue uniforme. En los cuentos, los mapas fueron usado para explicar acontecimientos especiales y igualmente fueron utilizados como ilustraciónes generales con poca referencia a la historia.

PUBLISH A FEATURED ARTICLE IN *CP*

The Editors of *CP* and the Publications Committee of the North American Cartographic Information Society invite you to submit manuscripts for consideration as Featured Articles in future issues of *Cartographic Perspectives.* Three of next year's four Featured Articles will be selected by the Publications Committee and the Editors from manuscripts of papers presented at the NACIS X conference in Orlando, October 24-27, 1990. Six copies of manuscripts may be submitted to the Publications Committee chair at the conference. See *Instructions to Contributors* at the back of this issue for details.

cartographic techniques

IMAGESETTING IN DESKTOP MAPPING

Mark Mattson, Department of Geography, Temple University

In a previous contribution to *CP* (Mattson 1989) I stated that "High-resolution PostScript output devices now afford the ability to generate color-separated, plate-ready negatives direct from the designer's desktop." The devices I was referring to are called *imagesetters*. Imagesetters are like laserwriters insofar as they transform PostScript programs into bitmap images. But unlike laserwriters, most of which affix black toner to plain paper at about 300 dots per inch (dpi), imagesetters use laser beams to expose photosensitive films and papers at resolutions up to 3,000 dpi. Another important distinction between laserwriters and imagesetters is price. The average cost of 23 models cited in Steve Roth's useful article "The Imagesetter Explosion" (*Macworld*, February 1990) is $67,500. Obviously, many smaller cartographic design and production facilities will not soon be able to acquire their own imagesetters, but those which use desktop mapping techniques will certainly have to deal with imagesetter service bureaus to get high quality output.[1] This article presents what we have learned about imagesetting at the Temple Cart Lab since we installed a Linotronic L-300 in January 1990. It is intended to be of use both to prospective purchasers and service bureau clients.

Imagesetters are composed of two units, a *raster image processor* (RIP) and an *imaging engine* (Figure 1). PostScript files are transmitted from the desktop workstation to the RIP to be translated into bitmaps by

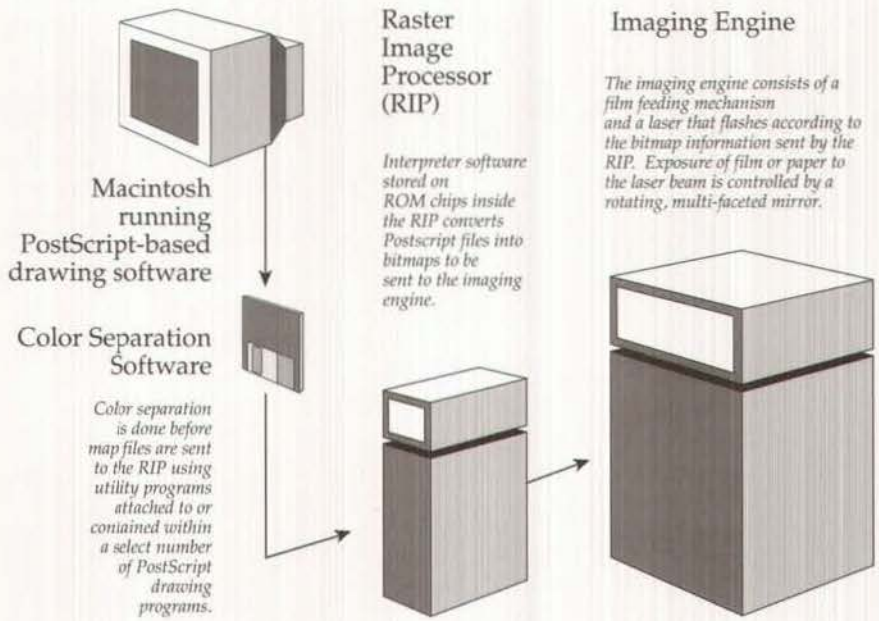

Figure 1: The imagesetter as part of the complete desktop mapping system

PostScript interpreter software. The RIP also contains a hard disk on which fonts are stored together with buffered print jobs. The imaging engine is the device that finally puts dots on film or paper through a series of on/off flashes from a laser beam. Cartridges of exposed paper or film are removed from the imaging engine and developed by an automatic film processor.

As Roth points out, the Linotype corporation enjoyed a monopoly on the laser imagesetter market for the first two years of the desktop publishing revolution. Today at least nine manufacturers[2] offer models which rival and in some ways may surpass Linotype for cartographic production.

To decide between alternative vendors and models, we first considered the requirements of the products we intended to produce. Not all imagesetters do all jobs. A model that is satisfactory for one organization may prove totally inadequate for another. The Temple Cart Lab, for example, needs a machine that produces color-separated film comprised of tint and halftone screens at screen frequencies of at least 120 lines per inch (lpi). A group like our University Publications Office, which typically runs 'repro' (simple paper products comprised of type with no tints or area fills) could do nicely with a less elaborate, relatively inexpensive imagesetter.

Comparing performance and service features of the various models is the second step in selecting an imagesetter. The most important features include PostScript compatibility, image resolution, page buffering, image accuracy, and reliability and service support.

PostScript compatibility

One of the reasons that we chose Linotype was that we were very concerned about compatibility between the imagesetter and the current crop of desktop publishing software packages and PostScript fonts. The Linotronic series is one of five imagesetters lines using licensed Adobe PostScript RIPs. Other machines use RIPs with 'cloned' (non-Adobe) PostScript interpreters. Roth (1990) gives clone interpreters a left-handed endorsement at best, stating that ". . . PostScript clones . . . are now

Manufacturer	Price	Resolution	PostScript Interpreter	Adobe Fonts	Page Buffer	Film Width
Agfa Compugraphic						
CG9400-PSTD	38000	1,200, 2,400	Adobe/Compugraphic	Yes	Yes	13 inches
CG9600-PSTD	61000	1,200, 2,400	Adobe/Compugraphic	Yes	Yes	13 inches
CG9700-PSTD	79000	1,200, 2,400	Adobe/Compugraphic	Yes	Yes	13 inches
Autologic						
APS-PS-PIP-W/670S	60000	1016	Adobe/Autologic	Yes	Yes	12 inches
APS-PS-PIP-W/680	118000	1000	Adobe/Autologic	Yes	Yes	13 .3 inches
APS-PS-PIP-W/108S	107000	1016	Adobe/Autologic	Yes	Yes	18 inches
Linotype						
L-200B	35000	635,846,1270	Adobe/Linotype	Yes	No	12 inches
L-300	60000	635,1270,2540	Adobe/Linotype	Yes	No	12 inches
L-500	80000	635,1270,1693	Adobe/Linotype	Yes	No	18 inches
Monotype						
Express 100	89500	1000	Adobe/Monotype	Yes	No	16.6 inches
Pioneer 70PS	79000	1000,1500	Adobe/Monotype	Yes	No	11.7 inches
Prism PS	39000	600,1200,2400	Adobe/Monotype	Yes	No	11.7 inches
Varityper						
4200B-P	35000	900,1800	Adobe/Varityper	Yes	Yes	11.7 inches
4300-P	54000	1200,2400	Adobe/Varityper	Yes	Yes	11.7 inches
5330	66000	1524,3048	Adobe/Varityper	Yes	No	12 inches

Table 1: Imagesetter vendors and models using licensed Adobe PostScript interpreters. Source: Roth (1990).

getting to the point where compatibility is a lesser concern" [my italics]. He goes on to say that Adobe interpreters are "still more reliable — especially with very large files containing scanned images." Some clones can't yet download Adobe fonts. Even though "makers of clone-based RIPs are catching up fast", we felt that it was prudent to go with an interpreter engineered by the organization that invented PostScript. Currently only five manufacturers feature RIPs that are controlled by Adobe designed boards (Table 1).

Image resolution

Besides the pedigree of their PostScript interpreters, imagesetters vary primarily according to *resolution*. Resolution is defined as the number of addressable points that are contained across the 'x' axis of one square inch. Obviously, as the number of addressable points increases, so does the resolution of the image. A good way to think about this is to imagine a picture in a newspaper and compare that picture to one of the spectacular panoramic shots in National Geographic magazine. The essential difference between the two, aside from color, is resolution. The newspaper shot is so coarse that the dots making up the image are visible without magnification. In the National Geographic shot the resolution is fine and the dots that make up the image are practically invisible from normal reading distance. Figure 2 is a simple demonstration of this concept.

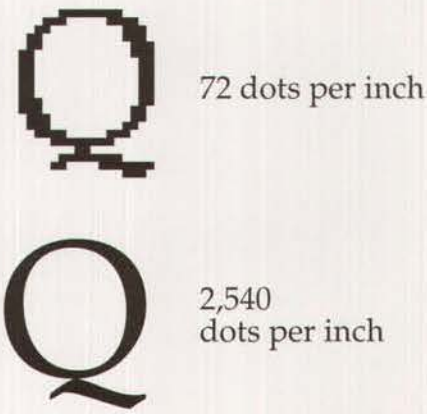

Figure 2: The quality of imagesetter output depends largely on resolution

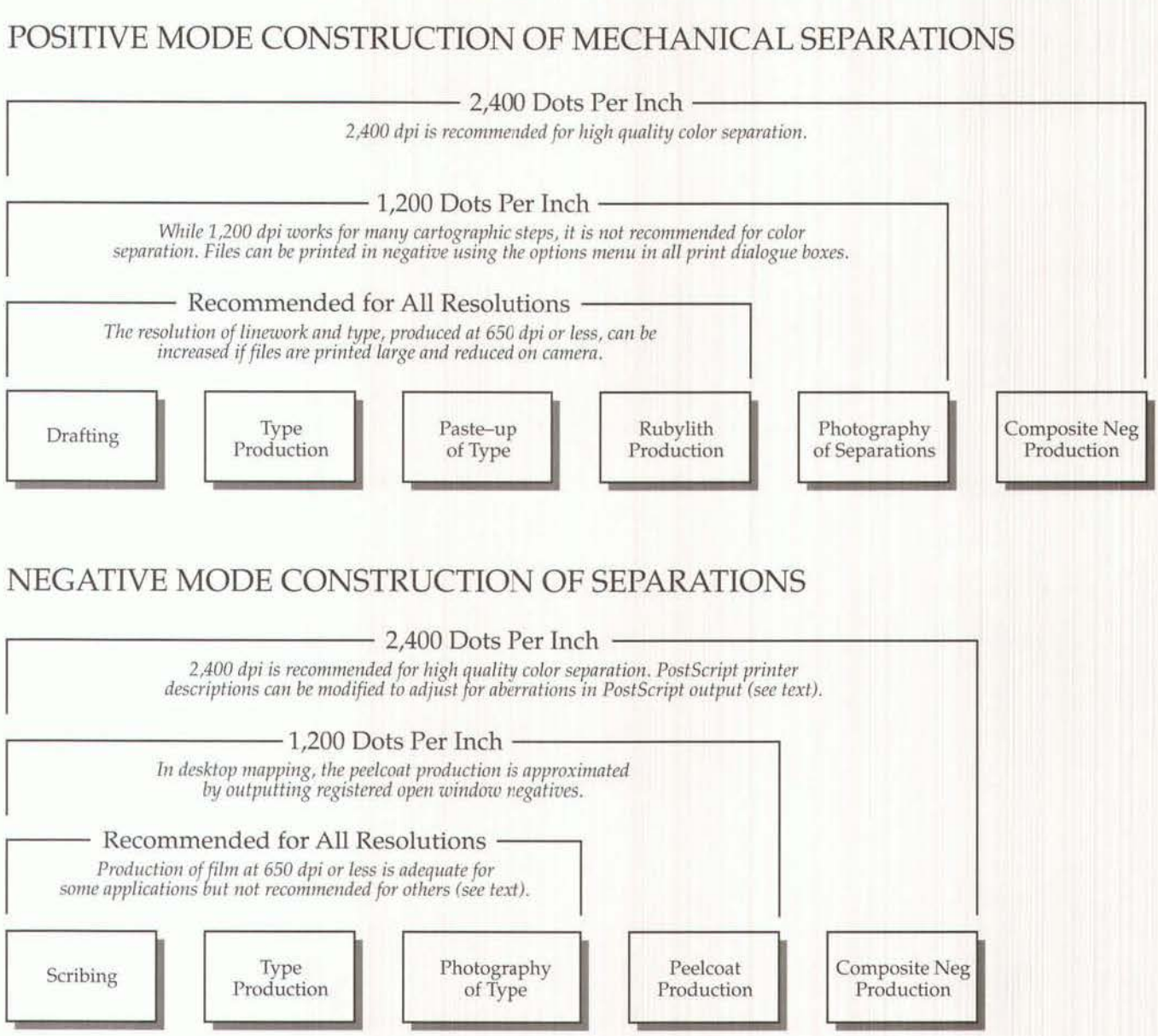

Figure 3: Acceptable imagesetter resolutions for cartographic production tasks

The resolution that can be achieved with today's imagesetters can be categorized in three levels: low (600 dpi), medium (1,000 to 1,240 dpi), and high (2,400 to 3,000 dpi). Figure 3 illustrates the relationship between resolution categories and tasks in a simplified cartographic production flow. The figure shows which tasks can be accomplished satisfactorily at various resolution levels.

In the context of a complete desktop mapping system in which cartographic projects are developed in digital form from design to composite film, an imagesetter — purchased or hired — must be able to deliver 2,400 dpi and above. Cartographers intending to stop somewhere short of composite film can rely on machines generating 1,200 dpi and less. Open window negatives, for example, can be obtained from imagesetters that produce film at 600 to 1,270 dpi. Linework and type can also be generated satisfactorily at these levels (even 300 dpi plain-paper laserwriters can do wonderful work in a traditional production context, particularly if artwork is produced upscale and reduced in a process camera as a way of increasing resolution).

Page buffering

All machines pass film or paper past a light source for exposure. The best products come from imagesetters that do this without interruption. When interruption does occur, streaks or 'artifacts' appear on the output. If the RIP cannot work as quickly as the imaging engine to which it is attached, the engine must stop to wait for information. This 'stop-

ping' is physically manifest as streaks in areas of uninterrupted tint screens. *Page buffering* is a process which guards against engine stoppage by delivering entire imaging jobs that have been placed in short term storage. Table 1, and the product option table in Roth (1990) indicate which models offer this feature.

Image accuracy

One aspect of quality in imagesetting is replicability. The measurement of replicability — known as *image accuracy* — is extremely important to desktop map-makers because it relates directly to the registration of film separations. Image accuracy is a function of the precision with which film or paper is mechanically tracked past the laser for exposure.

When we started experimenting with desktop mapping at Temple we hoped to use the Macintosh to help produce our *Atlas of Pennsylvania*. The registration of the tests that came back from our imagesetter service bureau varied so wildly that we almost gave up the idea of using desktop mapping entirely. We saw variations of as much as a quarter of an inch across a twelve inch sheet. But by changing to a different service bureau (using a different imagesetter) we solved our problems immediately.

When assessing a piece of equipment be aware that the acceptable tolerance for modern engines is four mils (thousandths of an inch) over the width of a twelve inch product (in reality, a good machine will do even better). Manufacturers' technical description sheets will include image accuracy specifications for specific products. Plan also to design a test graphic using drawing software with color-separation tools (like Adobe *Illustrator* or Aldus *FreeHand*) when interviewing potential service bureaus. Prototyping can save hours of aggravation and lost funds due to image accuracy problems.

Reliability and service support

The imagesetter industry is young: the first PostScript imagesetter was introduced by Linotype at the Print '85 trade show, and alternatives to the 'Lino' have only become available in the past year or two. Vendors just entering the imagesetting market simply lack what we perceived to be 'hours on the job.' We worried that we might fall through the cracks of some evolving developmental cycle. This is not to say that such a cycle might not deliver a splendid result in a few years, but we couldn't afford to be $75,000 guinea pigs.

In our effort to assess service support we tried to look beyond the claims of manufacturers' sales forces. According to them we could expect to have a service technician living in our darkroom twenty four hours a day eating leftover sandwich scraps as his only compensation. What we looked for was on-site endorsements. In this respect, Linotype came up smelling like a rose. In fact, I would say it was one of its strong points.

In day-by-day operation, service on a machine like ours reminds me of the old Maytag commercials. You know the ones: the little roly-poly guy feels left out because nobody ever calls him to fix their machine. For us, that's what it's been like. No service needed. I point this out not as an endorsement of Linotype but as a way of soothing those who might think that lasers are spoiled little beasts that require special attention. One of the most amazing things that we found was that this wonder of technology ran with as few demands as our Apple LaserWriter. Beyond some customized programming which I present later in this piece, the machine has run eight hours a day for eight months without a single problem.

AMORTIZATION AND COST JUSTIFICATION

We initiated on a two-step strategy to bring an imagesetter into our lab. The first step was to identify an appropriate product. Step two was to develop an air-tight cost justification to convince our central administration that having a high resolution imaging device on campus was an economically prudent and hence fundable idea. Perhaps some of this information will help other cartographers leverage a machine of their own.

At the time of our proposal we had a yearly flow of approximately 2,100 separations to off-campus service bureaus. At that volume, we were paying $15 per separation for high-resolution (2,540 dpi) film. Prices for output are determined by resolution, product size, and quantity. Resolution and size are the main factors, being related directly to speed of processing. As an example of the relationship between resolution and output speed, we printed Figure 4 on our L-300 at 635, 1270, and 2540 dpi. At 635 dpi, Figure 4 took 6 minutes to output. At 1,270 dpi output time was 10 minutes. At 2,540 dpi, the product was ready for processing in 13 minutes.

In 1989, a typical illustration or atlas page cost us $60.00 given that the standard presentation required a black, cyan, magenta, and yellow composite printer. An atlas of 240 pages (fifteen 16-page signatures) meant an outlay of $14,400. Added to this cost was an unavoidable number of AAs (author's alterations) that cost up to another $2,000 per book to correct.

An imagesetter seemed justifiable given our rate of output. As shown in Table 2, yearly operating costs, if the $75,000 for the imagesetter was amortized over a five-year period, would run just over $30,000. Compare this figure

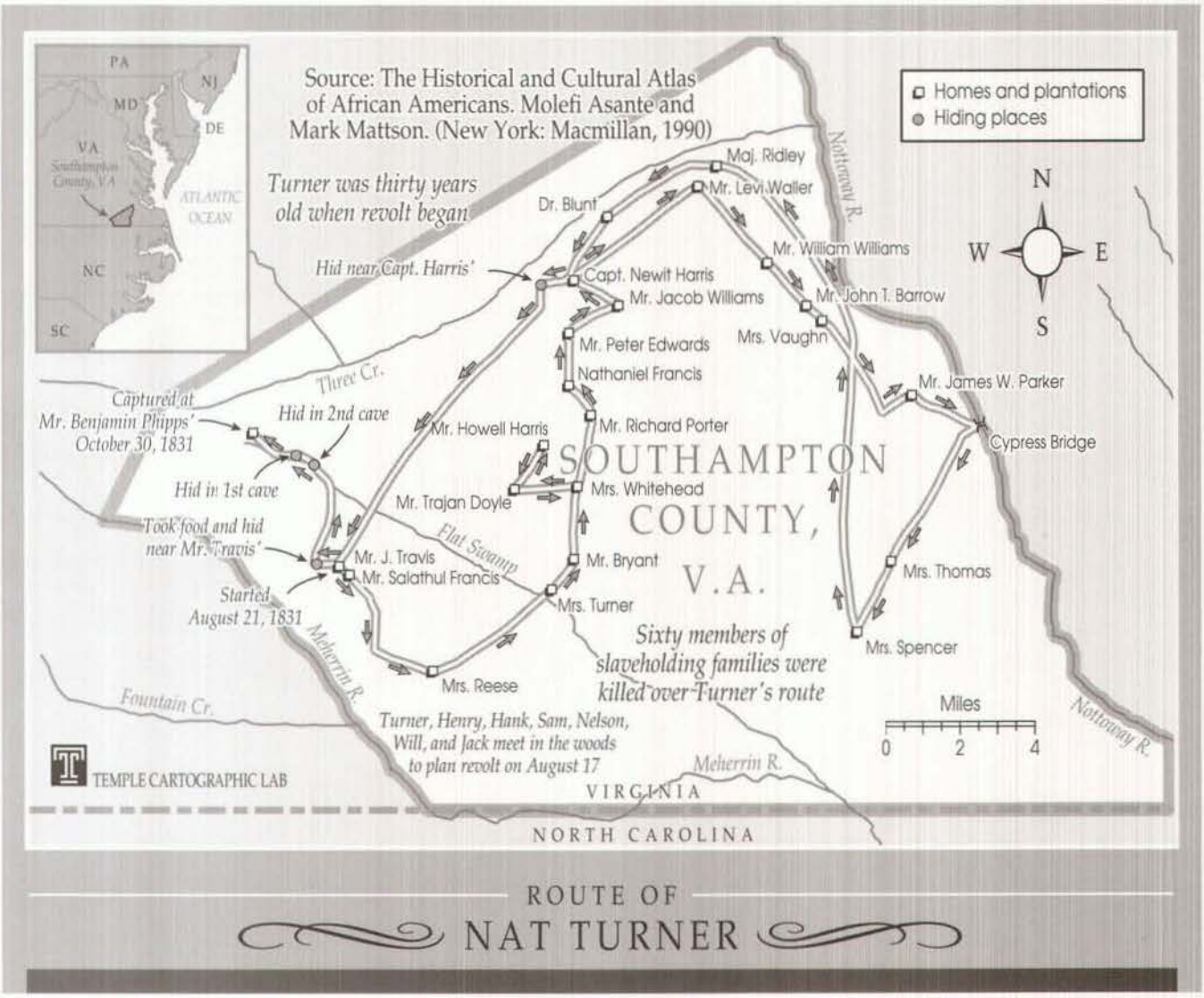

Figure 4: 120Kb graphic produced in Adobe Illustrator 88 used to test imaging times at various resolutions (shown here at 2,540 dpi)

to the $32,000 we anticipated spending on two atlases a year if we continued to send files off campus.

Materials costs were estimated as follows: one hundred foot, 12 inch wide rolls of Fuji PRF-100 laser film was purchased at an extended price of $126.40 per roll; Fuji PRH 100WP laser paper was purchased at $97.00 per 200 foot, 12 inch roll[3]; chemicals cost $31.00 per week for continuous operation of our DuPont 26C rapid access processor. Also factored into our calculations were maintenance contracts for both our film processor and our laser imagesetter and RIP. L-300 maintenance costs a whopping $8,000 per year for full, no questions asked service. Processor service is $1,200 per annum.

Shared services

We could see ourselves breaking even given the preceding scenario, but the proposition was anything but profitable. To carry our strategy forward and to solidify our ideas in the minds of our university hierarchy we needed to justify our expense beyond the mere recovery of costs. To do this we followed the example of an old-time friend and Temple graduate Joe School who currently directs the cartographic lab at the

L-300	**15000**
Maintenance/L-300	**7500**
Maintenance Processor	**1200**
Materials	**3120**
Chemicals	**1553**
Operation and Film Processing	**1800**
Total	**30173**

Table 2: Estimated annual costs of imagesetter operation

University of Maryland's Baltimore campus. His method has been to share services with other Macintosh-based offices on campus and to use their contributions to maintain an L-100 for his lab's contract work. On his campus, as on ours and many others, Macintosh plays an important role in various publications offices. We saw (and fortunately so did our university president) that we could develop quite a little cash-cow if the whole campus stopped sending work elsewhere and started turning it over to us. Funding for our imagesetter was approved.

COLOR SEPARATION

Color separation refers here to the process of reducing a polychromatic screen image to a registered set of negative films which correspond to the printable component colors of the original. Imagesetters generate plate-ready film separates, but they work from PostScript files that have already been color-separated. Software utilities integrated into or associated with PostScript graphics packages do the actual color-separation. Two leading drawing packages used to generate color-separated graphics for imagesetting are Adobe's *Illustrator 88* and Aldus' *FreeHand*.[4]

Comparing *Illustrator* and *FreeHand*

Illustrator and *FreeHand* do color separation differently. To color-separate an *Illustrator* document, the designer invokes a separate program called Adobe *Separator* (Figure 5). *FreeHand's* color separation utility is contained within the drawing program, and is accessible through its print dialog box (Figure 6).

A thorough comparative review of the two packages for cartographic design applications has not yet been published. Which program is better for color separation is a matter of debate. Certainly, *FreeHand's* on-board utility is easier to use. But with respect to image quality, our experience has shown that *FreeHand's* output tends to be plagued with banding at certain line frequencies and printer angles. Of greatest concern, in our shop, has been yellow at 133 lpi (it is possible that our problems are site specific).

Figure 5: Adobe Separator color separation dialog box

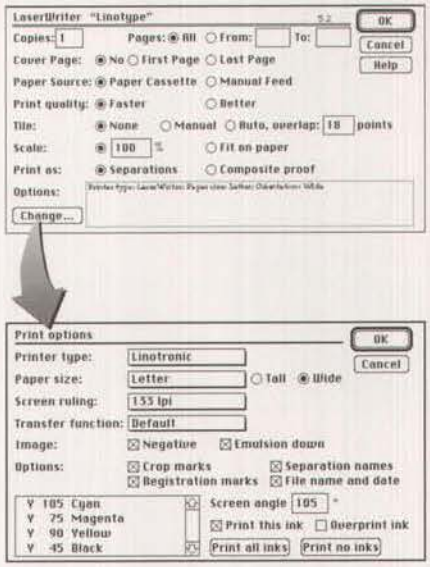

Figure 6: Aldus FreeHand 'Print' and 'Print Options' dialog boxes

Precision color-separation and imaging

After generating thousands of color-separated cartographic products at Temple, we have learned that the screen angles and dot frequencies specified in the process of digital color separation are not precisely realized by imagesetters using Adobe PostScript RIPs (Mattson 1989). These imprecisions can result in moiré patterns during the overprinting of dominant color printers. This problem is particularly acute when heavy screens of black (20 to 60 percent) are incorporated into map design in areas that are overprinted with magenta.

It seemed as though these problems were due to inadequacies in the implementation of the PostScript language itself, and Adobe released "workaround specifications" for avoiding moiré problems.[5] David DiBiase, who has reported good results using *FreeHand* for color separation at Penn State's Deasy GeoGraphics Lab, prompted me to consider that the imprecisions may be attributable to the Adobe's color separation utilities rather than to PostScript itself. To resolve this question I performed an experiment. Identical graphics files were created in both *Illustrator* and *FreeHand*. The *Illustrator* file was also saved in Illustrator 1.1 format, imported in *FreeHand*, and color-separated with *FreeHand's* utility. The color separated files were then output on our L-300. The resulting screened negatives were then carefully measured with a 300-power Nikon microscope. Deviations from specified screen angles were gauged with a 1° - increment transparent protractor. We noted deviations of as much as plus or minus 3° between specified screen angles and what was actually imaged. The screen angle deviations were worst for cyan (105°) and magenta (75°) screens separated by Adobe *Separator* at 90 and 133 lpi, and for 120 and 133 lpi screens separated in *FreeHand* (Table 3). The Adobe files imported and color-separated in *FreeHand* mirrored the *FreeHand* deviations at 90 and 120 lpi, but matched the *Illustrator* deviations at 133 lpi. Screen angle deviations were identical in all three categories (and smallest) at 150 lpi. In all

	Adobe Separator	Deviation	Aldus FreeHand File	Deviation	Illustrator 1.1 File, FreeHand Separator	Deviation
90 LPI						
Cyan (105°)	102°	-3	106°	1	106°	1
Magenta (75°)	77°	2	74°	-1	74°	-1
Yellow (90°)	90°	0	90°	0	90°	0
Black (45°)	45°	0	45°	0	45°	0
120 LPI						
Cyan (105°)	104°	-1	107°	2	107°	2
Magenta (75°)	76°	1	73°	-2	73°	-2
Yellow (90°)	90°	0	90°	0	90°	0
Black (45°)	45°	0	45°	0	45°	0
133 LPI						
Cyan (105°)	108°	3	103°	-2	102°	-3
Magenta (75°)	72°	-3	77°	2	78°	3
Yellow (90°)	90°	0	90°	0	90°	0
Black (45°)	45°	0	45°	0	45°	0
150 LPI						
Cyan (105°)	104°	-1	104°	-1	104°	-1
Magenta (75°)	76°	1	76°	1	76°	1
Yellow (90°)	90°	0	90°	0	90°	0
Black (45°)	45°	0	45°	0	45°	0

Table 3: Observed discrepancies between screen angles specified in color separation utilities and imaged with Linotronic L-300 imagesetter

cases, screen angles were precisely imaged for the yellow (90°) and black (45°) printers. The average absolute deviation for screen angles separated with Adobe *Separator* is .94°; *FreeHand's* separation utility is slightly more precise overall at .75° average absolute deviation (Table 4). Dot frequencies varied identically for both separators at more than 5 percent at 90 and 120 lpi, but less than 2 percent at 133 and 150 lpi. These results suggest that the precision of screen angles imaged by the L-300 are at least partly a function of the color separation software associated with drawing packages. Dot frequency imprecisions still appear to be caused by a PostScript interpretation problem, which is not likely to go away until 1992 when Adobe introduces PostScript Level 2.[6] Until then, *PostScript Printer Descriptions* (PPDs) customized with correcting parameters will have to serve as substitutes for clean and accurate screen production. The following section presents custom PPD code that may help imagesetter service bureau clients and imagesetter owners to avoid these problems.

PostScript Printer Descriptions (PPDs)

Critical image properties like dot frequency (lpi), screen angle, dot shape, dot density, color, and page sizes are assigned to each PostScript file and are communicated to the imagesetter as a series of instructions known collectively as PPDs. In the absence of a PPD the imagesetter falls back on a series of default parameters which may not match the user's needs. The proper use of PPDs can make the difference between good and poorly executed products. Adobe *Separator* requires the user to select a PPD for the target printer. Adobe PPDs can be stored in a folder anywhere on the Mac's hard disk, though Adobe recommends that a copy of the appropriate PPD be placed in the same folder or diskette as the graphics file for faster printer performance. *FreeHand* automatically links the appropriate APD (Aldus Printer Description) when a printer is selected in its print dialog box. *FreeHand's* installation routine places its APDs in the Mac's system folder.

***Illustrator* and *FreeHand* handling of PPDs**

Both *Illustrator* and *FreeHand* offer controls over page description functions. The essential difference

Resolution	Adobe Separator	% Deviation	Aldus FreeHand Separator	% Deviation	Illustrator 1.1 File, FreeHand Separator	% Deviation
90 LPI						
Cyan (105°)	95	5.2	95	5.2	95	5.2
Magenta (75°)	95	5.2	95	5.2	95	5.2
Yellow (90°)	95	5.2	95	5.2	95	5.2
Black (45°)	95	5.2	95	5.2	95	5.2
120 LPI						
Cyan (105°)	127	5.5	127	5.5	127	5.5
Magenta (75°)	127	5.5	127	5.5	127	5.5
Yellow (90°)	127	5.5	127	5.5	127	5.5
Black (45°)	127	5.5	127	5.5	127	5.5
133 LPI						
Cyan (105°)	135	1.5	135	1.5	135	1.5
Magenta (75°)	135	1.5	135	1.5	135	1.5
Yellow (90°)	135	1.5	135	1.5	135	1.5
Black (45°)	135	1.5	135	1.5	135	1.5
150 LPI						
Cyan (105°)	152	1.3	152	1.3	152	1.3
Magenta (75°)	152	1.3	152	1.3	152	1.3
Yellow (90°)	152	1.3	152	1.3	152	1.3
Black (45°)	152	1.3	152	1.3	152	1.3

Table 4: Observed discrepancies between dot frequencies specified in color separation utilities and imaged with Linotronic L-300 separator

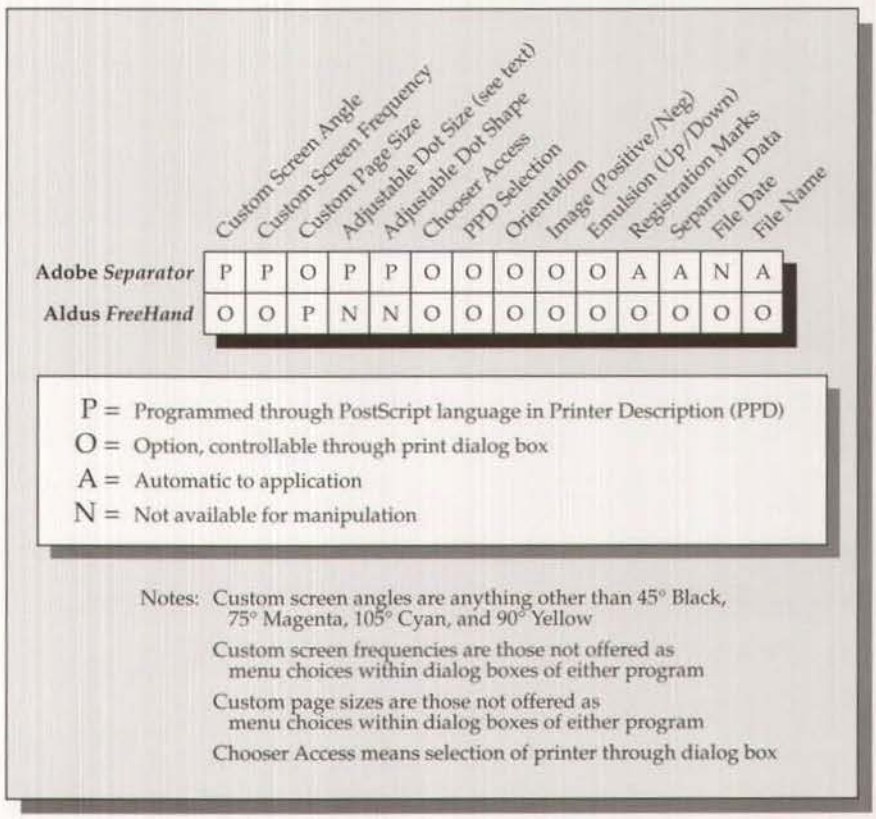

Figure 7: Comparison of PostScript Printer Description options using Adobe Illustrator/Separator and Aldus FreeHand

is how they are handled. In each case, certain functions are changed in the separator while others are changed in the PPD code. Figure 7 shows which functions can be controlled from the computer and which functions are controlled through PostScript programming (programming details will be illustrated in the final section). The only functions that can be performed by the Adobe PPD and not the Aldus APD are adjustments in dot shape and dot size. Regarding dot shape, the Adobe PPD can be used to create round, square, or elliptical dots. The APD can not. More importantly, however, is dot size. With certain adjustments to the PPD the amount of black covering each inch can be adjusted.

I would like to use the initial set-up of our L-300 as an example of why this is important. When we got our machine, we also bought a $1500 Tobias TB+ transmission densitometer. We wanted to check whether our negatives were of adequate density and correct screen specifications. If they did not and we were getting a 14 percent tint when we were calling for a 10, our color designs would be unpredictable and in many cases unsuccessful.

As expected, we found that the Linotronic didn't produce a predictably accurate dot straight off the shipping skid and needed adjustment to meet tolerance. We also found out, through hiring a consultant, that the adjustment wasn't on the imagesetter but was instead inside the PPD. As a result, one of our first tasks was to run every dot density from 10 percent to 100 percent for all four process colors to determine how true they were coming straight off the machine. Our second task was to re-program our PPDs to correct for inaccurate dot density.

Customizing PPDs

In some cases, adjustments to printer descriptions are needed for the reasons described above and can be accomplished through simple programming. I say simple because, like many of our colleagues, we are hardly what anyone could call computer geniuses. We learned to customize PPDs through a method that can be best described 'monkey-see-monkey-do'. Areas that will be covered for *Illustrator* are line frequency, screen orientation, and dot size. Covered for Aldus *FreeHand* and *PageMaker* will be custom page sizes.

PostScript printer descriptions are in ASCII text format and can be opened through any text editor or word processing program. It would probably be helpful if our readers were to open an Illustrator PPD now. Each imagesetter needs a PPD designed for it. An L-300 PPD starts with the following header:

```
*% L300 CART LAB STANDARD PPD
*%
*% Adobe PostScript(R) Printer Description File
*% For "Linotype" version 47.0
*% Produced by "GETapd.ps" version 2.0 edit 47
*%
*% Copyright 1988 Adobe Systems Incorporated. All Rights
Reserved.
*% Permission is granted for redistribution of this file as
*% long as this copyright notice is intact and the contents
*% of the file is not altered in any way from its original form.
*%
*% The byte count of this file should be exactly 015357.
*%
*% Date: 3/30/88
*FormatVersion: "2.0"
*FileVersion: "1.0"
*LanguageVersion: English
```

Further along in the document is a line that reads:

```
*% Color Separation Information ==================
```

This note starts the section of the Adobe PPD that deals with color separation. Information is organized according to line frequency. A standard PPD starts with 90 lpi and is followed by 120, 133, and 150. In each section, the information is the same. The 133 section looks like this:

```
*% For 133 lpi set ==============================

*ColorSepScreenAngle ProcessCyan.133lpi/133 lpi: "15"
*ColorSepScreenAngle ProcessMagenta.133lpi/133 lpi: "75"
*ColorSepScreenAngle ProcessYellow.133lpi/133 lpi: "0"
*ColorSepScreenAngle ProcessBlack.133lpi/133 lpi: "45"
*ColorSepScreenAngle CustomColor.133lpi/133 lpi: "45"

*ColorSepScreenFreq ProcessCyan.133lpi/133 lpi: "133"
*ColorSepScreenFreq ProcessMagenta.133lpi/133 lpi: "133"
*ColorSepScreenFreq ProcessYellow.133lpi/133 lpi: "133"
*ColorSepScreenFreq ProcessBlack.133lpi/133 lpi: "133"
*ColorSepScreenFreq CustomColor.133lpi/133 lpi: "133"

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*ColorSepTransfer ProcessBlack.133lpi/133 lpi: "{
mark
1.0 1.0 .94 .85 .76 .66 .56 .48 .38 .28 .16 .0
counttomark dup 3 add -1 roll exch
2 sub mul dup floor cvi
dup 3 1 roll sub
exch dup
3 add index exch 2 add index dup
4 1 roll
sub mul add
counttomark 1 add 1 roll
cleartomark
} bind
"
*End
```

The first two sections of the following modified PPD will effect the Adobe "workaround specifications" to correct for imprecisions in screen angle and dot frequency imaging (bold type indicates new specifications). The modified third section is a ColorSepTransfer procedure to change dot density for each of the process colors. Keep in mind that only the 133 lpi set needs to be changed to implement adjustments to the PPD. When printing through Adobe *Separator* use the 133 lpi print option:

```
*ColorSepScreenAngle ProcessCyan.133lpi/133 lpi: "72"
*ColorSepScreenAngle ProcessMagenta.133lpi/133 lpi: "18"
*ColorSepScreenAngle ProcessYellow.133lpi/133 lpi: "0"
*ColorSepScreenAngle ProcessBlack.133lpi/133 lpi: "45"
*ColorSepScreenAngle CustomColor.133lpi/133 lpi: "45"

*ColorSepScreenFreq ProcessCyan.133lpi/133 lpi: "133"
*ColorSepScreenFreq ProcessMagenta.133lpi/133 lpi: "133"
*ColorSepScreenFreq ProcessYellow.133lpi/133 lpi: "127"
*ColorSepScreenFreq ProcessBlack.133lpi/133 lpi: "120"
*ColorSepScreenFreq CustomColor.133lpi/133 lpi: "133"

.
.
.

*ColorSepTransfer ProcessCyan.133lpi/133 lpi: "{
mark
1.0 1.0 .88 .79 .69 .59 .49 .40 .30 .21 .10 .0
counttomark dup 3 add -1 roll exch
2 sub mul dup floor cvi
dup 3 1 roll sub
exch dup
3 add index exch 2 add index dup
4 1 roll
sub mul add
counttomark 1 add 1 roll
cleartomark
} bind
```

```
"
*End
*ColorSepTransfer ProcessMagenta.133lpi/133 lpi: "{
mark
1.0 1.0 .88 .79 .69 .59 .49 .40 .30 .21 .10 .0
counttomark dup 3 add -1 roll exch
2 sub mul dup floor cvi
dup 3 1 roll sub
exch dup
3 add index exch 2 add index dup
4 1 roll
sub mul add
counttomark 1 add 1 roll
cleartomark
} bind
"
*End
*ColorSepTransfer ProcessYellow.133lpi/133 lpi: "{
mark
1.0 1.0 .88 .79 .69 .59 .49 .40 .30 .21 .10 .0
counttomark dup 3 add -1 roll exch
2 sub mul dup floor cvi
dup 3 1 roll sub
exch dup
3 add index exch 2 add index dup
4 1 roll
sub mul add
counttomark 1 add 1 roll
cleartomark
} bind
"
*End
*ColorSepTransfer ProcessBlack.133lpi/133 lpi: "{
mark
1.0 1.0 .94 .85 .76 .66 .56 .48 .37 .28 .15 .0
counttomark dup 3 add -1 roll exch
2 sub mul dup floor cvi
dup 3 1 roll sub
exch dup
3 add index exch 2 add index dup
4 1 roll
sub mul add
counttomark 1 add 1 roll
cleartomark
} bind
"
*End
```

Customizing Aldus APDs

Nearly all Aldus APD functions are conveniently controlled through the *FreeHand* print dialog box. The one area that requires manipulation through language is custom page size. Adding a new APD for a custom page size will allow for the printing of documents larger in size than the options built directly into the program. It will also allow for smaller formats that can be used to crop small images to save processing time and materials (why print a 3"x 4" map on a full page when a smaller sheet can be created?).

To add a custom page size go to the section that reads:

```
@Comment: PageSize options appear in the "Paper" list box in the
Printer-specific dialog.
@DefaultPageSize:"Letter"
@PageSize Letter:
"letter"
.
.
.
@Comment: PageRegion gives the printable area of each paper
option.
@PageRegion Letter:
"0 0 612 792"
.
.
.
@Comment: PaperDimension gives the total paper size of each
option.
@PaperDimension Letter:
"612 792"
.
.
.
```

Add this new line after:

@PageSize Letter."letter":

```
@PageSize Newsize:
"statusdict begin 720 864 0 1 setpageparams end"
```

Also add this new line after @PageRegion Letter: "0 0 612 792":

```
@PageRegion Newsize:
"0 0 720 864"
```

Finally, add this line after @PaperDimension Letter: "612 792":

```
@PaperDimension Newsize:
"720 864"
```

In the preceding example '720' and '864' are the sizes of the new page, in points. Quick arithmetic reveals that we have created a custom page size that is 10 by 12 inches. To use the custom page size click "change" in *FreeHand's* print dialog box. Then select the new APD from the "Printer type" scroll box and the new paper size from the "Paper" scroll box.

Comments

Never modify original PPDs or APDs, only copies. Add only the lines specified above. Never exceed the maximum size of the imagesetter. Also be aware that commands having to do with page orientation that are infused into the original file will be overridden in Adobe *Separator*. In other words, if landscape orientation is specified in *Illustrator* and landscape is used in *Separator* the map will turn a second time and end up in a portrait mode.

CONCLUSION

Whatever vendor and model, whether through a service bureau or in-house, the PostScript imagesetter is a critical part of the complete desktop mapping system. Coupled with color separation utilities and PostScript drawing packages, this device supplants traditional photomechanical methods for high-quality, color thematic map design and production. ⌀

NOTES

1. An annual directory of PostScript imaging service bureaus is available from *Electronic Publishing & Printing*, 29 North Wacker Drive, Chicago IL 60606-2574.

2. A complete table of imagesetter vendors, models, and features can be found in Roth (1990).

3. Several companies manufacture compatible film and paper products, including DuPont, Anitec, and Kodak. Our tests indicated that Fuji's products are superior for overall density, dot structure, and consistency of emulsion.

4. This assessment follows from the editor's conversation with Mike Gladden of Waldman Graphics, Pennsauken, NJ, a major PostScript imaging service bureau. Gladden reported (in October 1989) that *Illustrator*, *FreeHand*, Aldus *PageMaker* and Quark *XPress* files accounted for "95 percent of the Lino output at Waldman."

5. As reported in Mattson (1989), Adobe's "workaround specifications" are as follows: Black 45° 120 lpi; Cyan 72° 133 lpi; Magenta 18° 133 lpi, Yellow 0° 127 lpi.

6. See "Adobe PostScript Level 2," *TypeWorld* 14:13, July 1990.

REFERENCES

Mattson, Mark (1989). Desktop mapping at Temple University. *Cartographic Perspectives* 3, Fall 1989; pp. 3-12.

Roth, Steven (1990). The imagesetter explosion. *Macworld*, February 1990; pp. 141-147.

ACKNOWLEDGEMENT

David DiBiase's contributions to this article, both editorial and substantive, are appreciated.

GIS REPORT AVAILABLE

SEAI'S new three-volume 588-page report on *Geographic Information Systems: An Assessment of Technology, Applications, and Products* is designed as a strategic planning guide for organizations interested in the benefits of GIS implementation and companies seeking to exploit the market opportunities which GIS presents. The report focuses on the practical aspects of GIS: PC and workstation-based systems, assessment of commercial products, and implementation. Chapters 7, 8 and 9 include a description of over 300 GIS installations and products. Five GIS case studies are described in detail in chapter ten. An assessment of the commercial products and services of 126 companies is presented in chapter 13.

The report is available for $485 from SEAI Technical Publications, Inc., P. O. Box 590, Madison, GA, (404) 342-9638, FAX: (404) 342-9642.

BASIC MAP READING I AND II: SLIDE/TAPE PROGRAMS

S.D. Johnson and A.C. Kellie, Virginia Polytechnic Institute and State University, Blacksburg, Department of Civil Engineering, November 1982, 23p, OSM-565. PB90-199613/WNR; price code PC A03/MF A01.

The Basic Map Reading program is a narrated visual treatment of skills necessary to use and understand topographic maps properly. The program emphasizes standard USGS 15' quadrangle maps, but the basic skills explained in the program are useful when using any topographic map. The program is divided into Parts I and II to make the segments short enough for comfortable viewing and listening without fatigue and to provide a natural break in the content of the material presented. Part I deals with the quantitative aspects of a topographic map and the important features of a USGS 15' quadrangle map sheet. The program shows how distance, elevation, direction, area, and position are determined from a topographic map. Part II treats the qualitative aspects of a topographic map. Interpretation skills necessary to understand symbology and identify landforms using contour lines are covered in this segment.

Contact: National Technical Information Systems, 5285 Port Royal Road, Springfield, VA 22161.

NEW LANDSAT GROUND RECEIVING STATION PLANNED

The Turkish government has informed the Earth Observation Satellite Co. (EOSAT) that it plans to build a satellite ground station to receive and process Landsat remote sensing data. The station will be located near Ankara, Turkey, and is scheduled to be operational by the launch of Landsat 6 in late 1991.

The government-owned Post, Telegraph and Telephone (PTT) will oversee construction and operation of the Ankara station. Within the next month, the PTT anticipates soliciting bids for construction of the multi-million dollar station. Construction is expected to be completed in about one year.

The Ankara station will be the eighteenth ground station built to receive Landsat data. All seventeen existing Landsat ground stations have been built by the governments of the countries in which they are located. Station operators pay EOSAT an annual fee to receive Landsat data which may then be sold by the station.

New Landsat ground receiving stations have been coming on line since EOSAT acquired control of the Landsat program in 1985. The two most recent additions were Quito, Ecuador, in November 1989, and Islamabad, Pakistan, in early 1989. Interest has also been expressed in building new stations in Kenya, Western China, New Zealand, Korea and Taiwan.

TIGER FILES FOR PCs

American Digital Cartography, Appleton, WI., has announced that it can now provide Topographically Integrated Geographic Encoding and Referencing System (TIGER) Line Files in formats that run on PCs and workstations. TIGER Line Files were produced by the U.S. Census Bureau in cooperation with the U.S. Geological Survey and contain information on streets and roads, railroads, water features, political boundaries and census geography. Users can display, modify, add features and plot digital TIGER maps using AutoCAD, Intergraph and most popular CAD and GIS packages. *GIS World, 3:3, June/July 1990*

TIGER-TO-DXF TRANSLATOR

Micro Map and CAD, Littleton, CO, has released a stand-alone translator that provides users of AutoCAD with access to the Census Bureau TIGER map files. TIGER-to-DXF Translator is a fully customizable translation utility that converts TIGER basic data and shape files into AutoCAD Rel10 compatible DXF files. TIGER map features may be translated with customizable parameters for linetype, color, polyline width and merging layer names. The TIGER-to-DXF TRANSLATOR comes with a simple TIGER attribute viewing program that allows TIGER record viewing as a pop-down menu choice.

Contact: Micro Map and CAD, P.O. Box 621135, Littleton, CO, 80162, (303) 973-2768.

NEW MARKET STUDY ON AUTOMATED MAPPING

Applied Data Corporation, a Boston area market research firm, has just completed a new survey of the latest technology for automating mapping and mapmaking. The survey identifies several mapmaking applications and end user mapping markets which offer significant growth opportunities for cartographic firms and their suppliers. The results of this survey are examined in detail in a new and comprehensive market study.

One of the most prominent and influential trends is the growth of desktop mapping. As desktop computers have gained power, cartographic databases have expanded in detail and variety. The software that integrates cartographic and demographic databases continues to become more powerful and easy to use.

The study contains market analysis, statistics, end user profiles, product descriptions and forecasts designed to provide readers with all of the information necessary to identify technology trends and growth opportunities for automated mapping and mapmaking. One hundred twenty five pages in length, it is available for immediate delivery from Applied Data Corporation, P.O. Box 834, Andover, MA 01810. The price is U. S. $1,050; supplemental copies are priced at $150 each.

fugitive cartographic literature

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

Ziegler, A. M. (1990) Mapping the mesozoic and cenozoic at the University of Chicago. *Geotimes*, April 1990, pp. 23-24.
reviewed by Edward J. Hall, Kent State University

The Paleogeographic Atlas Project of the Department of Geophysics at the University of Chicago was founded in 1975. Its goal, among others, was to produce a large format, full color Mesozoic/ Cenozoic paleogeographic atlas of the world. The project involves developing several computerized databases in order to produce the atlas and to assist in various projects tied to the atlas.

The first step in atlas preparation is to generate base maps. The continental shapes and interrelationships need to be researched and verified. The next step is to figure the rotational axis for each time period under consideration. The project must also establish the polar position for each map interval to within five degrees — a difficult level of accuracy to achieve. The project must also assemble statistically reliable paleomagnetic data for comparison with paleoclimatologically sensitive sediments and floral data without incurring circularity from using the data.

The team of researchers is charting the positions of shorelines and various bathymetric and topographic contours. Inferences on the pattern of shoreline motion can be made long after the direct record has been erased once it is known if a basin results from thrust loading or extension. Physiographic studies will be made after the effects of glacial loading on the Canadian Shield, Greenland, and the Baltic Shield are determined, reversed and evaluated. Warping of the shield areas and the appearance of kilometer-high mountain ranges appeared to be common at that time.

An epeiric sea connection across Manitoba to Hudson's Bay and through the Hudson Strait to the Labrador Sea may explain the similarities of Cretaceous faunas from the Western Interior Basin (North America) to West Greenland.

Inferences may also be made about the Cretaceous marine rocks through combining a knowledge of sea level curves with biogeographic connections. The aim of the Paleogeographic Atlas Project is to complete the Mesozoic/ Cenozoic North American maps by June 1990 and then the maps of Europe and northern Asia. The last major problem area in producing the base maps and the final atlas will be the completion of the plate-tectonic interpretations of the Alpine and central Tethyan zone.

The scope of this atlas is extremely ambitious. I look forward to seeing the published volume.

Monmonier, Mark (1987) Making maps. *Design [The Journal of the Society of Newspaper Design]* 26, pp. 14-17. A geographer's view of newspaper cartography.
Reviewed by Ellen White, Michigan State University

"Daily newspapers are a significant source of geographic information for the American public." So saying, Mark Monmonier proceeds to discuss some of the common problems with news maps that hinder their communication of valuable geographic information — information much of the public will obtain from no other source. A

number of maps from newspapers are provided to illustrate his comments on what does, and does not, work.

Projection is the first major element Monmonier considers. He notes that distortion is an inevitable accompaniment to the process of transferring a three dimensional globe to a two dimensional page. However, for most subcontinental areas, the distortions involved are negligible and the ready availability of atlas base maps, clip art files, and commercial outlines makes it relatively simple to provide appropriate base maps. For larger areas (continents, the whole world) an appropriate projection choice is critical.

Projections can also be used to provide dramatic insights to areas of interest. The use of bird's eye perspectives, gnomonic projections to illustrate great circle routes, and views of regions from other than north-up are examples of creative applications.

Monmonier cites several design questions which enter into planning a news map. Among these are the amount of surrounding territory to be shown, the number and selection of relevant places, inclusion of inset or locator maps, as well as positioning of type. Poorly centered and illegible maps often result from trying to reuse archived drawings, particularly where the originals must be highly reduced. State or national chauvinism is another factor often contributing to poor design. The point is well made that weather and travel are seldom restricted to home states, especially for cities located near borders, yet single state maps of these topics are the norm rather than the exception.

The graphic hierarchy of geographic features is yet another design feature that can lead to confusing maps. "The overall collection of map elements should be designed to convey and reinforce the hierarchy of geographic concepts inherent in the map, its caption, and the story it accompanies." Sometimes confusion results from overly rigid style guidelines or the limitations of photowire transmission.

Locator insets can provide a unifying element to the overall design of the newspaper if carefully executed. Aspects of insets to avoid include lack of a border, large areas of solid black, and heavy drop shadows. Monmonier feels that the drop shadow — adopted by newspaper artists in the 1980s with the same fervor that automobile designers embraced the tail fin in the late 1950s — can be effective if light in tone and not too thick. Similarly the popular use of three dimensional symbols can divert attention from more important elements.

Type is yet another aspect of design that can cause serious problems. Wherever possible, labels should be placed near their symbols rather than in lists or legends. Names should be aligned with their features. Type style and size should be varied in a consistent manner that reinforces the graphic hierarchy.

Dr. Monmonier has provided a handy design guide to a very particular set of map producers. These producers seldom have any formal cartographic training and must often work under very tight deadlines with limited facilities. As an increasing number of news maps are produced "pressure for improving standards must come from managers and committed professionals. Workshops, practicums, regional and juried competitions, and other outreach programs will be highly important means of upgrading and maintaining quality standards."

Editor's note: Mark Monmonier is author of Maps with the News *University of Chicago Press (1989).*

Tibbetts, Steve (1989) ***Big Map Idea.*** ECM Records 839-523 (CD); 52' 52" AAD.
reviewed by David DiBiase, Penn State University.

Tablas jwoop, congas patter; skilled fingers and palms caress stretched hides. Ephemeral rhythms: now urgent, now pensive, now fading among brown mists at dusk. Wisps of children's song glimmer through high silver clouds. Fine brass-wound nickel strands tuned low over hollow, cherished spruce and rosewood; fingered guitar sings a wanderer's muse, improvised intricate as gnarled branches of winter oaks. Delicately thumbed kalimba, malleted steel drum, bells, shakers, berimbau . . . whence comes this music? From uncharted lands.

Big Map Idea — guitarist Steve Tibbetts' fifth ECM release — transports this listener to remote, unfamiliar landscapes. Tibbetts and his long-time collaborator, percussionist Marc Anderson, often discover the kernel of a new composition in a fragment of 'found sound' recorded during their travels. The exotic triptych "Three Letters," for instance, is informed by snippets of festivities recorded at a Hindu shrine at Parpen, Nepal. Says Tibbetts, "These little pieces of sound make you realize you're far from home."

Tibbetts has remarked that "Musicians may be overly sensitive to their environment." In a recent interview I asked if he and Anderson work consciously to evoke images of particular places in their music. He suggested that it tends rather to be "the sense of place [that] evokes a song."

Forced to categorize, he calls his work 'folk music.' "I am an untrained musician and a 'folk' as well." But not all of Tibbetts' recordings rely principally on the delicate voices of acoustic instruments. A previous release, *Exploded View* (1987; ECM 831-109),

is a stormy hour about which Tibbetts has remarked, "A lot of emotional upheaval and travelling created that record." *Exploded View* is remarkable for Claudia Schmidt's soaring soprano, but specially for Tibbetts' searing electric guitars that rage down through roiling clouds like Shiva, come to lay the world to waste.

So what is the big map idea? According to Anderson, titles are always an afterthought for the duo, and "Big Map Idea" was "a title of Steve's that in the end we both rejected." An ECM executive selected it from a list of prospective titles.

Meanwhile, Tibbetts and Anderson are embarked on a new exploration. Asked where his forthcoming music is headed, Tibbetts said, "I don't know. I don't want to know." Tibbetts' art springs from sensitivity to his instruments and surroundings, not from premeditation. "The sound of the guitar, just the noises get me excited about making music. The way a guitar feels when I play it . . ." A plan or map can be a hindrance to the visceral appreciation of some landscapes. Yet Tibbetts does admit a fondness for cartography: "My favorite Christmas gift last year was a *Times Atlas of the World.*"

Reprinted in Harper's Magazine, August 1990, from the Utne Reader

cartographic artifacts

NTIS BIBLIOGRAPHIES

Computer Aided Mapping January 1987-April 1990, a bibliography from the NTIS Database. National Technical Information Service, 5285 Port Royal Road, Springfield, Va. 22161. April 1990, 71p, supersedes PB89-861652. PB90-8654486/WNR; price code PC N01/MF N01.

This bibliography contains citations concerning theoretical aspects and applications of computer techniques in cartography. Topics include automatic mapping, discussions of databases, and computerized photomapping. Satellite image analysis and processing techniques, and descriptions of specific mapping projects are discussed. (This updated bibliography contains 137 citations, 34 of which are new entries to the previous edition.)

Geographic Information Systems (GIS) April 1971-March 1990, a bibliography from the NTIS Database. National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. March 1990, 90p, supersedes PB89-854608. PB90-864182/WNR; price code: PC N01/MF N01.

This bibliography contains citations concerning theoretical aspects and applications of geographic information systems (GIS). Data Collection and organization methods, the use of artificial intelligence in photointerpretation, and program overviews are among the topics discussed. Considerable attention is given to descriptions of selected GIS projects. Citations pertaining specifically to computer aided mapping are excluded. (This updated bibliography contains 164 citations, 37 of which are new entries to the previous edition.)

1990 *GIS* SOURCEBOOK ANNOUNCED

GIS WORLD magazine will soon publish its second annual *GIS Sourcebook*. The sourcebook will contain extensive technical and price data on most GIS software. "Our first software survey, in 1988, compared thirty-five systems. The 1989 edition contained sixty-two systems, and the new survey to be published in this year's *GIS Sourcebook* will reach one hundred," said H. Dennison Parker, publisher.

In addition to GIS technical data, the *GIS Sourcebook* will have articles on GIS applications, consultant listings, data sources and firms and GIS educational opportunities. Its price is being held to a minimum. "Our primary objective is to provide useful information about GIS technology," said Parker, "and our advertisers are helping us do that by making a book like this available to virtually anyone." The book will sell for $59.95 to *GIS WORLD* subscribers, $119.95 to others. A 30 percent pre-publication discount off both prices is available until July 16. The book will be published and distributed worldwide in August. Contact: GIS World, Inc., P.O. Box 8090, Ft. Collins, CO, USA 80526 (303) 223-4848.

GUIDE TO CARTOGRAPHIC LITERATURE

Informational Sources in Cartography, edited by C.R. Perkins and R.B. Parry, June 1990, 540p., $75. Designed for practitioners, academics, and map librarians, this new contribution to Saur's highly regarded *Guide to Information Sources* series covers information sources for cartography and related material. With contributions from thirty-four different authors, *Information Sources in Cartography* highlights the "best

and most appropriate" source material. It covers a range of subjects in the field from general source material, to the history of cartography, to map production and librarianship.

In addition to traditional primary and secondary sources, the guide features coverage of applications of remote sensing, computerized cartography, geographic information systems, and automated search and retrieval systems.

To facilitate access, the volume is organized into six major parts. The first covers general aspects of information retrieval, primary sources such as books, journals, reference sources, bibliographies, indexing, and abstract services, on-line services, and reviewing media. The next two sections cover the History of Cartography and Map Production which examines the different stages of cartographic work from data capture through design to production. The following sections, Map Librarianship, a guide to specialist literature, and Types of Mapping, covers major thematic groups of contemporary mapping such as topographic, geoscientific, navigational, and socio-economic. The final section, Map Use and Promotion, is a practical assessment of literature available for different needs and levels. Also provided are listings of map publishers, cartographic journals, and societies. Contact: Clare Williams, (212) 463-6860.

STATE GEOGRAPHIC INFORMATION ACTIVITIES COMPENDIUM

The Council of State Governments (CSG) is a nationwide service organization for executive, legislative and judicial branches of state governments and is well-known for its publication of state resource documents, such as the *Book of the States* and the *Resource Guide to State Environmental Management.*

In January, CSG announced work on a State Geographic Information Activities Compendium, a project initiated in response to growing requests for improved resources and information about state geographic information activities. For more than a year, state representatives have been meeting at GIS related conferences to learn about each others' activities. The consensus of this growing network is that resources and activities for all fifty states are increasingly needed.

No comparable resource currently exists. The Compendium will contain an annotated database of state contacts; a review and examples of executive and legislative directives; lists and excerpts of existing plans, reports, policies and standards; focus, membership, roles, responsibilities and description of interagency and intergovernmental GIS coordination groups; and a general status of GIS development in each state, including financial and personnel information.

The compendium is expected to be available in early fall of this year. Contact: John Johnson at CSG, (606) 231-1923.
GIS World, 3:3, June/July 1990.

NATIONAL ATLAS OF CANADA

Since 1906, the Canadian federal government has provided authoritative geographic information about the country through five editions of the *National Atlas of Canada.* Now, the conventional atlas program is evolving into a more responsive National Atlas Information Service (NAIS). Having been converted from a bound atlas format to a loose-leaf series, the sixty maps published in the 5th Edition were updated as required and then reprinted. A common scale of 1:7.5M, along with consistent base components and designs, makes comparison of individual map themes possible.

In addition to the *Atlas,* the Service publishes maps in the International Map of the World (IMW) 1:1M scale series (seventy-four sheets), at 1:2M (being updated currently in seven provincial or regional sheets), and at scales as small as 1:30M. NAIS manages the National Toponymic Data Base, containing some 485,000 Canadian place and feature names. For other federal departments without cartographic or geographic resources, NAIS also provides consultation, mapping and contract mapping services.

NAIS has digitized some of the maps in the 1:7M series and is currently digitizing the 1:2M series. The data is clean and topologically consistent, but does not yet carry any attribute information. Elements are separated into individual files and registered together.

Both cartographic and toponymic digital data are available. Prices, which are currently under review, will be quoted at the time of ordering. Inquiries and requests should be directed to: National Atlas Information Service, Canada Centre for Mapping, EMR, 615 Booth Street, Room 650, Ottawa, Ont, K1A 0E9, (613) 992-7680.
Federal Geomatics Bulletin, 2:1, Winter 1990.

EXPERIMENTAL USGS IMAGE MAPS PUBLISHED

The U.S. Geological Survey has published satellite image maps of Monterey, San Francisco and San Jose at 1:250,000 from 1985 Landsat data. The two-sided maps have a silver ink overprint of feature names on the image map. A topographic map appears on the reverse side. Price $6 each.

NEW LANDSAT PRODUCTS

The Earth Observation Satellite Co. (EOSAT) has introduced two new Landsat products — a 1:50,000 scale Thematic Mapper color print and the Landsat Scene Finder software package.

The 1:50,000 scale color print covers one-sixteenth of a Landsat Thematic Mapper (TM) scene, or one-quarter of a TM quadrant. The area included in the 1:50,000 scale print is about 2,000 square kilometers. The product is available as a single quarter-quad print for $2,400 or as a four-print quad set for $4,700.

The 1:50,000 scale print complements the EOSAT Film Product (EFP) line, which includes full and quadrant scene prints available in several scales ranging from 1:100,000 to 1:1,000,000. A full TM scene covers approximately 31,500 square kilometers (185 x 170 km) at a cost of only thirteen cents per square kilometer. All color TM prints are available in the customer's choice of three-band combinations.

The Landsat Scene Finder (LSF) software package enables EOSAT customers to check on the availability of Landsat Thematic Mapper data using their IBM or compatible personal computers. The LSF includes database information and microfiche displays for all TM scenes acquired by Landsat since January 1, 1989. The package is offered on a subscription basis for $950 per year, with bi-weekly updates. EOSAT customers already subscribing to the TM microfiche service pay only $700 for LSF.

An EOSAT customer initiates an LSF search on a personal computer by entering coordinates of an area of interest. LSF graphically identifies the scene or scenes containing the coordinates. The scenes are identified by path/row designation according to the Landsat Worldwide Reference System. The LSF database provides the acquisition date and cloud cover information for that scene as it appears in TM Band 3 (visible red).

The customer can then determine if cloud location and other scene characteristics fit his or her requirements and order the appropriate Landsat data product directly from EOSAT Customer Services.

LSF software and database are provided on 5.25", 360Kb floppy disks and can be used on any IBM compatible MS-DOS or PC-DOS operating system with at least 512K memory and 10 Mb hard disk. A microfiche reader is also necessary. Contact: Customer Services, (301) 552-0537 or (800) 344-9933.

EHRENBERG NAMED CHAIR OF US BOARD ON GEOGRAPHIC NAMES

Ralph E. Ehrenberg, Acting Chief, Geography and Map Division, Library of Congress, has been appointed Chair of the United States Board on Geographic Names for the 1989-91 term by Manuel Lujan, Jr., Secretary of the Interior.

The United States Board on Geographic Names is an interdepartmental agency that has legal responsibility for standardizing place names used on Federal maps and in other official government publications. Established in 1890, the Board is composed of representatives from nine Federal agencies who review all new names, name changes, or name conflicts submitted by public or private persons or organizations. Research and administrative support is provided to the US Geological Survey and US Defense Mapping Agency.

Ehrenberg has served as the Library's principal member to the Board since 1983. Ronald Grim, Head of the Reference and Bibliography Section at the Geography and Map Division, was appointed by the Library of Congress as a deputy member to the Board for the 1989-91 term.

AAG Newsletter, 25:6, June/July 1990.

NCGIA CORE CURRICULUM PROJECT

In July, the National Center for Geographic Information and Analysis will release the tested and revised version of the GIS Core Curriculum. The three volumes provide materials for a series of seventy-five one-hour lectures, grouped into three courses, with supporting handouts, overheads and slides. The lecture text is also supplied on diskette. The lectures were compiled with the assistance of over thirty-five experts from the world-wide GIS community, and tested in the 1989/90 academic year at over one hundred institutions. The materials are designed to be adapted into existing programs, or taught as entire courses, and are suitable for use in a variety of disciplines at the upper undergraduate or beginning graduate levels. For further information contact NCGIA, University of California, Santa Barbara, CA 93106, phone (805) 961-8224, FAX (805) 961-8016; email: ncgia@voodoo.bitnet or ncgia@topdog.ucsb.edu.

A NEW LOOK FOR NOAA CHART NO. 1

The 9th edition of NOAA Chart No. 1, which covers chart symbols, abbreviations, and terms, has been printed and released for distribution. This edition has been totally redesigned. The major change is the incorporation of symbols of the International Hydrographic Organization's Chart INT No. 1. This new and more logical arrangement shows the explanatory text in a center column, flanked by U.S. symbols on the left and the international equivalent on

the right. Also shown in a separate column are the symbols used on foreign charts reproduced by the Defense Mapping Agency.

Chart No. 1 may be obtained for $2.50 from NOAA or authorized chart sales agents of the National Ocean Service (NOS). For inquiries, contact Dennis Carroll at (301) 443-8157. For orders, contact the Distribution Branch at (301) 436-6990.

DIGITIZING THE FUTURE

The second edition of "Digitizing the Future," dated October 1988, is now available. This free publication describes the background, format and content, and typical applications of most existing DMA data bases or products. They include Digital Terrain Elevation Data, Digital Feature Analysis Data, the Digital Aeronautical Flight Information File, and the Navigation Information Network. Prototype products and special subjects are also described, including Prototype Tactical Terrain Data, Military Services Digital Data Technical Points of Contact, and Video Discs of Maps and Charts. The DMA Stock Number is DDIPDIGITALPAC. It replaces stock numbers DMADPBROCHCOVER and DMADPBROCHINSRT. The publication is available from DMA Combat Support Center, ATTN: PMSR, Washington, DC 20315-0020.

Hydrographic Products Quarterly Bulletin, June 1990, p. iii

FIRST MOSAIC OF NORTH AMERICA COMPLETED

The first digital mosaic of remotely-sensed images of the North American continent has been completed by ERIM, working in conjunction with the National Geographic Society and with the cooperation of the EROS Data Center, Canada Centre for Remote Sensing, and NOAA.

AVHRR (Advanced Very High Resolution Radiometer) LAC (Local Area Coverage) data, collected between December 1985 and July 1989, have been geocoded, resampled to one kilometer, and mosaicked to produce a stereographic projection of the entire continent.

The AVHRR mosaic will be reproduced in National Geographic's new world atlas, which is scheduled for publication this fall.

ERIM can provide limited quantities of the full North America mosaic and individual data subsets of states or regions in either digital or photographic form.

For more information and a complete price list of available products, contact Larry Reed at ERIM; (313) 994-1200, ext. 3606 or FAX (313) 665-6559.

ERIM News Release, April 17, 1990

GETAMAP VERSION 3.0

GETAMAP Version 3.0 is now available for requisitioning. GETAMAP is a software package produced by DMACSC and provided to users in an effort to reduce requisition processing time and eliminate delays encountered in mailing orders to DMACSC. GETAMAP helps to correctly format the customers orders and will generate several order formats that are accepted by DMACSC. These include AUTODIN message format, Standard For 344 format, and Electronic Mail (E-Mail).

To operate GETAMAP, users will need an IBM PC compatible microcomputer capable of operating in an MS-DOS or PC-DOS environment. Those interested in E-Mail will also need a Hayes compatible MODEM, communications software that supports ASCII terminal emulator and file transfers, and their Defense Data Network (DDN) host computer. DOD E-Mail customers must provide DMACSC their DDN host name and DDN network address. Complete instructions are contained in the "How to Use E-Mail" portion of GETAMAP. A copy of GETAMAP may be obtained by sending requests to Director, DMA Combat Support Center, ATTN: PMSR, Washington, DC 20315-0020. The DMA Stock Number is GETAMAP.

Hydrographic Products Quarterly Bulletin, June 1990, p. v

WORLD VECTOR SHORELINE FILE

The World Vector Shoreline (WVS) is a digital data file containing the shorelines, international boundaries, and country names of the world. These geographic features are required for many of the digital data bases being used to support geographic information systems and weapon systems. A detailed description of the WVS can be found in the DMA publication, "Digitizing the Future," (DMA stock number DDIPDIGITALPAC). Users of this product may convert the WVS data to system specific formats. WVS is ASCII coded, written to unlabeled ANSI standard 9-track magnetic tapes, and available in 1600 CPI (DMA stock number WVXX9TRK1600) and 6250 CPI (DMA stock number WVXX9TRK6250). WVS is available to Executive Branch agencies, qualified contractors, and for sale to the public for $625.

Hydrographic Products Quarterly Bulletin, June 1990, p. V.

NEW MAP MAGAZINE

In October, 1990, Global Map Library will publish a new magazine entitled Current Maps & Charts File (CMCF).

This will be a quarterly which will review new maps and charts in books and magazines as well as

geography-related products; record and index all new maps and charts published every quarter with annual cumulations; include reproductions of five to six outstanding thematic maps and charts; profile current cartographers as well as cartographic firms, institutions and map dealers.

The magazine will be a tool for map libraries, publishers, teachers, students and travellers. The publisher welcomes news and notes on new maps and charts, as well as publications for review, articles and newsletters. Contact: George Kurian, Publisher, Box 519, Baldwin Pl., NY 10505; (914) 962-3287

WHAT USE IS A MAP?

'What use is a map' is an exhibition of seventy maps in the British Library from March 1989 to December 1990. The exhibit is grouped into seven categories according to purpose: the world of business, the riches of the earth, knowledge and news, having fun, attack and defense, going places, and running a country.

An illustrated booklet entitled *What use is a map?* is available at the British Library bookshop, £2.95. Contact: The British Library, Great Russell Street, London WC1B 3DG.

APPOINTMENT

James O. Minton, Assistant Professor and Map Librarian, The University of Tennessee, Knoxville Libraries, 37996-4000.

PUBLISHER SEEKS AUTHORS

Oxford University Press, publishers of the popular *Principles of Geographical Information Systems for Land Resources Assessment* by Peter Burrough, is looking for authors for its new Spatial Information Systems Series. The publisher's editorial board for the series includes Burrough, Michael Goodchild, co-director of the U.S. National Center for Geographic Information and Analysis, Philip Beckett, editor of an Oxford series on soils and natural resources, and Paul Switzer of Stanford University. The publisher eventually hopes to add software, videos and computer exercises to the series. Contact: Oxford University Press, Walton Street, Oxford OX2 6DP, England.

NEW PRODUCTS FROM THE CCA

'Mapping the planets'

by P.J. Stooke and C.P. Keller

This is a new collection of forty slides of maps depicting the planets of the solar systems and their satellites, compiled by CCA members Philip Stooke and Peter Keller. The set comes with a twenty page descriptive booklet, complete with historical background to planetary mapping. A great educational aid for cartography, astronomy, and extra-terrestrial enthusiasts. Price: $50 (including postage). Order from: Roger Wheate (CCA), Geography Department, University of Calgary, Calgary, Alberta T2N 1N4, fax: (403) 282-8606, telephone: (403) 220-4892, email: wheate@uncamult.

Bumper sticker

Bumper sticker in blue lettering, price $3 each, 2 for $5, 5 for $10. Order from: Roger Wheate (CCA), Geography Department, University of Calgary, Calgary, Alberta T2N 1N4, fax: (403) 282-8606, telephone: (403) 220-4892, email: wheate@uncamult.

GIFT IDEAS

How about a topographic relief map of your state, made of chocolate?

The Denver based Topographic Chocolate Company's current product line includes twenty-four locations: maps of seven states, including California, New York and Texas; eleven cities, including Chicago and Seattle; national attractions and fifteen mountains.

Topo spokesman Donald Yakush says he started designing topographic maps for fun but the concept took off when requests starting pouring in for other geographic areas. Suggested retail price of the chocolates is $9.95.

cartographic events

1990

October 1-4: **International Map Collectors' Society 8th Annual International Symposium,** Washington, DC, under the aegis of the Washington Map Society. Contact: Eric W. Wolf, 6300 Waterway Drive, Falls Church, VA 22044.

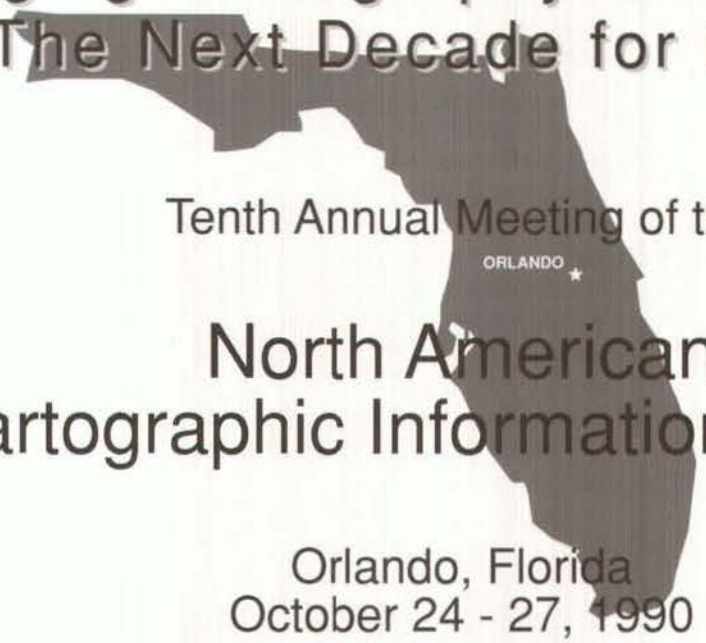
October 23-24: **Earth Observations and Global Change Decision Making: A National Partnership**, Fall Conference, Washington, DC. Contact: ERIM, Change Conference, Dr. Robert H. Rogers, P.O. Box 8618, Ann Arbor, MI 48107-0944.

October 23-26: **Visualization '90**, San Francisco, CA. Contact: IEEE Computer Society, 1730 Massachusetts Avenue, NW, Washington, DC 20036-1903.

October 24-27: **10th Annual Meeting of the North American Cartographic Information Society (NACIS X),** Orlando, FL. Contact:

(continued on p. 32)

Changing Cartography in the Nineties
The Next Decade for NACIS



Tenth Annual Meeting of the

North American Cartographic Information Society

Orlando, Florida
October 24 - 27, 1990

The Tenth Annual NACIS meeting will feature papers on various aspects of cartographic information and, in particular, those papers which relate to the theme of this year's meeting: *Changing Cartography in the Nineties — The Next Decade for NACIS*. Topics include:

* Atlases
* Canadian Cartography
* Cartography and the Media
* Cartographic Education
* Cartographic Software
* Geographic Information Systems
* Geological Mapping
* Latin American Cartography
* Map Animation
* Map Librarianship
* Mapping Water Resources
* Navigation
* The Cart Lab: Issues and Problems

The NACIS X conference site will be the Holiday Inn on International Drive in Orlando. This site provides easy access to Disney World, the Orlando International Airport and downtown Orlando. NACIS X will include a variety of paper and poster sessions, keynote speakers, exhibits, cartographic field trips, workshops, and panel discussions with recognized authorities from government, academic and private organizations. Registration, all sessions and hospitality will take place at the convention facilities of the Holiday Inn.

Contacts for information concerning:

The Society	*The Program*	*Poster Session*
North American Cartographic Information Society 6010 Executive Blvd., Suite 100 Rockville, MD 20853 (301) 443-8075	**James F. Fryman** Department of Geography University of Northern Iowa Cedar Falls, IA 50613-0406 (319) 273-6245	**Craig Remington** Department of Geography University of Alabama Box 870322 Tuscaloosa, AL 35487 (205) 348-1536

James F. Fryman, Program Chair, Department of Geography, University of Northern Iowa, Cedar Falls, IA 50614-0406. Bitnet: WALLACNI@UIAMVS

November 7-10: **GIS/LIS '90**, Anaheim, CA. Contact: Urban and Regional Information Systems Association, 900 2nd St. NE, Suite 302, Washington, DC 20002.

1991

March 23-29: **ACSM/ASPRS Annual Convention**, Baltimore, MD. Contact: ACSM, 5410 Grosvenor Lane, Bethesda, MD 20814.

March 25-28: **Auto-Carto 10: Tenth International Symposium on Automated Cartography,** Baltimore, MD. Contact: Auto Carto 10, Department of Geography, 105 Wilkeson, North Campus, State University of New York at Buffalo, Amherst, NY 14260.

April 13-17: **Association of American Geographers 87th Annual Meeting**. Hyatt Regency, Miami, FL. Contact: AAG, 1710 16th St. N.W., Washington, DC 20009-3198.

June 22-28: **CG International '91: Visualization of Physical Phenomena,** MIT, Cambridge, MA. Contact: Barbara Dullea, CGI '91 Secretariat, MIT Room 5-430, 77 Massachusetts Avenue, Cambridge, MA 02139.

August 9-16: **27th International Geographical Congress,** Washington, DC. Contact: Dr. Anthony de Sousa, 27th IGC, 17th and M Sts. NW, Washington, DC 20036.

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

CALL FOR PAPERS

The Association of American Geographers (AAG) will hold its 1991 Annual Meeting in Miami, Florida, April 13-17. Members of the AAG, full-time undergraduate and graduate students, geographers who reside outside the U. S., and scholars from other disciplines and professions are invited to submit papers or posters for presentation at the meeting. Each paper presented is allotted fifteen minutes for presentation and discussion. Posters are encouraged for material that lends itself to visual rather than verbal communication.

The deadline for paper and poster submissions is September 21, 1990. All presenters must submit an abstract of no more than 250 words that presents the purpose, methods, and conclusions of their research. Abstracts should be submitted on a 5.25" or 3.5" IBM compatible diskette (any density) in ASCII or WordPerfect 4.0+ format, along with one paper copy of the abstract, the program participation form and the appropriate fee. To obtain copies of the submission form and guidelines, write to: AAG, 1710 16th Street NW, Washington, DC 20009-3198.

NACIS news

NACIS OFFICERS

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NOT RECEIVING YOUR COPY OF *CP?*
If you have not been receiving *Cartographic Perspectives* as expected, one of two causes can be cited. Either your NACIS membership has lapsed through non-payment of dues, or your name has been inadvertently deleted from our mailing list. To renew your membership, xerox the form at the back of this issue and send it in with your dues. Dues are payable at the beginning of the calendar year (1991 dues should be paid by January 1, 1991). If your membership is current yet you still have not received this bulletin, let us know, and the missing back issues will be sent you. We apologize for any inconvenience.

OMB CONSIDERS DATA COMMITTEE, A-16 REVISIONS
continued from page 2

Coordination for Surveying, and Mapping Activities, to include coordination of GIS data development, use and distribution as a primary objective. The 1990 revision was proposed this spring after a series of FICCDC meetings were held to discuss the issues. A formal response from OMB is expected late this summer.

Circular A-16 first was issued in 1953 by the Bureau of the Budget, predecessor to OMB, to coordinate production requirements for federally funded mapping and surveying activities. The circular requires the Department of The Interior's USGS NMD to exercise government wide leadership in mapping and surveying activities.

In 1989, under the current A-16, the NMD solicited mapping and digital cartographic requirements from approximately forty federal agencies and from the fifty states. Under the proposed 1990 revision, NMD would coordinate federal GIS database development activities and related services through its leadership of the recommended FGDC, with major roles in the guidance and production of topic specific databases assigned to agriculture, commerce and transportation departments.

The NMD's Office of External Coordination describes the current A-16 process as follows: "During the last ten years, approximately two-thirds of the federal agencies contacted have replied to the solicitation, with about half of these identifying requirements. Each year, participating agencies are requested to provide their first, second and third priority requirements. Priorities are based on whether the requestor is a federal or state office, the priority set by that office, the product requested, and the geographic area covered by the request. By subjecting these factors to a weighing algorithm, overlapping requests of highest priority for each product provide NMD with a ranked list of production priorities, essentially identifying where maximum benefits would be obtained per dollar expended. Whereas the A-16 process is funded by congressional appropriations, production through cost-share, work-share and data exchange arrangements extends its ability to respond favorably to agency requests."

The proposed FGDC will most probably pattern its method for handling GIS database requirements along similar lines and encourage the use of cost-sharing, work-sharing and data exchange agreements.
GIS World, 3:3, June/July 1990

MAP ILLITERACY TO BE FLUSHED OUT!
This was the headline on a news story from Davidson College in North Carolina, about promoting geographic literacy among college students. The story states that International Studies students have taped world maps to the sides of about 150 campus bathroom stalls. "It's a place where people have time on their hands. We're hoping this will help them use it constructively," said senior Mary Snyder, founder of the Bathroom Brigade For Geographical Literacy.
IMDA Newsletter, May 1990, p. 8

MAP SELLER TAPS OIL SPILL CLEANUP

Maps and mapping have long been highly valued as tools for managing events most people would rather avoid — war, taxation, and environmental accidents, for instance. The June 1990 issue of *American Demographics* cites one map entrepreneur who transformed the Alaskan oil spill nightmare into a personal windfall: "Fred A. Kings of Anchorage was a sixty-three year old retiree and boating enthusiast who started a small business selling laminated nautical maps about two years ago. 'Then the oil spill happened, and I got to thinking, "These charts would be really nice for the oil spill people,"' he said. 'You could get oil on 'em and wash it right off without ruining your chart. So I called the head man at Exxon down in Valdez. He said, "Send me all you got, and all you can get, of Prince William Sound." I sold hundreds of 'em. As the oil spread, so did the demand for the charts.'"

SNYDER ASSUMES ACA PRESIDENCY

John P. Snyder, a semi-retired map projection specialist at the U.S. Geological Survey's National Mapping Division in Reston, Virginia, has been installed as president of the American Cartographic Association (ACA), a member organization of the American Congress on Surveying and Mapping (ACSM). Snyder, who was incumbent ACA vice president last year, succeeded to the ACA presidency on March 21 at the ACSM annual convention in Denver, Colorado.

Snyder, who has served as secretary-treasurer of ACA, currently serves on the editorial board of *Cartography and Geographic Information Systems*, ACSM quarterly technical journal.

EXCHANGE PUBLICATIONS

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

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

Canadian Cartographic Association Newsletter. A quarterly publication offering news and announcements to members of the CCA. Contact: Canadian Cartographic Association, c/o Roger Wheate, Department of Geography, University of Calgary, Calgary, Alberta T2N 1N4, Canada; Email: Wheate@UNCAMULT.

Cartographica. A quarterly journal endorsed by the Canadian Cartographic Association/Association Canadienne de Cartographie that features articles, reviews and monographs. B V Gutsell, founder and editor. ISSN 0317-7173. Contact: University of Toronto Press Journals Department, 5201 Dufferin Street, Downsview, Ontario, Canada M3H 5T8; (416) 667-7781.

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

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

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

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

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

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

Map Online Users Group Newsletter. This quarterly publication offers feature articles, regular columns, product reports and indexes of interest to users of online map data base systems. ISSN 0749-338X. Contact: Edward J. Hall, editor, Map Library, Room 410 McGilvrey Hall, Kent State University Libraries. Kent, OH 44242.

instructions to contributors

FEATURED PAPERS

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

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

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

Papers ranging from the theoretical/philosophical to methodological/applied topics will be considered providing that ideas are presented in a manner that will interest more than a narrow spectrum of members. To be considered for the paper competition, papers should be prepared exclusively for NACIS, with no major portion previously published elsewhere.

TECHNICAL GUIDELINES

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

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

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

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

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

COLOPHON

This document was desktop-published at the Deasy GeoGraphics Laboratory Department of Geography, Penn State University, using an Apple Macintosh IIcx. Word processing was accomplished primarily with WriteNow 2.0; page layout with PageMaker 4.0. Graphics not rendered with Aldus FreeHand 2.02 or Canvas 2.0 were scanned from paper originals using an HP 9190 ScanJet desktop scanner. The PageMaker document was output by a Linotronic 300 at PSU Printing Services. The bulletin was printed by offset lithography on Warren Patina 70# text stock. Text type is set in Palatino, a face designed by Herman Zapf. The featured color is PMS 172C.

NACIS membership form

North American Cartographic Information Society
Sociedad de Informacion Cartografica Norte Americana

Name/Nombre: _____

Address/Direccíon: _____

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_____

Organization/Afiliacíon profesional: _____

_____

Your position/Posicíon: _____

Cartographic interests/Intereses cartografíco: _____

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Professional memberships/Socio de organizacíon: _____

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Membership Fees for the Calendar Year/
Valor de nomina de socios para el año:
Individual/Regular: $28.00 U.S./E.U.
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Institutional/Miembros institucionales:
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Make all checks payable to/
Hagan sus cheques a:
NACIS
c/o Dr. Gregory Chu, Treasurer
Department of Geography
University of Minnesota
414 Social Sciences Building
Minneapolis, MN 55455

The North American Cartographic Information Society

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

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

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

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

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

§ to influence government policy on cartographic information.

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

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