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cartographic perspectives

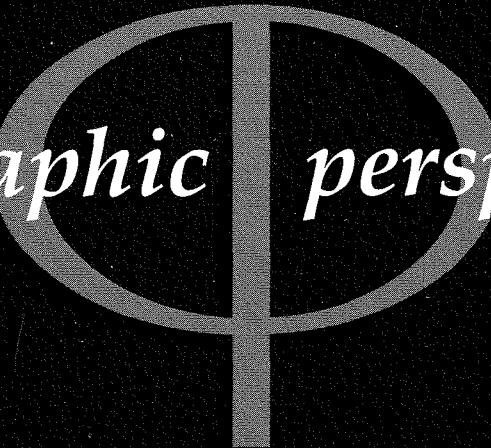
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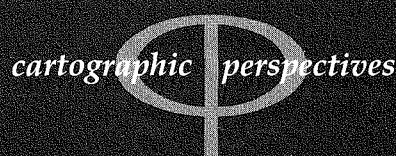
FROM THE GUEST EDITOR

The papers published here were presented at the 1998 Association of American Geographers Annual Meeting in a session on Qualitative Methods and Reasoning in Cartographic Research, sponsored by the Cartography Specialty Group. The AAG session featured current qualitative research on cartographic topics and cartographic materials: interviews by telephone and in person, focus groups for map critique, and critical analysis of both maps as components of corporate annual reports and projects that share geographic data on the Web.

Specifically, the participants in the AAG session and topics they presented were: Mark Monmonier on "Probing the Practices of Experienced Map Authors with Partly-Structured Telephone Interviews;" Trudy Suchan, "It's only my Opinion But...Interviews on Everyday Conceptions of

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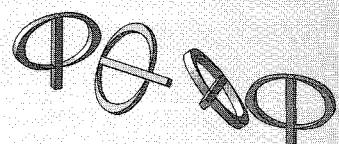
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about the cover



The cover design was created by Louis Cross III. Louis is a cartographer and multimedia specialist at the Florida Resources and Environmental Analysis Center at Florida State University. Current research interests include application of GIS to evaluate changing landuse trends and their effects on water quality in south Florida, in addition to continued efforts focusing on combining raster imagery and vector linework to produce high-quality printed educational materials.

This cover was created using Adobe Photoshop, Macromedia Freehand and linework from Cartesia MapArt's Global perspectives edition. The lightning effect was created by manipulating Photoshop layers and applying multiple filters.

from the Guest Editor
continued from page 1

Rural;" Judy Olson on "Teaching and Learning Focus Group Skills: A Classroom Example;" Myke Gluck, "Content Analysis, Semiotics, and Social Semiotics for Cartographic Analysis: Interpreting Geospatial Representations; and Barbara Poore, "What are the Benefits of Sharing Geographic Data? Qualitative Approaches."

Barbara's paper was a speculative piece that she has not yet pursued further. Mark's how-to for telephone interviews with subject experts who are map users but not cartographers is covered in part elsewhere (Monmonier and Johnson 1991). Myke's paper is the lead article in this issue of *Cartographic Perspectives*. Myke proposes methods for analyzing maps as images in corporate annual reports, and is an example of research studying diverse forms of representation for diverse audiences. Judy's paper, with nine student co-authors, also is presented in this issue. It is a how-to for classroom use of focus groups, with a map as the object of study. My own AAG presentation included an anecdotal portion on in-person interviews plus a discussion of analysis tools for non-numeric data. In lieu of the anecdotal portion, which did not lend itself to formalization for print, I provide (at the end of this introduction) published resources that give practical guidance in conducting interviews. The latter part of my

AAG presentation has been developed into a lengthy qualitative-data-analysis software review, co-authored with JoAnn Vender, for this issue of *CP*.

Qualitative methods garner data that are words or images, not numbers. Qualitative analysis also most often are done on, and presented with, words or images. As I have pursued the topic of qualitative methods in cartographic research, I have heard both criticism that qualitative methods used by cartographers are too casual to "count" as research and that cartographers using qualitative methods in research "count" too much, meaning that we rely too much on the quantitative paradigm for rules of evidence and validity in analysis. Further criticism focuses on failing to situate our qualitative research within a specific philosophical or political paradigm.

But debate on "proper" qualitative research, occurring in any discipline where qualitative methods are being broached, should not discourage use of qualitative methods in our research. Together, the papers at the AAG session in Boston demonstrated that qualitative research methods can help us develop and conduct cartographic research in expanded real-world environments, with both novice and expert—and especially non-cartographic—participants, in natural settings. I hope the growing body of qualitative research in cartography, in this issue of *Cartographic Perspectives* and elsewhere

in the geographic literature (Suchan and Brewer 1999), will prompt you to think about incorporating non-numeric data, real-world materials and situations, and participants beyond the readily-available students, in your research tool kit.

Monmonier, Mark, and Branden B. Johnson. 1991. Using qualitative data-gathering techniques to improve the design of environmental maps. *Proceedings of 15th International Cartographic Association Conference*, at Bournemouth. Vol. 1, 364-373.

Suchan, Trudy A. and Cynthia A. Brewer. 1999. Qualitative Methods for Research on Map Making and Map Use. Forthcoming in *The Professional Geographer*.

For basic advice on in-person interviews, see:

Rubin, Herbert J., and Irene S. Rubin. 1995. *Qualitative Interviewing*. Thousand Oaks, CA: Sage Publications, Inc.

Patton, Michael Quinn. 1990. *Qualitative Evaluation and Research Methods*. 2nd ed. Newbury Park, CA: Sage Publications, Inc.

Merton, Robert K., Marjorie Fiske, and Patricia L. Kendall. 1956 and 1990. *The Focused Interview*. Glencoe, IL: The Free Press.

Content Analysis, Semiotics, and Social Semiotics for Cartographic Analysis: Interpreting Geospatial Representations

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Several mutually informing methods for analyzing cartographic and geospatial images are presented and illustrated in this work. First, an apparently objective method, content analysis, is applied to a collection of corporate annual reports' geospatial imagery resulting in a categorization and description of those images. Then a traditional semiotic analysis is conducted on the same data done by experts who describe and express out of their personal expertise and intuitive insights the meaning of signs contained in the imagery. Subsequently, a user/viewer epistemological and ontological framework called sense-making is discussed and combined with semiotic processes enabling social semiotics. Sense-making permits map users to present their point of view providing a method to go beyond the experts' traditional semiotic interpretations. These user/viewer based interpretations incorporate postmodern meanings from the various users of signs exposed by the corporate annual reports' geospatial imagery.

Keywords: Content Analysis, Semiotics, Sense-making, Social Semiotics, Corporate Annual Reports, Geospatial Imagery

INTRODUCTION

Research in the use of maps and cartography in general has traditionally been reductionist in at least two ways. First, the methods applied to study map use have been reductionist because they have been rather limited, most such research has employed testable, statistical hypotheses that study extremely detailed issues in artificial settings. This form of research accounts for narrow aspects of map use and has been useful in understanding, for example, use of icon size, color, and legends (e.g., Mersey, 1990). Most frequently such cartographic use research has been driven by a psychological perspective which views humans as information processing machines. Time and error data are collected from subjects on limited tasks from which their internal processes are inferred. For example, speed and accuracy in the use of legends has been analyzed (e.g., Slocum, Robeson & Egbert, 1990). The hope endures that putting all the little pieces together (e.g., icon size, color) will ultimately lead to better maps. However, such research does not explain much variation in user behavior in natural settings.

Map use research has also been reductionist because it has usually studied maps in isolation from other materials real people use to resolve their information needs such as pictures, the actual landscape, other people, written material, etc. Of course, there are circumstances in which the map may be the only resource apparently used (wayfinding, orienteering, etc.). However, most map use is done in conjunction with goals for which the map serves as only one information source for the overall goal confronting

the user. For example, even in wayfinding, we often need to know what the destination actually looks like to match the address with the building to arrive at the appropriate destination; the map is rarely enough by itself.

To go beyond the traditional narrow and limited approaches to cartographic research, three methods of cartographic and geospatial imagery analysis are discussed in this paper. First, content analysis is shown to be an effective and efficient method for generating descriptions of imagery. Unfortunately, content analysis lacks the interpretive processes of semiotics, sometimes called the science of signs. Next a traditional semiotic analysis is presented that demonstrates the ability of semiotics to yield significant and meaningful denotations and connotations for cartographic and geospatial imagery. Unfortunately, traditional semiotic analysis privileges expert interpretations precluding the incorporation of real map users' views. Consequently, a third approach, social semiotics, is presented in this work. Social semiotics combines traditional semiotics with a sense-making framework privileging both the casual user and the expert in describing the meanings of geospatial imagery. Sense-making views humans as complex and values the human condition providing social semiotic analysis a rich ontological and epistemological approach to cartographic research. Why struggle to perform three related but distinct analyses for geospatial imagery? Each of these approaches to the analysis of geospatial and specifically cartographic imagery (content analysis, semiotics, and social semiotics) inform and make manifest various differing views of the imagery under study. Therefore, conducting content analytic, semiotic as well as social semiotic analyses provide a valuable integrated and more holistic analysis of the phenomena of geospatial imagery in corporate annual reports.

There is a lack of mutual understanding between experts and casual users of geographic information in general. Explicating the role of experts is necessary before exploring these various approaches to image analysis presented below. The pervasiveness, routinization, and invisibility (to most people) of formal geographic knowledge and the lack of most academic scholars' understanding of the informal geographic expertise of the public (Egenhofer and Mark, 1995) provides one major motivation for this project. For example: How many people in the general population are aware of the spatial components of the commodification and exploitation of workers and the environment in the production, social production, and distribution of coffee, soft drinks, candy bars, stereo components, or computer chips? Correspondingly, how many scholarly experts are aware of the range of economic as well as non-economic reasons behind the choice of commuting routes of most people or the legitimate emotional criteria in the purchase of residential real estate?

Permission to reproduce images from corporate annual reports was difficult to obtain and / or reproduction quality was inferior in black and white for this project. Consequently, only a limited number samples from corporate annual reports are displayed. The author can provide to individuals facsimile copies of the originals for research purposes or the individual corporations' media relations offices may be contacted to obtain the actual reports.

The remainder of this paper is divided into three sections. The first provides a background on content analysis and semiotics, the second is a discussion of an experiment underway that applies these two methods to the geospatial imagery found in corporate annual reports, the third provides background on sense-making and suggests how sense-making may be combined with semiotics to yield social semiotics. The third section also briefly describes tentative results of employing social semiotics to the same corporate annual report imagery.

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BACKGROUND

Content Analysis

Content analysis is a process of forming a collection of categories called a "scheme" and for developing rules for placing the items under study in one and only one of the categories of the scheme. Weber's (1985) description provides the most common approach to the process of creating a content analysis scheme:

- 1) Determine the recording unit of the scheme used for all categories. A typical recording unit might be a word, phrase, sentence or open-ended text, map or other graphic item.
- 2) Develop categories that are mutually exclusive (distinct) and exhaustive (provide full coverage). The scheme may be developed inductively directly from the raw data or deductively from concepts or previous work.
- 3) Test for clarity of category definitions using different subsets of the data and different people as coders who make assignments of the items to categories. The scheme is then revised to eliminate ambiguities.
- 4) Test new data subsets until coder agreement reaches a predetermined threshold.
- 5) Code all the collected data so that each datum is in only one appropriate category.
- 6) Summarize the data for reporting, often collapsing categories for rhetorical clarity.

"Content analysts do not claim that a given categorization is the only one possible."

"The content analytic process depends upon an essentialist structure requiring a mutually exclusive and exhaustive categorization scheme."

"... essentialism limits the overall usefulness of content analysis but does not preclude using content analysis as an entry point to a broad description ..."

Content analysts do not claim that a given categorization is the only one possible. An additional approach to content analysis may be seen in Ericsson & Simon (1993). They develop a process to organize the verbalizations collected while users are executing various tasks with computer software. Simon and Ericsson extract from the verbal expressions links between computer tasks executed by users and users' short term memory use, in contrast to Weber's broad textual categories.

Examples of content analysis in cartography are found in Gilmartin (1992) in which she uses content analysis to describe twenty five years of cartographic research, in Monmonier and Gluck (1994) which uses content analytic techniques to report focus group discussions of an animated cartographic software product, and in Gluck, Danley & Lahmon (1995) that describes librarians' views of recent geospatial information needs of their patrons.

The content analytic process depends upon an essentialist structure requiring a mutually exclusive and exhaustive categorization scheme. Content analysis ignores the view that items may *partially* belong to several categories simultaneously except through a tolerance for less than 100% agreement in the placement of items in the categories by coders. The dichotomy of an item either being in or out of a conceptual category (and in only one) is highly suspect. A post-Enlightenment view of categorization precludes the inherent essentialism of a place for everything and everything in its place (Mervis & Rosch, 1981; Lakoff, 1987). Such essentialism limits the overall usefulness of content analysis but does not preclude using content analysis as an entry point to a broad description of imagery content that additional methods can extend and refine.

In practice ranging from sociology to communication to psychology, a category scheme is developed using 25-30% of the data. The scheme is tested for ability of coders to assign items consistently to categories (intercoder reliability). If there is low agreement, the rules for assignment to the categories are reworked until 90% agreement among coders is achieved. Retests of reliability are done on different subsets of the data and with

different coders. The number of categories is frequently taken into account to eliminate the random placement from contributing to the agreement. For example, with two categories 50% agreement is no more than chance or random agreement. Therefore, modified formulas for measuring reliability have been development that eliminate mere chance agreement.

Kerlinger (1986) describes the use of content analysis as both an analytic and observational tool. Content analysis provided both these functions for exploring the geographic images including maps in a sample of *Fortune* 100 and Global 1000 corporate annual reports. Content analysis permitted identification of categories and geographic images and maps as well as an analysis of the selection and distribution of these geographic images within the reports. Kerlinger attempts to make the process of content analysis seem value free and objective, a view not taken in this work. The categories pursued for analysis in this work are merely one set of categories among many that could have been chosen. Tests of the reliability of coders were conducted to avoid claims regarding the idiosyncratic or solipsistic nature of the categories as well as for the rules governing the placement of a particular datum in a category. An item could be added to the catch-all category of "other" when coders could not consistently place the item in a major category of the scheme. This process generated mutually exclusive categories with high reliability avoiding an idiosyncratic scheme but with concessions to the multiplicity of possible schemes and the minimization of reductionism through the use of the "other" category.

Traditional content analysis also seeks claims for validity of schemes through cross validation by repeated use of the scheme in other datasets and domains. This work only makes validity claims for construct and face validity of the schemes themselves (Cook and Campbell 1979). Thus, content analysis, derived from goals of rationality, essentialism, and epistemological completeness is adapted for use in this project to permit multiple voices to be heard and to minimize reductionism.

Semiotics

Semiotics is the "science" of signs and seeks to understand signs by exploring triangular relationships among an object or concept, its representation, and its meaning (MacEachren, 1995). The terminology of semiotics can be confusing because different disciplines with differing jargon have approached the study of signs and their meaning. In addition, many terms have common usage which predates the scientific use of the term developed within semiotics. For example, the term "sign" has a narrow meaning in semiotics. The term "sign" in this work refers to the overall relationship among the entity encompassing an expression, the concept it stands for, and the in-the-world object or concept represented (if one exists). A sign is not used here as a symbol in the everyday sense nor does it represent marks carrying meaning. Rather, the "sign-vehicle" will be the term used to refer to the carrier of meaning. Thus, the common usage of a sign (for example, a stop sign) is a sign-vehicle; it is the expression of the sign. "Interpretant" refers to the meaning(s) the sign-vehicle elicits: the halting of a car at an intersection, for example. "Referent" refers to the actual, real-world object that relates to the sign vehicle: the cessation of the car that actually occurs at the intersection (cf. MacEachren 1995). A cartographic example: a stylized tree or tent is used to represent a campground with the sign-vehicle the tent or tree image, interpretant being a campground, and the referent being the actual campsites on the land.

The formal study of signs developed along two different approaches. In 1916, Saussure, a linguist, described a dyadic relationship between the

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"Peirce's triad relationship has permeated North American literature on the study of signs . . ."

"Further, a sign can serve as sign-vehicle itself generating myth as a secondary sign."

"Baudrillard and Derrida analyzed current culture and claim the supremacy of appearance in symbols over substance."

" . . . these authors claim all signs are reappropriated for purposes of power and control."

sign-vehicle and the interpretant initiating one approach to the study of signs called semiology (Innis 1985). Saussure was a linguist and viewed semiotics as a grammar of arbitrary signs. (Saussure actually used the terms "signifier" for the sign-vehicle and "signified" for the interpretant.) Saussure focused on the relationship of sign-vehicles to their concepts, explicitly omitting the real world referents. He felt that any collection of associations of sign-vehicle with referent and interpretant or system of signs was totally arbitrary (Saussure 1966). For example, the word formed by the letters "t-r-e-e" is an arbitrary representation for the concept or the real world object of tree. Saussure believed that meanings form a network of relations and that semiotics need only concern itself with the differences between the meanings, not the identification of an object's meaning: a structuralist's point of view.

In contrast, Peirce (1931, 1955), a philosopher and logician, considered the referent (the real or referred to object) of immense concern to the study of signs. Semiotics became the label attached to Peirce's approach to the analysis of signs. Peirce described a triad relationship among sign-vehicle, interpretant, and referent (Hervey 1982; MacEachren 1995). Peirce's triad relationship has permeated North American literature on the study of signs, with various authors emphasizing different components. Peirce stressed the sign-vehicle as the mediator between the referent (object) and interpretant (meaning) while Ogden and Richards, for example, stressed the role of interpretant as mediator between sign-vehicle and referent (cited in MacEachren 1995: 221).

Semioticians then developed typologies of signs based upon either the dyad or triad models. Peirce developed a three-term typology for the relationship between referent and sign-vehicle (from the point of view of the interpretant): icon, index, and symbol. These categories are not mutually exclusive nor exhaustive of the relationships. Further, a sign can serve as sign-vehicle itself generating myth as a secondary sign. Also, signs are associated with both literal and cultural messages with the literal image denoted and the cultural image connote (Barthes 1968). Sless (1986) has summarized semiotics as the search for understanding and categorization of "stand for" relationships.

The epistemological assumptions of the various approaches to semiotics have moved from privileged expert with essentialist views to postmodern and intersubjectively informed ones. Pierce, Saussure, and recent writers in cartography including Schlichtmann (1995) and Head (1984) have sought grammars that unambiguously tie the sign-vehicle to its interpretant and / or referent object at least for a particular time, place and culture. Geographers such Brian Harley (1989) and Denis Wood (1992) have expressed the need to deconstruct maps. Others such, as Barthes (1968), are more committed to the inherent ambiguity and total social construction of all signs and their components. Baudrillard (1968, 1993) and Derrida (1982) analyzed current culture and claim the supremacy of appearance in symbols over substance. They would claim that the sign vehicle and interpretant constitute "hyper-reality" and that referents (reality) are insignificant. They would further claim that there are only lost referents or free-floating signifiers, all meaning is arbitrary, and no sign is unproblematically associated with the real entity that may have initially spawned it. Signs are only connotative, denoting nothing in and of themselves; thus, these authors claim all signs are reappropriated for purposes of power and control.

Simultaneously, these experts privilege their own expertise in analysis. They defend their connotative inferences as equal to any. However, one gets the impression that these experts' views, as insightful as they may be, are more equal than others' views. Such an impression understates the subjec-

tive nature of interpretation. Others such as Gottdiener (1995; Sless 1986), seeking a socially-informed, postmodern understanding of semiotics, suggest the need for discussion with members of a group to inform current meanings of signs and their effect on the user community. Unfortunately, this latter group does not indicate a meaningful method for acquiring these intersubjective views. Such varied and conflicting epistemologies often co-exist within adherents to different postulates who can not quite free themselves from earlier settings (Barnes 1996 explores this issue in broader context for economic geography). Unfortunately, the postmodern views of semiotics fail to provide a practical and validated approach and method to understanding users' views of signs and myths. Sense-making (Dervin 1992), discussed at length in section four of this paper, poses an epistemological basis in concert with the postmodern semioticians but also provides a well-tested method for obtaining users' views. Sense-making posits an epistemology and ontology which privileges all users, not just experts, and concludes that the driving cognitive need of all humans is to make sense of the world they make and are, in turn, made by. Such a combination of expert and user views may permit a richer and more human understanding of representation to emerge.

Preparatory to the discussion of sense-making and social semiotics, the results of a case study applying content analysis and semiotic analysis to the cartographic and geospatial imagery of major corporate annual reports (ARs) is reported. The ARs of the *Fortune* 100 and Global 1000 provide a window on the rhetoric of the world's largest corporations. Such rhetoric is manifest in the ARs text, images, and statutory financial information (e.g., Miles 1988; Galant 1994). AR content reveals much about a company's espoused philosophy, mission, goals, objectives, behavior, and performance. They have also proven to be useful for almost 75% of shareholders asked, though not as useful as the daily newspaper (Epstein and Pava 1993). ARs' geographic content in image and text are components of the rhetoric surrounding financial and accounting information, yet the geographic content of ARs has not been critically examined (Hopwood 1996). The extensive audience for ARs includes current and potential individual and institutional investors, potential customers, professional analysts and stock brokers, interested members of the public, bankers, community leaders, financial reporters, unions, suppliers, consumer groups, and merger and acquisition candidates (e.g., Hill and Knowlton 1984). Thus, ARs provided a rich resource to compare user and expert views and with which to compare and contrast the methods of content analysis, semiotics, and social semiotics applied to cartographic and geospatial imagery.

This study explored the imagery of the 1994 ARs for the 100 largest U.S. corporations as ranked by *Fortune* magazine, and 53 additional companies to complete the top 100 of *Business Week's* Global 1000. *Fortune* magazine revamped their rankings in 1995 merging the largest US service and US manufacturing categories into one category of largest US industrial corporations. *Fortune* ranks the companies only by sales but displays corporate profits, assets, stockholder equity, and the percentage changes of these parameters from the previous year. The Global 1000 as determined by *Business Week* ranks worldwide corporations by market value based on the number of outstanding shares multiplied by the price per share using several classes of stock. During 1993-1994 several companies merged, spun off independent companies, or changed their names, complicating the number of companies for analysis. This led to a sample of 153 ARs for analysis.

"...varied and conflicting epistemologies often coexist within adherents to different postulates who can not quite free themselves from earlier settings."

THE CURRENT PROJECT

"AR content reveals much about a company's espoused philosophy, mission, goals, objectives, behavior, and performance."

"ARs provided a rich resource to compare user and expert views..."

"... content analysis forms a structure of sequential and related components of geographic images in ARs."

"The geographic domain can not and should not ignore tying the referent to sign-vehicle and interpretant."

The current analysis approaches the interpretation of geographic signs including maps in corporate annual reports images as a three-fold process. First, content analysis is used to collect, categorize, and describe the structure of ARs' geographic content in images from all of the Fortune 100 and a sample of the Global 1000 corporate ARs. This content analysis forms a structure of sequential and related components of geographic images in ARs. This is only one expert and privileged narrative description of AR images. Second, a semiotic analysis initially explores a description of the denotative nature of the images displaying the range of manifest issues and concepts depicted in the geographic images of ARs. The semiotic analysis builds upon the denotative analysis generating a connotative representation by studying binary oppositions of the possible meanings represented in the geographic images. The connotative phase of the semiotic analysis seeks among several oppositions at least one that has some claim to express what the AR is "about." This semiotic "aboutness" addresses the connotative aspects of the ARs signs and derives from the uses, values or cultural associations of the signs as understood by experts (who are in this case faculty and graduate students with background in semiotics and semiotic analysis).

Third, recent purchasers of the stock or products of these companies will be interviewed to collect sense-making views of the images in the ARs; this last approach privileges all users' views of the maps and images (expert or casual users) providing the social semiosis. As mentioned earlier maps rarely stand alone as an information resource in natural settings. The social semiotic approach treats them in more isolation in the early stages of analysis but joins maps with other geospatial imagery at the later stages of analysis.

The geographic domain can not and should not ignore tying the referent to sign-vehicle and interpretant. Therefore, in this work the content analytic and semiotic approaches used are Peircian in spirit. Although there may well be lost and free-floating signifiers (e.g., Baudrillard 1968, 1993; Barthes 1968) the attempt at recovering them should be made. Such attempts may provide interdiction to the hegemony of the dominant paradigm (Gottdiener 1995). Similarly, a strong sense of realism is present in this work. Geography is certainly real at the level of trees and cities and ravines, no matter what these objects are called or how their attributes are grouped or interpreted.

At this point two phases of the three-fold process have been completed. The data collection of the social semiotic sense-making interviews is not yet complete. Below brief results of the first two phases and the structure of the third phase are presented. These results motivate asking real users for their views on maps and other geographic imagery found in ARs fostering the use of social semiotics.

Content Analysis Results

Merrill Lynch (1994) states ARs have three sections: *Executive Letter*, *Business Review*, and *Financial Review*. According to Merrill Lynch, the Executive Letter is to provide "a broad overview of the company's business and financial performance," the *Business Review* "summarizes recent developments, trends, and objectives of the company, and the *Financial Review* describes "business performance ... quantified in dollars." The *Financial Review* itself according to Merrill Lynch contains two sections: Discussion and Analysis, a narrative with charts and graphs in which the corporate management describes the changes in operating results from year to year, and Financial Statements that include the balance sheet, income statement,

statement of changes in shareholder equity, statement of cash flows and footnotes. Our analysis confirms these components of structure. However, in addition, this work added two critical sections of images in which management communicates its vision, and in which geographic content is strongly present: *Front Matter*, such as the cover of the AR, and *Back Matter* that often includes corporate addresses, annual meeting information, and the AR's back cover. All corporate reports analyzed contained this five part structure regardless of their style, format of presentation, industry as determined by Standard Industrial Code (SIC), or national origin. The presentation format for these reports befit the image of "responsible and conservative" corporations. The general layout seeks to appease the stock purchasers and stock brokers but do not generally directly appeal to the consumers of their products. Thus, corporate reports are highly structured with these five sequential sections: *Front Matter*, *Executive Letter*, *Business Review*, *Financial Review*, and *Back Matter*.

A content analysis scheme for the 153 ARs' geographic images was developed which explored the geographic images of all five AR sections. This exhaustive review lead to a five category scheme for the geographic imagery structure: Informative Map, Incidental Map, Incidental Images, Geographic Symbol, and Geographic Chart. The section of the AR in which the image appeared was recorded as well as the size of the image as a function of the proportion of the page. Scheme coders consisted of faculty and graduate students with background in content analysis techniques forming the cadre of experts for this project.

The two cartographic categories were described as follows:

Informative maps in an AR present information explicitly about the company in cartographic form. The most common cartographic types included nominal point maps, route maps, interrupted maps, and various inset maps. The maps might be stylized attempts at two dimensional versions of three dimensional globes, topographic maps or simple outlines of countries. The "definition" of map and map types employed did not consciously follow or apply any well-known typology of maps. Our typology arose from the data and produced high intercoder reliability and agreement for the scheme by the three coders. Often an informative map was a combination of types such as global and nominal point map or nominal point map and route map. The coverage of the map, whether it attempted a three-dimensional look, presence or absence of graticules, amount of space occupied on the page, and a title were all recorded. Examples included Fleming's point map of operating units on its inside front cover (Figure 1), Occidental's pipeline route map, ARCO's interrupted world map indicating sites of their exploration projects (Figure 2), and ARCO's inset map from a full hemisphere map indicating the South China Sea and the location of China's first offshore natural gas field and the route of the subsea pipeline that will bring the gas to market (Figure 3).

Incidental maps are of the same general types as indicated above but they fail to provide any data concerning the company. They may be decorative maps, logos, outlines of countries, or others. They perform no specific function beyond getting the reader's attention and being aesthetically pleasing though they may well influence opinions of the corporation. Some of these are difficult to spot and are frequently deeply embedded in the artwork. For example, Fleming's AR cover (Figure 4) includes the words "VISION 2000" enmeshed in a graticle accompanying the description of Fleming "Becoming a world-class marketing and distribution company." (Note how this is in contrast to the informative map on the inside front cover indicating that all Fleming operating units are within the U.S.) Litton Industries includes a picture entitled: "An operator tracks simulated targets

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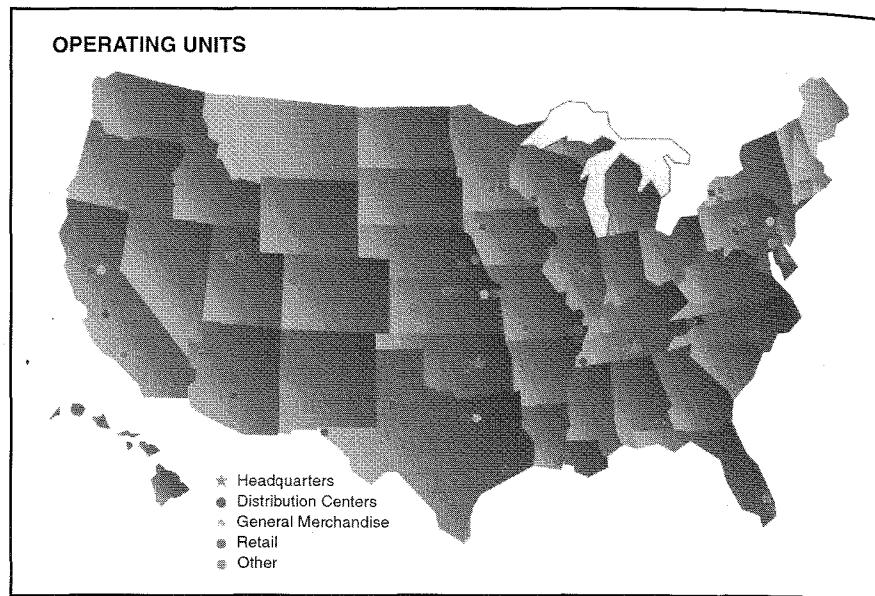


Figure 1. Fleming Operating Units, 1994 (Copyright Fleming, permission to reproduce granted from Fleming media relations)

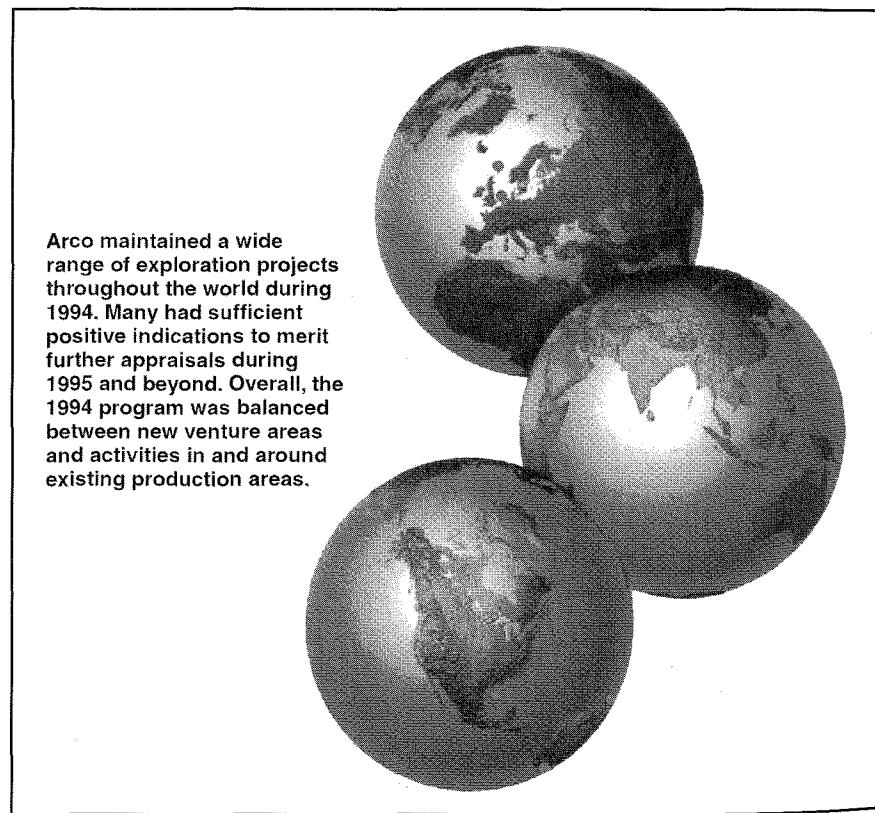


Figure 2. ARCO Exploration Sites, 1994 (Copyright ARCO, permission to reproduce granted from ARCO media relations)

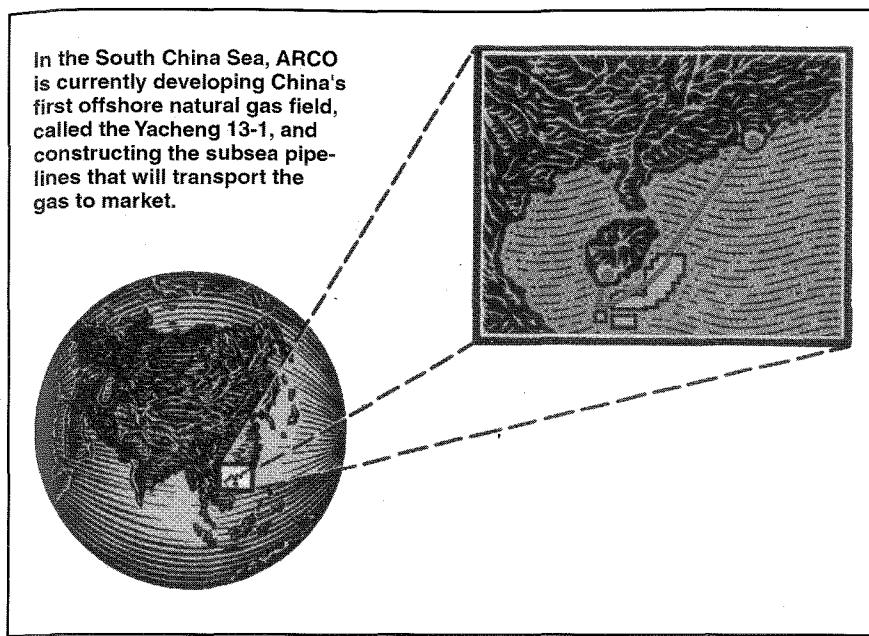


Figure 3. ARCO South China Sea Pipeline, projected 1994 (Copyright ARCO, permission to reproduce granted from ARCO media relations)

inside Tactical Operations Center being developed by Litton for the US Army's Theater High Altitude Area Defense (THAAD) system." The only perceptual images in the darkened photo are the operator's faint profile and the CRT screen exhibiting a relief map (perhaps of central California) whose legend or details are illegible even with a magnifying glass. The map provides no explicit information about the company although the title says much.

In the 153 reports analyzed, 1036 instances of geographic images occurred, for a mean of 6.77 images per AR, mode of 2 images, and a median of 5.5 geographic images per report. The promotional use of these reports accounts for the relatively low proportion of informational maps (131) compared to incidental maps (278) among the 1036 instances of geographic images in the reports (Figure 5). This content analysis provides a concise description of the imagery in corporate annual reports and also serves as useful input for constructing a semiotic analysis of the imagery.

Semiotic Denotative Results

The content analysis reported above provides an overview of geographic formats, the scope of the definition of geographic content of images, and a structural assessment of maps and geographic images within corporate annual reports. This section expands that analysis to build a semiotic description of the particular geographic content denoted in the AR. Semioticians distinguish between what a sign may literally stand for or denote from its cultural associations or connotations (Fiske 1990). However, to insist that denotation is merely a "literal" meaning of the images underestimates the inherently cultural basis of objects and their signs. Denotation has much to do with labeling (Sless 1986).

Objects are often defined by their use and a particular use may be well-known in one culture and unknown in another. That is, the same object may have widely differing denotations in different cultures. For example, a book may be seen as a food source by a goat or a doorstop at an undergraduate party. Therefore, some level of interpretation is necessary even to form

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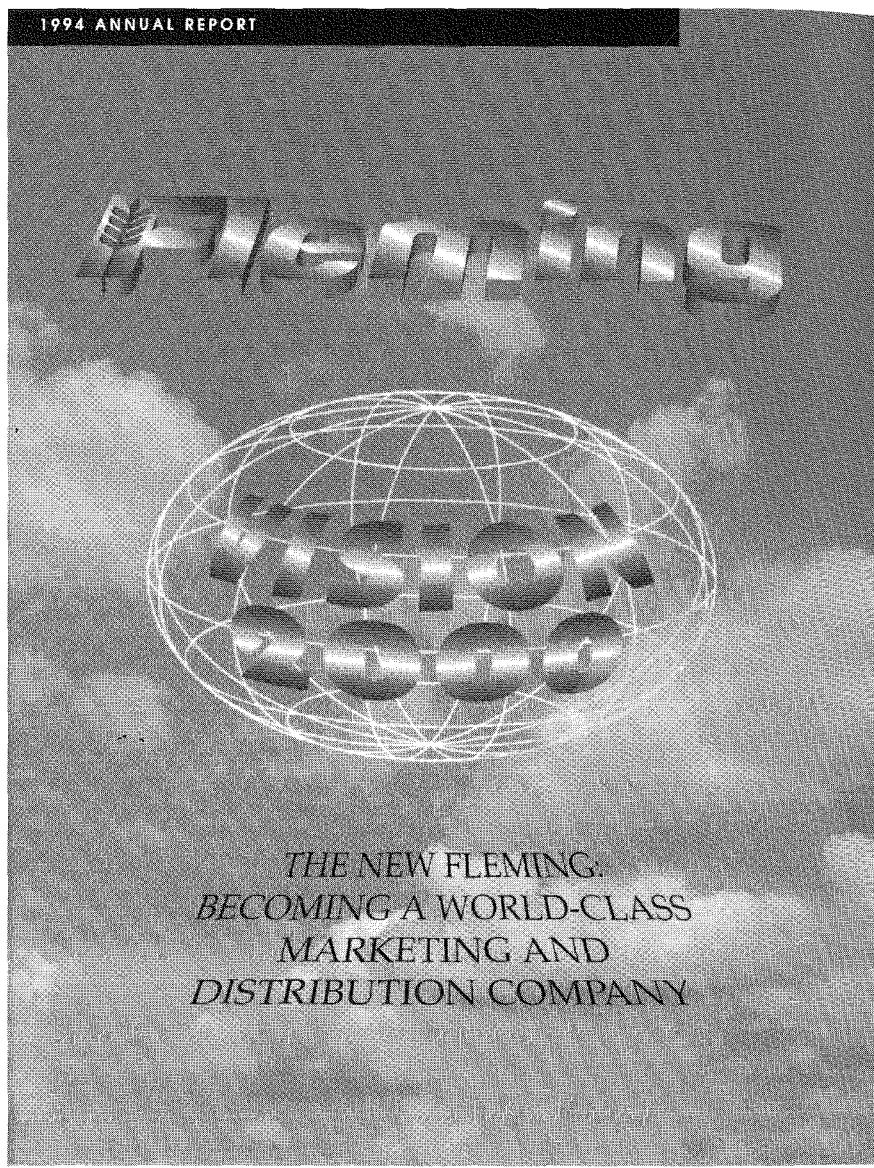


Figure 4. Fleming AR Cover, 1994: Incidental Map (Copyright Fleming, permission to reproduce granted from Fleming media relations)

"The goal of denotative analysis is to capture the taken-for-granted intersubjective literal meanings appreciated by a particular community or language group."

"...denotation... serves as a necessary precursor to the connotative or deep interpretive semiotic associations..."

denotations. The goal of denotative analysis is to capture the taken-for-granted intersubjective literal meanings appreciated by a particular community or language group. As stated earlier, some would claim no signs are natural and that denotations are no more than the fixed understandings across communities for some time period. When the denotations are separated from the possible associative meanings for that same community, a richer analysis of the intersections of ideologies and discourses may be possible (Hall 1980). The analysis of denotation in ARs provides a sense of what explicit and manifest geographic content is provided in ARs. Such denotation clarifies the role of maps and other imagery in ARs and serves as a necessary precursor to the connotative or deep interpretive semiotic associations of the geographic imagery in ARs. The specific community of users for this project consists of the readers of annual reports, itself a diverse community with varying values, expectations, needs, and preferences.

A sample of 28 corporate ARs was selected from the 153 ARs used for this denotative description of geographic imagery. These 28 were chosen to

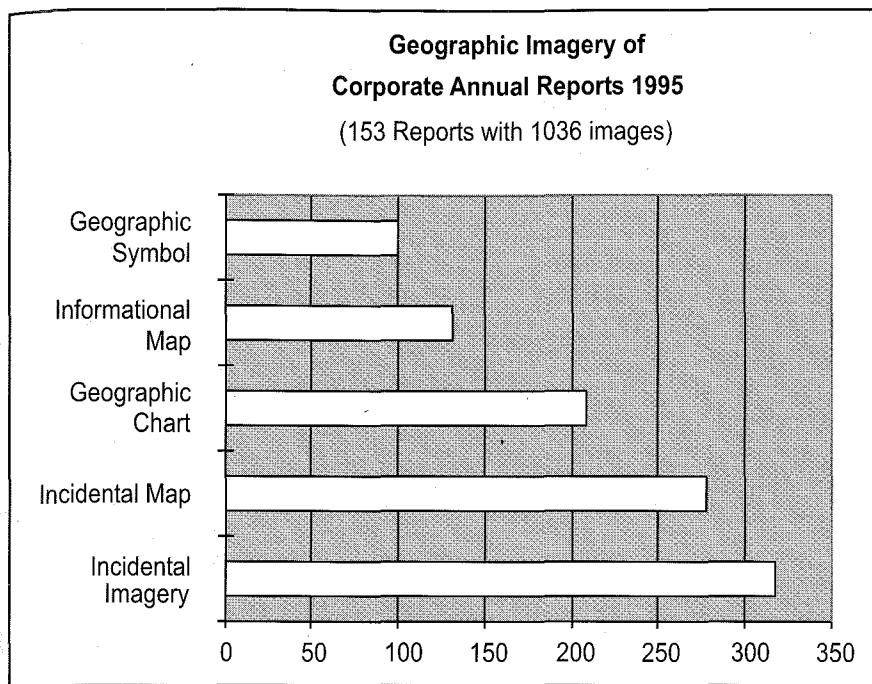


Figure 5. Distribution of Geospatial Imagery Types in Corporate Annual Reports

provide wide coverage of industries indicated by SIC codes, markets, and corporate philosophies as indicated in the body of the reports as well as coverage of the maps and geographic imagery types as presented in the content analysis scheme described previously. So what is represented in the photos, diagrams, maps, charts, icons and other graphics of ARs that is geographic in nature? That is, what are the major modes of geographic imagery as seen by expert semioticians in ARs?

At least nine major modes of denotation appear in this set of AR geographic images. Of these nine only one covers maps. The other eight modes (e.g., landscapes as the main focus of the graphic presentation, graphic backdrop to illustrate corporate activities or products which are manifest in the scene, and humans illustrated by industrious workers in action on the job or as corporate employees donating time to assist local communities) indicate the wider role that geographic information plays in support of resolving information needs in which maps and cartographic imagery are embedded; however, only the one covering maps is elaborated upon here.

Maps appearing in ARs are both informative and incidental as mentioned under the content analysis. The principal informative use of maps is to describe the regions where the companies are actively doing business, growing, or hope for global expansion. For global companies, a world point map of operations is pro forma. Often country or state icons are juxtaposed near text discussing company activity in that country or state providing a graphic relief from the intense text and as a geographic locator.

Several companies portray themselves as being global but have operations in only a limited number of countries (e.g., Quaker Oats). Several such companies exhibit global maps without country borders with or without a graticule. These representations leave the impression that the company is without borders and is more omnipresent than the list of countries of operation might indicate. This also happens with incidental maps that carry no real information per se but provide a global patina for the company.

"At least nine major modes of denotation appear in this set of AR geographic images."

"The principal informative use of maps is to describe the regions where the companies are actively doing business, growing, or hope for global expansion."

"In these maps a balance is struck between global presence and yet being near to consumers."

"The nine denotation modes . . . do not provide the moral or culturally imbued holistic meaning."

"As the sign is assigned to a cell(s) aspects of its semiotic meaning within space and time for a linguistic community are exposed . . ."

Incidental maps are intriguing; they present no apparent data concerning the company yet they express much. For example, they often make the company appear to be present in more places and at more times than a point map of operations might indicate. In these maps a balance is struck between global presence and yet being near to consumers. For example, Quaker Oats displays a distorted "hemisphere" map centered over the Atlantic Ocean that includes North America and parts of South America, Europe, Asia, Pacific Rim, and Africa with thunderbolt icons that point to places Gatorade is consumed. Quaker states its mission for Gatorade is to "quench the hot and thirsty consumers in every corner of the world." The text discusses US, Canada, Latin America, Europe, and the Pacific Rim; however Africa and China are left unmentioned.

The nine denotation modes are pervasive in the ARs, both in the sample 28 studied in-depth and in the full set of 153. The modes present a literal context of the geographic images of ARs, and detail the story line or script describing the role of geography in ARs. However, they do not provide the moral or culturally imbued holistic meaning that readers make about the company, use in their stock or product purchases, or communicate about the company to others.

Connotative Results: Attitude-Behavior Matrix

Investigating the geographic images of ARs including maps with an attitude-behavior matrix provides one means of access to the more holistic message or associated semiotic meanings of the AR geographic images. Semiotic connotations expose a deeper sense of the whole of AR geographic imagery than denotations alone. Connotations clarify the philosophical, cultural, political, and economic role of corporations in society, and suggest the corporate wished-for beliefs and behavior of individual readers of ARs.

One approach to developing semiotic connotations employs a 2-by-2 attitude-behavior matrix. Such a matrix is composed of four cells in which each cell corresponds to an attitude-behavior category. Both the attitude and behavior variables are dichotomous (recording only the presence or absence of the trait) in which the rows indicate either an optimistic or pessimistic attitude while the columns indicate either active or passive behavior. Applying this matrix to signs of the ARs involves assigning either a whole image or a part to one or more cells. As the sign is assigned to a cell(s) aspects of its semiotic meaning within space and time for a linguistic community are exposed through the tension of the dialectic nature of the variables. The matrix (figure 6) represents an exploratory device, not a statistical tool. Examples of applying the matrix to ARs serve to illustrate the concepts that the matrix process exposes.

Abbott Laboratory's cover photo of a mother and baby daughter who are both healthy thanks to Abbott's nutritional supplement represent an entry in the *optimistic-passive* cell. That is, Abbott's cover imagery with an out-of-focus shrine in the background seems to say "Trust us. We will take care of you and yours; be happy. You don't need to concern yourself with these issues no matter where you live, that is our business." Underscoring this interpretation of Abbott's photo is the slogan appearing on the cover pronouncing Abbott's mission as "Quality Health Care Worldwide." However, nowhere in the AR is analytic research in text or graphic to indicate the validity or reliability of the product, for whom the supplement is best, under what circumstances it is most efficacious, or what its long-term effects are upon mother or baby.

Raytheon describes its conversion of military and defense electronics to environmental monitoring while exhibiting an image of water falling

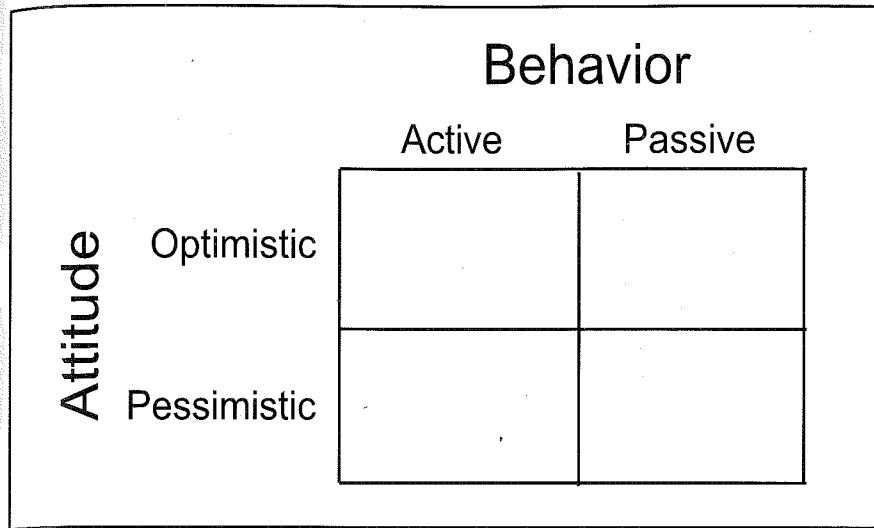


Figure 6. Attitude Behavior Matrix

hundreds of feet deep in the green Amazon rainforest region of Brazil. This image belongs at first glance to the *optimistic-active* cell. The image reflects the company's concern for the environment and the ability for others (governments, landowners, environmental groups?) to keep an eye on the environment and keep it safe. All one needs is Raytheon's products to be safe but this requires action. One can also see the *optimistic-passive* elements in this image since all one needs is Raytheon's products to monitor the environment, and somehow monitoring is equated with complete protection of the rainforest. There is also a subtle sense of *pessimistic-active* in this image of rainforest monitoring. The activity is driven by motivation to obtain the products and the pessimism is inferred from the need for the monitoring in the first place and a sense that more is needed than just monitoring for all to be well. However, the optimism and passivity are accentuated by the beauty and tranquility of the waterfall, similarly the passivity is accentuated further by the homage paid to Raytheon for being so creative in redeploying the military electronic surveillance equipment for us.

No examples could be found to reflect the *pessimism-passive* cell in the ARs geographic imagery of any mode or type. The imagery was always supportive of the corporations. The *pessimistic-passive* cell represents a fatalism antithetical to the messages corporations wish to enunciate. Images in this cell by their very nature are expressions of hopelessness and futility. Such views might be expressed by images of hedonism or solipsism. Images of rebellion against authority crushed by authoritarian regimes might also reflect such *pessimistic-passive* concepts. For example, Chinese actions in Tiananmen Square in 1989, frustration of Peruvian terrorists in taking over the Japanese embassy, the loss or accelerating loss of Brazilian rainforest, or the disillusionment of many communists or Marxists with the changes taking place in the former Soviet Union might be poignant reminders that power reflects resources and control at farther and farther distances (Giddens 1984). Yet in ARs no images appear that indicate that problems pronounced by the companies cannot be resolved or cured by their products or services. An example of a *pessimistic-passive* image *might* have been a chart or choropleth map reflecting the loss or accelerating loss of Brazilian rainforest because of non-sustainable harvesting of timber over the past five years; however, no such image is present in any of the ARs.

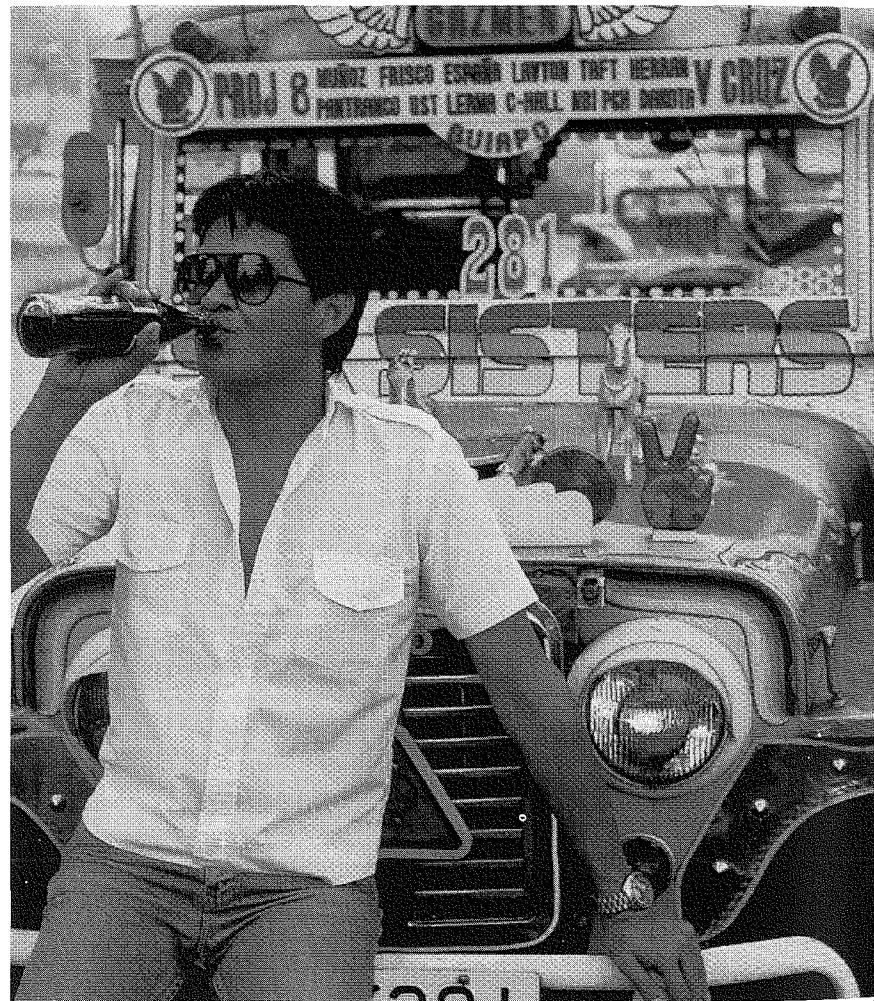
"... homage paid to Raytheon for being so creative in redeploying the military electronic surveillance equipment for us."

"The imagery was always supportive of the corporations."

"... no images appear that indicate that problems pronounced by the companies cannot be resolved or cured by their products or services."

Examples of the *optimistic-passive* nature of the geographic imagery in ARs include:

- Maps indicating the expansion of the company's 'reach' through new manufacturing sites, or expanding market penetration [e.g., Quaker, Coca-Cola]
- Incidental maps that imply the globalization, regionalization, and, yet, local concern of corporations [e.g., Fleming, IBP]
- The paternal nature of Kimberly-Clark in aiding feminine hygiene in Korea
- The somber beauty at sunset of US military strength emanating from Ingalls shipbuilding division in Mississippi displayed on the cover of Litton's AR, and
- The taken-for-granted advantages gained by a Philippine bus driver quenching his thirst with a bottled carbonated soda [Grace] (see Figure 7).



Rapidly increasing consumption of carbonated soft drinks makes container sealing a growth industry in developing countries like the Philippines.

Figure 7. Complex Geospatial Imagery: Commodification of Culture (Copyright W.R. Grace & Co., permission to reproduce granted from Grace Corporate Communications)

Each of these reflect the optimism of the corporate message along with a sense that with this company all is, and will be, well. Labor strife, expropriation of foreign culture and resources, infiltration of new cultural values into old cultures, and the occasional or continual corporate lapses of responsibility for children, women and families never seem to balance the unending faith in the corporation to solve the world's problems given just a little more time and capital. In summary, the attitude-behavior matrix as a tool for semiotic analysis exposes the optimistic messages of geographic imagery and maps of corporations and of corporate responsibility and ability to maintain and improve an already wonderful world.

Background

Postmodern semiotics calls for casual user as well as expert input in analyzing signs yet does not provide either a good conceptualization of humans or a method to collect user / viewer data (e.g., Gottdiener 1995, Sless 1986). Therefore, a richer and more robust epistemology and ontology is needed to go beyond the expert interpretations of traditional semiotic and content analyses such as those discussed above. Dervin's (e.g., 1992, 1995) sense-making framework and its associated methodologies is one such rich and robust approach. Combining sense-making with postmodern semiotic sensitivities poses a useful extension to semiotics that does privilege all users whether expert or casual. Sense-making explicitly accounts for time and space dependencies of human information needs by metaphorically representing the cognitive states of humans as continual movement along a road in time and space. The perception of a person's current position along this road depends on where the person has been (past) as well as where the person is (present) and where the person is going (future). Dervin pictures humans as intelligent, creative creatures capable of making sense by incorporating knowledge from within themselves and from the external world allowing for forward movement along their cognitive road. She notes that discontinuities or gaps that represent a need for the individual to make sense of their world often appear along their cognitive road and that humans must make sense of the barriers and gaps before movement may continue along the cognitive road. Gaps are a direct consequence of Dervin's perspective of a human view of reality as sometimes intersubjective, sometimes recursive, sometimes chaotic but constantly changing. Dervin derives her view of the human becoming in the world from her positing ontological and epistemological incompleteness. Dervin's (1995) assertion that information is designed by humans making and unmaking information has much in common with Giddens' (e.g., 1984) structuration theory. Giddens and Dervin pose an ontological philosophy of social relations in which agency and structure blend in social relations. They agree that humans often embed social relations in routinized activities of individuals who can neither be aware of all preconditions nor able to predict all the unintended consequences of their actions.

Gaps are respondents' concerns that generate information needs in conjunction with respondents' expectations of how bridging the gap would be useful to continue movement along their cognitive road. Gaps are operationalized in sense-making experiments as questions respondents had as they proceed to resolve their information needs. Dervin acknowledges that these needs are not always well articulated or acknowledged by respondents. Uses are operationalized as the helps or hurts respondents express concerning the value of the responses they obtained to their questions. Dervin believes that humans have a common need to make sense of the world, an innate desire to get back on their cognitive road. Her approach

"... attitude-behavior matrix as a tool for semiotic analysis exposes the optimistic messages of geographic imagery and maps of corporations."

SENSE-MAKING

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"... common experiences among individuals limit the range of human diversity present at a particular point in space and time."

"Generating a prototypical sequence of gaps and support for resolving the gaps provides a design for information systems..."

allows each person to represent his or her own reality. However, Nilan (1985, 1991) suggests that this does not lead to unmanageable variability in analyzing human behavior because humans share socio-cultural experiences. Human need to make sense and the evidence for common experiences among individuals limit the range of human diversity present at a particular point in space and time.

Dervin illustrates the process of sense-making using situation, gap, and use as the three vertices of a triangle. That is, humans find themselves facing gaps they need to bridge mediated by the situation in which they find themselves. Often the actual usefulness of the bridge differs from the expected usefulness. Indeed, our cognitive movement through a situation is the accumulation of a series of steps. A triad consisting of an event of the situation, gaps at the event, and the uses obtained as responses to the event's gaps (whether helpful or impeding, actual or expected) represents each step or micro moment of the situation. Dervin often uses a time line method for respondents to map out the sequence of events of the situation, the questions (gaps) they had during the events, and the responses they obtained in making sense of their situation.

The individual is privileged in Dervin's conceptualization yet sense-making analyses go beyond an individual's view of a situation forming a social conceptualization of information needs. An individual may forget an aspect of a situation for a range of reasons, not the least of which is that the particular issue was not important to him or her or they easily resolved it. However, what one individual did not recall, another will. The sense-making methods have shown a high degree of overlap of micro moment steps among respondents in the same situation. Further, holistic impressions of triads for describing a situation require relatively few respondents (Nilan et al, 1989). To go beyond the individual, sense-making seeks out the commonalities as well as the not-so-common aspects among individuals' inputs by merging individuals to form a general view of the situation. Aligning and overlaying different respondents' sense-making triads leads to changing the essence of prediction from IF ... THEN to THEN... THEN while acknowledging the incompleteness of such a construction. Generating a prototypical sequence of gaps and support for resolving the gaps provides a design for information systems (Nilan et al, 1989) yet acknowledges ontological and epistemological incompleteness. To repeat, open systems have unacknowledged preconditions and unintended consequences. The sense-making methods accept such indeterminacy, producing flexibility and robust information systems that help people in their situation. In summary, the sense-making method is based upon collecting a series of micro moment steps in which users' state their gaps and actual and intended uses within a situation's events: the Dervin Triad. The work of Weich (1995), done independently of Dervin, provides additional perspective of sense-making for groups.

For example, Nilan et al. (1989) analyzed the situation of users developing a desktop publishing product such as a poster, card, or newsletter. They analyzed the time lines of respondents with a range of experience levels, developed a model for the process of creating desktop publishing projects by overlaying time lines, and then displayed a novel online help system. The novel help system incorporated facts, task analyses, and tutorials on a menubar. The menubar reflected the situation time line rather than the standard categorical menubar items ubiquitous in desktop metaphor graphical user interfaces. In this sense-making application to information-in-use systems the individual is privileged within the collective actions of a small group leading to a meaningful design. Another example of sense-making in use is described by Dervin (Dervin & Nilan, 1986) in work with

terminally ill cancer patients. The patients, because of their experiences, were better able to support each other emotionally and informationally than were their physicians who were more centered on system rather than user support. Shields' (1994) work illustrates the use of sense-making methods in analyzing the gender issues surrounding advertising images of females. Gluck, Danley and Lahmon (1995) applied sense-making to develop an understanding of the events, gaps, and helps associated with seeking geospatial information in public libraries. Applying such a user based approach to cartographic design and interpretation and geographic imagery found in corporate annual reports is the major goal of the current project.

"Gluck, Danley, and Lahmon applied sense-making to develop an understanding of the events, gaps, and helps associated with seeking geospatial information in public libraries."

Preliminary Results of Social Semiotic Analysis of AR Geospatial Imagery

The next phase of this project uses the sense-making interview techniques to explore users' views of the maps and imagery in these ARs. The participants in the interviews will be recent purchasers of the stock of these companies, stock brokers who advise their clients to purchase these stocks, and recent purchasers of the products or services sold by these corporations. These interviews are expected to expand our understanding of how maps influence their users and how they interact with other geographic imagery to assist users in resolving their information needs. Combining the sense-making data with semiotic analyses should provide a social semiotic approach to geospatial imagery understanding.

"... sense-making data with semiotic analyses should provide a social semiotic approach to geospatial imagery..."

The sense-making interview methods involve several stages of discussion with the respondents (i.e., recent stock or product purchasers) about the AR geographic images and maps. The method employed is a modification of Shields (1994). First, respondents are given 10-15 minutes to browse several (2-3) complete ARs. Respondents are then asked to select several graphic images that stand out to them most which include a geographic aspect or component with at least one that contains a map. Respondents are then asked to share their reactions, such as:

*What images or ideas or thoughts did this graphic bring to mind?
What questions did it lead you to ask?
What emotional reactions did it lead you to have?*

"The terms "promoting" and "appeal" are purposefully ambiguous and are probed through additional questioning..."

For each image/idea/thought/question/emotion respondents will be asked to describe what leads them to that response and to describe how the reaction relates to their life, now or in the past. Also, respondents are asked to indicate how such a reaction helps, facilitates, or assists them or hurts, hinders or disturbs them.

"... those interviewed ... indicate more scepticism and concern about the role of these services and products..."

In the second and third activities respondents rank a set of 10 geospatial images selected by the researcher from ARs. The first criteria for ranking is the appeal of the image as promoting or not promoting a positive image of the corporation; a second criteria for ranking is the personal appeal of the image to the respondents. The terms "promoting" and "appeal" are purposefully ambiguous and are probed through additional questioning in a manner similar to the that employed in the first activity.

Preliminary interviews applying the above activities indicate that real users do reflect some of the corporate intended messages of the optimistic-passive cell of the matrix. The US economy is doing well and the influence of the economic downturn of the Asian tigers has failed to effect the economic optimism of those interviewed. However, those interviewed to date also indicate more scepticism and concern about the role of these services and products in society at large. Participants were concerned about the

effect on children of the expanding sales of products often illustrated in cartographic images. Needless to say, much more work is needed to explore real users' connotations and denotations of the maps in ARs.

FUTURE WORK AND CONCLUSIONS

Traditional content analysis and semiotic analysis are an elitist deconstruction of geographic imagery and maps based upon experts' opinions or intuitive labels or understandings. In spite of these apparent short-comings these techniques yield interesting insights into the type and structure of geospatial imagery in ARs. Application of sense-making and semiotics to form a social semiotic analysis appears to permit a reframing and decentering of geographic imagery and map research providing researchers a less reductionist, and hopefully deeper understanding of how maps are used and the role they play in informing their users and viewers. It is further hoped that others becoming aware of social semiotics will employ it as one more tool in the process of understanding cartographic products and services.

NOTE: A preliminary version of this paper was presented by the author during a session on qualitative methods in cartography at the 1998 Association of American Geographers meeting in Boston, MA. April, 1998.

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Teaching and Learning Focus Group Skills: A Classroom Example Evaluating Map Design

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As a group learning experience in a graduate cartography course, a focus group study was performed of a recently-redesigned map of the Michigan State University campus. The learning process involved two parts. Part one was a 75-minute focus group discussion during regular class time with the instructor as the moderator, one student as the assistant and notetaker, and the other members of the class as the subjects. After instructions were given, everyone studied the map for a brief period and then discussed a set of issues focused on the design of the map. Discussion was orderly but lively and packed with relevant comments. Part two occurred at the next class session. Students discussed the experience, the results, the assigned readings on the method, and relevance of the method to other projects. A written report was then prepared for the producers of the map.

Reactions to the learning experience were highly positive, and several participants have since used qualitative methods in other research. An actual study proved an effective means of learning the fundamentals of focus group research.

Keywords: focus groups, qualitative methods, cartography, campus map.

INTRODUCTION

It is important that students in graduate programs develop a sense of how to approach a variety of research problems. In the graduate curriculum at Michigan State University, students take a course in research design that requires the development of a proposal and covers a number of general elements of research such as problem statements, choice of appropriate methods, and reporting of results. Students are also required to take a research seminar, and the one in cartography and geoprocessing requires the development of an individual research project from proposal to final report of results. Other courses include research skills to varying degrees, and the quantitative methods course is heavily relied upon to teach students the skills that are necessary to develop "true" research, that is, scholarly work that will contribute new knowledge to the discipline.

There is currently no course in the department devoted to qualitative methods, that is, to the techniques of "open-ended interviewing to explore and understand the attitudes, opinions, feelings, and behavior of individuals or a group of individuals" (QRCA, 1998). With the increasing use of and respect for qualitative methods in the social sciences, it became clear that these methods had to be more than "mentioned in passing" in graduate courses. Although some faculty use qualitative methods in their research and convey a degree of knowledge about them to students, the opportunity to gain expertise in their application to cartography and geoprocessing was not available. This paper describes the experience of exploring a qualitative technique-focus groups-in a classroom setting.

We wished to gain competence in the focus group method because of its potential usefulness in our own research. It is a group interview technique

that relies heavily on interaction among the group and that uses the researcher's questions primarily to stimulate discussion and interaction. The products are data and insight that would not readily be available without interaction (Morgan, 1997). The method is of special interest in cartography because maps are highly complex and yet within the realm of experience of a wide variety of people. A quantitative survey might find that X% of people made a specific choice for a specific question, whereas in a focus group discussion, the logic of one participant may immediately be recognized by the group and thus affect group consensus on the question because more information is available to participants. The discussion may stimulate responses that go well beyond what a researcher is able to compose in the quantitatively-treatable questions that could be used on a survey form. The complexity of the map makes it difficult at best to capture in quantitative surveys the potential insight of participants, yet participants are quite able to contribute to discussions of maps and to express a wide array of opinions in their own words and gestures.

There is no lack of literature on qualitative methods and on focus groups in particular. Sage Publications alone lists over 50 research methods titles that include the term "qualitative," and a dozen that include the term "focus group" (Sage Publications, 1998). Among these titles, *Focus Groups: Theory and Practice* (Stewart and Shamdasani, 1990) is a balanced introduction to the method that covers the nature of the method, recruiting of participants, designing and conducting the session, and analyzing results. *Focus Groups as Qualitative Research* (Morgan, 1997) compares focus groups to participant observation and individual interviews, discusses their use in association with other methods and as an independent method, and outlines the procedures and issues in focus group research. *Focus Groups: A Practical Guide for Applied Research* (Krueger, 1994) concentrates on processes, issues, and concerns and discusses them in more depth.

Some of the key elements of focus group research that are distilled from sources such as these are: 1) The focus group is composed of about 8-12 people of homogeneous backgrounds relative to the matter at hand. 2) The researcher plans a list of main issues or questions on which the group will focus. 3) The moderator plays a key role not only in eliciting comments from all members of the group but in formulating probes that follow up on responses to the main issues or questions. 4) The interaction among participants allows and encourages development of thoughts and ideas as the discussion progresses and is a positive aspect of the discussion. 5) A means of recording the content of the discussion must be planned. 6) Treatment of results can range from straightforward reporting of ideas and insights to detailed observation and analysis of content, depending on the needs of the project.

In the cartographic literature, the seminal study was an application of the focus group method to dynamic cartography. Monmonier and Gluck (1994) had four sets of participants respond to narrated demonstrations of graphic scripts, i.e., graphic materials that tell a story. The study yielded a wide variety of input that is potentially helpful not only to the specific materials used in the study but to dynamic cartography in general.

Other use of open-ended techniques to gain information in cartography tend to have been embedded in studies that were primarily quantitative in nature. They also tend to have involved individual responses rather than group discussion. Olson (1981), for example, supplemented quantitatively-analyzable questions with open-ended ones that prevented naïve conclusions about map reader abilities with two-variable maps.

"A quantitative survey might find that X% of people made a specific choice . . . whereas in a focus group discussion, the logic of one participant may immediately be recognized by the group and thus affect group consensus . . ."

THE LITERATURE

"The interaction among participants allows and encourages development of thoughts and ideas."

We are aware of no literature that discusses qualitative methods in general in the field of cartography. Neither did we find material that tells how qualitative methods, and focus groups in particular, should be taught or learned.

THE CLASS ACTIVITY

"The focus group technique was of special interest in evaluating our project because we wanted participants to interact as they provided their reactions and insights."

To explain our interest in focus groups and the reason we carried out our focus-group learning exercise, we need to explain the nature of our class a bit further. It is not a research seminar but a graduate course entitled "Map Automation". It includes a laboratory component in which the group develops a production project that furthers cartographic and related skills in a collaborative work environment. For the production project we chose to develop some multimedia materials in physical geography, and we discussed some of the ways that both qualitative and quantitative methods might be employed to evaluate our materials. We wanted to be prepared to actually conduct that evaluation (most likely after the completion of the semester), and the question was how we were to develop skills in qualitative methods *before* conducting that project and taking the time of numerous volunteer subjects. The focus group technique was of special interest in evaluating our project because we wanted participants to interact as they provided their reactions and insights, but we needed to develop some experience with the method. None of the students among us had ever participated as a subject in such a project, much less as a researcher. The instructor had been a subject in a focus group but had not used the technique in cartographic research. We decided that an in-class exercise actually using the focus group method would best prepare us.

In addition to reading a selection of literature on focus groups, the instructor consulted a knowledgeable colleague (Sontag 1996) before selecting the issue, preparing materials, and developing the protocol. She arranged to have a video camera to record the session, as recommended in our sources. One of the students would be the notetaker and also assist the instructor in the planning and in setting up the room. The rest of us would participate as subjects and were told nothing about the content of the discussion other than that it would be some kind of map evaluation that could be completed in our regular seminar-style classroom. The session was to be held during regular class time. Most of us, then, were to be participants, or subjects, on the appointed day; the (student) notetaker and the instructor were to be the researchers. The following class session would be used for a discussion of the experience and results, a sort of meta-evaluation of the map evaluation project, in which we would all become part of the research team.

"The subject for the focus group was a new campus map."

The subject for the focus group was a new campus map. Produced by the Cartography Center (in contrast to earlier editions, which came from the MSU Physical Plant), it was a drastic change in design and would be updated, refined, and reprinted in the relatively near future. The map was new enough that its producers wanted and needed feedback, and no systematic evaluation had been done, nor were there funds for the producers to conduct such a study. It was an ideal topic for us for at least five reasons: First of all, our class knew the area well. We could react to more than mere symbols on paper. Second, although we might have seen the map in passing, no one had a copy of the map at that point, which meant all were approaching the map on the same footing. Had some been using the map for weeks or months while others were seeing it for the first time, we would not have been a suitably homogeneous group and it might have been difficult for everyone to participate at the same level. Third, as a relatively straightforward one-sheet (two-sided) map, it could be discussed fairly thoroughly in the time available but was complex enough to offer fodder for

good discussion and interchange. Fourth, we were a logical selection of subjects to react to the map because we all had experience with maps and map design. And fifth, it was not a "make-work" subject for the discussion; the producers of the campus map wanted the results.

Procedure-Day 1

On the day of the focus group discussion, a video camera was set up before the start of class. All had the opportunity to see how to operate it, a skill needed if we were to use the device later in a project of our own. At the start of class, the moderator (instructor) first had everyone tell just a little about themselves including what area we were pursuing in the graduate program and where we had taken our first cartography course and from whom. The instructor and notetaker gave this information about themselves first, setting the pattern for length and type of statement. This initial information was elicited to be sure everyone had a chance to talk, about something on which we were the experts (our own backgrounds), before anxiety embedded itself as a result of the presence of the video camera. Telling something about our first cartography course also helped to establish the common background we all shared.

The moderator then informed those of us who were participants that we would be evaluating the new campus map. She went through a series of introductory comments that established the value of everyone's participation and indicated the rationale (shared expertise in mapping and familiarity with campus) for this particular group to be discussing this particular map. No reference was made to the need to learn about the focus group technique; we were acting strictly as participants in the map evaluation that day.

The moderator presented an outline of the procedure to prevent any confusion about what was to happen. She also indicated that the subject matter was not sensitive and no one need hold any content of the discussion in confidence. She assured us that no one would be identified in connection with specific content in the report to the producers of the map and that only our class would have access to the tape, which would be erased when the report was completed. We were asked about previous exposure to the new campus map, again to establish for us that we were all approaching the map critically for the first time.

We then each received a copy of the map and everyone present (moderator and notetaker included) were to study it in silence for about 5 minutes. When people seemed to have had time to acquaint themselves reasonably well with the map, the study time ended, and we were asked to look at a list of issues posted on the blackboard:

- Color
- Image
- Errors
- Design Elements
- Authority
- Strengths and Weaknesses

The moderator described the items, indicating the major questions associated with each. These focus questions appear verbatim in the report of results that appears in the Appendix.

By going through the list of items and associated questions, everyone could be comfortable with the "agenda." The moderator also indicated that other observations about the map, not fitting in these categories, could be

"The moderator . . . went through a series of introductory comments that established the value of everyone's participation . . ."

"By going through the list of items and associated questions, everyone could be comfortable with the "agenda."

"The discussion was lively and all participants contributed."

raised and that comments on any of the listed issues could come up whenever they fit the discussion (comments on weaknesses did not have to wait till the end, for example).

The discussion was lively and all participants contributed. The brief study period was sufficient for each of us to have noticed things upon which we wished to comment, and the list of issues helped to order our discussion. We were very much engaged in the experience of participation, not once shifting gears to focus on technique (focus groups) rather than content (the map evaluation). That was important because the intention for that day was that we gain experience as subjects rather than as researchers. Discussion continued for 75 minutes, at which time it felt complete, neither prematurely ended nor stretched beyond usefulness.

As an evaluation of the product, the discussion was a success as well. Over 50 suggestions and comments resulted. They ranged from content issues ("The distinction between administrative and teaching buildings is unnecessary and takes up too much of the color contrast") to errors ("Reservoir is misspelled") to connotative aspects of design ("The green background is very appropriate for MSU") to pragmatics ("Some buildings are multifunction, which is not reflected on the map; . . . get rid of the distinctions . . ."). There was little doubt by the end of the discussion that makers of the map would benefit from a session report.

Shifting Roles-Day 2

"The subject matter for the next class session was the evaluation and discussion of the focus group experience and results."

The subject matter for the next class session was the evaluation and discussion of the focus group experience and results. In other words, we shifted roles and all of us became part of the research team. The reaction to the experience of being subjects was positive and all felt the session had been enlightening both with respect to bolstering knowledge and sensitivity to map design matters and with respect to understanding what a focus group discussion is all about, how it happens, and what it can accomplish. We discussed the various elements of planning that had preceded the session, including the prepared protocol and its importance even though the moderator was not reading directly from it, the role of the notetaker, and the arrangement of the room. By this time the moderator had viewed the tape and could comment on how difficult it would be to extract results from the tape only and yet how helpful the tape had been in the few cases where clarification of an item in the notes had been needed. We discussed the varying uses of the video tape for different kinds of analyses, recognizing that much could be done beyond the use we were making of our tape. We viewed a few minutes of the tape to gain directly a sense of how well it captured the session.

"A common concern about qualitative methods is interpretation of results."

A common concern about qualitative methods is interpretation of results, and we had had such concerns ourselves when we were first considering learning about focus groups. Perhaps map evaluations are particularly untroublesome in this regard, but there had been very little disagreement on points made about the campus map. When there was any hint of such disagreement, the moderator had acknowledged it and encouraged expression of alternate opinions such that the spectrum of viewpoints could be covered in the report (e.g., "There were differences of opinion on whether the inside of the stadium should be solid green . . ."). We were comfortable with the notion of reporting both agreed upon opinions and alternative opinions when they existed. In other words, after actually participating in the focus group exercise, we found ourselves far less concerned with the interpretation issue because we could see that both agreement and disagreement become a part of the results.

Following the two in-class sessions, the instructor compiled a draft report for the Cartography Center. It was sent by e-mail to the rest of us, and we suggested edits and changes in an effort to make the report as complete and accurate as possible. At the end of the designated time for responses, the report was submitted to the Center.

Our main conclusion was that the in-class focus group study was an effective way of becoming acquainted with the focus group method and of learning first-hand about the elements that distinguish it from ordinary classroom or group discussion. It was also convincing of the merits of the method in cartography because the final report was a rich set of suggestions for the makers of the new campus map. The source materials (readings on the method) had been excellent, but the exercise had given insights that cannot be gained from reading. It was a positive experience that gave us enough knowledge to be confident that we could select and use the method when applicable in other research projects.

The first-hand experience also brought home the observation made by Monmonier and Gluck that map design "is a subjective, largely wholistic process; and focus groups appropriately avoid the limitations of inherently narrow subject-testing strategies more suited to evaluating hypotheses than to refining complex presentations" (Monmonier and Gluck, 1994, p. 46). It was inconceivable that any quantitatively-analyzable survey of users would have resulted in the array of information that resulted from the 75-minute focused discussion.

It is interesting in retrospect to observe how different this learning process is from the processes of learning about quantitative research. We learn quantitative methods primarily by working with the measurement and manipulation of data. Being a respondent to a Census form would hardly be a major contribution to our education in the use of survey data. Qualitative methods are considerably more personal; they are designed specifically to observe "attitudes, opinions, feelings, and behavior" (QRCA, 1998). As such, understanding the role of "the observed," the participant in other words, is of utmost importance in understanding the nature of what can be observed.

The study, and hence the learning experience, had its shortcomings. One was that we were looking at a specific map and giving feedback to its makers rather than looking at something with more general application within the field. Even that seemingly limited application, however, led to the highly general and broadly-applicable observation for the class (not for the producers of the campus map) that such focus-group study of specific maps would help cartography students to develop knowledge of design. Learning to design, like the map design itself, is also wholistic and in need of approaches other than classroom lecture and hands-on map construction, the traditional mainstays of cartographic instruction. The rich array of comments resulting from the 75-minute discussion suggests, too, that broader application of the focus group technique by commercial and other producers of maps could bring considerable insight and likely improvement of products.

Another shortcoming was that our use of the method did not take us deeply into the analyses that are possible with qualitative research, and there was no discussion, much less use, of software for qualitative analysis. A more thorough treatment of qualitative research methods would include such discussion and experience.

In addition to our (qualitative) conclusion that it was a worthwhile experience, there is evidence of the success of the experience in activities following that class. Three class members later subjected the laboratory

CONCLUSIONS AND COMMENTS

"It is interesting in retrospect to observe how different this learning process is from the processes of learning about quantitative research."

"Learning to design, like the map design itself, is also wholistic and in need of approaches other than classroom lecture and hands-on map discussion."

project carried out by the class (those physical geography multimedia materials) to a focus group study. At least two students are employing the technique as part of dissertation work. One student used, in a subsequent seminar, another of the qualitative techniques covered in the reading materials. And the instructor has conducted curriculum-oriented focus group discussions with three different groups as part of a collaborative study with a colleague. In each case, the method was appropriate for the data needed, data that might well not have been gathered had the researcher not been familiar with the focus group method.

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APPENDIX

Report to MSU Cartography Center from GEO 823 Class (F'96)

Focus group study of the new campus map

Geo 823 conducted a focus group study of the new campus map during the week of November 18, 1996. The study was conducted as a learning experience, as students are interested in using the method later to examine dynamic maps and map-related products. The session was not simply "practice," however. The Cartography Center wanted feedback on the new campus map, and the needs of the class and those of the Cartography Center were both to be served by the exercise.

Ellen White posed the subject to Judy Olson, who, with the help of Amy Lobben (and using Stewart and Shamdasani, *Focus Groups* . . .), planned the questions and procedures to be used. Olson served as moderator and Lobben as notetaker during the procedure. Seven other Geo 823 students (Lesha Broomes, Geoffrey Duh, Lisa Dygert, Jill Hallden, Alison Philpotts, Ian Sims, and Jen Ware [Scott Drzyzga was attending professional meetings out of town that week]) were participants during the focus group session.

All students as well as instructor later participated as "researchers" for the evaluation and writeup of the outcomes. The session was videotaped for experience in using the equipment, but the content is not being (and was not planned to be) subjected to content analysis. Our goal was to write up the main points in organized fashion for use by the Cartography Center.

The session was limited to about 75 minutes. Participants were not aware of what cartographic product would be evaluated until coming to the session. Each participant was given a copy of the map and several minutes were allocated to individual examination of the map. The main items for discussion were then presented. They included:

Color: Are the colors used effectively? Is color appropriately balanced, say between parking lots and buildings?

Image: Does the map give a sense of the campus, or would one be surprised upon reaching campus? Does the map represent MSU positively? Does the map look refined or crude? Does it look modern/old, formal/informal; does campus look inviting/uninviting?

Errors: Do you see any mistakes on the map (as opposed to design flaws)?

Design elements: Other than color, what design improvements could be made? Attention was called to this list of items, with no obligation to cover any or all:

- Type
- Logo
- Title (size / placement / wording)
- Indexes
- Scale bar
- Graphic indications of scale
- Campus definition
- Use of space
- Graphic clarity of the map
- Clarity of Symbol meaning
- Linework
- Figure-ground
- Symbol hierarchy
- Details
- Printing quality
- Map size
- Paper quality
- Content
- Spatial coverage

Authority: Does the map look authoritative? Does it look trustworthy?

Strengths and weaknesses: What are the strengths and weaknesses of the map?

The keywords for main issues were posted on the wall to keep discussion focused. Comments resulting were as follows:

Color:

- Faculty parking lots look like buildings; the brown is too dark. The classes of parking do need to be distinguished, however.
- The color of student lots is too light; it blends with the background. If an alternative color is not feasible a hairline outline might be used.
- The distinction between administrative and teaching buildings is unnecessary and takes up too much of the color contrast. The difference between them could be subtle if needed at all. The map could have more detail if less building colors were used.
- University apartments look more like parking lots than buildings, and their parking lots look like buildings. Interestingly enough, those who live there did not notice that until it was pointed out; it was those who live elsewhere who brought it up.
- Non-university buildings are a shade of gray not indicated in the legend.
- What are the gray areas near Manly Miles (should be brown maybe, since they have parking lot numbers)?
- Visitor parking stands out well.
- The street outside of the Student Union is white, which makes it look like a parking lot. It is inconsistent with other areas with similar parking.
- Street labels do not show up well when printed over gray.
- Emergency phones seem to "float." Sidewalks would make sense of their location.
- Buildings have no depth. A 3-D effect would be useful.
- Pool outside IM Sports West is not labeled.
- Fields south of Munn look awkward; the whole area should be labeled as a recreational field.
- When asked if the colors were appropriate for campus, one participant remarked that there was a lot of blue and gold, a comment not lost on the rest of the group.
- The green background is very appropriate for MSU.
- The Stadium would look more like Spartan Stadium if it were solid green and the S were white (it happens to be white on the big billboard by the Stadium, too). There were differences of opinion on whether the inside of the stadium should be solid green; the S would show up on the light green anyway, or a small solid green block could be behind a slightly smaller white S.
- On the back of the map, the blue for non-campus area looks like water. Beige is a possible alternative.
- On the Places to Visit map, the black-on-red labels are hard to read (but white circles should definitely not be used).
- Participants were slightly bothered by the use of gray for roads on the front and white on the back.

Image

- The question "Does this 'look' like campus?" brought noticeable silence. It does not give as much feeling of the campus as it might.
- The distinction between housing and other buildings is good. Colors all blend together.
- The 3-D on the old map was good.
- The trees on the old map were good.
- The new map looks clean and stark; it could use detail (notably sidewalks, trees).

- Campus would look friendlier with trails (sidewalks) and trees.
- (In response to a specific question) It looks moderately formal-stark so a sort of "boring formal look" but a lot of things on it so somewhat "informal."
- Definitely looks modern, which is fine, but it doesn't reflect age of campus. (It would be fine to look like a modern map of an older campus.)

Authority

- It looks trustworthy.
- Some buildings are multifunction, which is not reflected on the map; the suggestion is to get rid of the distinctions rather than refine them.

Errors

- The tennis courts have changed location.
- Reservoir is misspelled.
- Change Olin to Olin Health Center as its function IS important. Other emergency buildings should also be more explicitly labeled and perhaps colored red: Public Safety, Fire Dept.
- Why is Central School indicated and not other nearby ones? Is it the only one used as a lab school? Even the one right on campus (in Paolucci) is not labeled.
- Spartan Village School is not part of the University so needs a change of color.
- The far left highway is a different color than other roads.
- Some roads are misregistered on the press.
- On the small-scale map on the back, MSU campus should be under the highways.
- Parking lots 37 and 41 are not faculty / staff.

Design

- Should distinguish grad assistant parking. The group acknowledged that grad students probably use this map quite differently than freshmen.
- It would be nice if the parking map could be incorporated but people recognized that it is probably not feasible to do so.
- Place the highway symbols over the highway and open up the background so the number is readable (use "convert to paths" in Freehand).
- Move the scale down so it does not go over roads.
- Move the north arrow up by the scale.
- Change scale on the back to miles.
- Grid is not proportional so locational grid cell A-1, for example, is a rectangle. Intended?
- Type on smaller roads does not fit within the street.
- The placement of the Grand River label is inconsistent (on or beside the street).
- Direction of labels is not consistent.
- The paper choice was good in that it is high quality and is not as "noisy" as the old one when being folded and unfolded. It does produce some glare, however.
- A different photo from Kresge could be more interesting.
- The area coverage is good.
- Map size is good.
- The Office Index might be relabeled "Selected Offices." (With the current label, one expects to find departments listed, but adding them is probably not feasible.)
- Type size drew favorable reaction from all the young eyes in the group;

the older-eyed moderator found it a bit small for all the space on the map.

- Names on buildings is good.
- Wharton Parking (19) needs color change (or maybe putting "Wharton Parking (ramp) 19" right over the building would clarify it?)
- There is no real figure / ground difference.
- Perhaps the Stadium, Munn, Breslin, Kobs, . . . need some kind of emphasis. All in Spartan Green?
- The presence of the date is good.
- The smaller maps on the back do not need emergency telephone symbols.

Strengths and weaknesses

- Time was running out and we thought they were already covered reasonably well anyway. Although there are numerous suggestions for improvement here, the class reacted favorably to the map and found it worthy of discussion and attention.

Participants were explicitly told that the content of the discussion was NOT confidential but that "who said what" would not be identified in this report nor would the tape be seen by anyone outside of class.

We hope these comments will be useful to the Cartography Center and will appreciate feedback about their usefulness. We will also be happy to clarify if we can.

Geo 823, Fall '96
Report date: 12/96

software review

QSR NUD*IST and ATLAS/ti
QSR NUD*IST (Non-numerical Unstructured Data Indexing Searching and Theorizing), v. 4.0.
 Qualitative Solutions and Research, Australia
 Distributed in the US by Scolari/Sage Publications Software
 For PC and Macintosh platforms
www.scolari.com/nudist/nudist.htm

ATLAS/ti, v. 4.1
 Thomas Muhr, Scientific Software Development
 Distributed in the US by Scolari/Sage Publications Software
 For the PC platform only
www.atlasti.de

Reviewed by
Jodi Vender and Trudy Suchan
The Pennsylvania State University

Qualitative data are non-numeric (text, image, or sound) so have different problems of data preparation, exploration, aggregation, and reporting than numeric data. We review two software packages that assist the researcher in managing qualitative-data documents—assist in coding categories and ideas, and in constructing and testing theories about the data. While QSR NUD*IST and ATLAS/ti perform the same basic functions, they are designed around different models. The best-known qualitative data software, NUD*IST, imposes a hierarchical organization on data and analysis. ATLAS/ti employs a hypertext model for data organization and exploration.

Both NUD*IST and ATLAS/ti allow the researcher to investigate text (reports, interview transcripts, survey responses, meeting minutes, field notes, newspaper clippings) or non-text (maps, charts, photographs, voice recordings, films).

Our experience is with interview transcripts, so we emphasize that form of data in this review. The focus-group transcripts in Olson, et al's study of a map (this issue) could be analyzed similarly with one of these packages. Both NUD*IST and ATLAS/ti also could be used to analyze maps. Each map in a series could be a data document coded with categories of information, or smaller units of analysis can be delineated within the larger image. Gluck's cartographic images in corporate annual reports (this issue) could thus be analyzed using these packages.

NUD*IST can manage both imported documents (files whose text is stored within the program's database in ASCII format) and external documents (documents that exist outside the database, such as maps and graphics, that cannot be saved as ASCII text). For all documents one can create codes referencing text, search coding patterns, write and edit memos about the data, and generate summary-level statistics. Imported documents can also be edited, annotated, searched, and text itself retrieved (external documents are essentially bitmapped images). ATLAS/ti allows the same basic data-management functions but facilitates a different coding style. NUD*IST requires the researcher to specify the text unit—the smallest chunk that can be coded and retrieved (such as a page, section, paragraph, line, or word; a text line is recommended in the manual)—set by hard returns in imported documents. The researcher codes a text unit, which begins and ends only approximately with the data item of interest. ATLAS/ti, in contrast, allows selection of any-length text passages for coding, and allows overlapping passages or text units, so context dependence of the item coded can be preserved.

NUD*IST allows text to be appended to documents, and the user may type comments directly into a document and code them as "docu-

ment annotations" that can be searched and browsed. In ATLAS/ti, once a document is imported, it should not be changed. Coding is linked to locations in the document, not to particular words or phrases, so if text is changed and text lines shift, the coding becomes nonsensical. NUD*IST has a formal structure for entering header information. While NUD*IST, then, allows in-document notations and has a structure for a header, the ATLAS/ti user must create memos attached to the document, text passages, and/or codes to cover these needs.

Creating and applying codes is first-level analysis, exciting but eventually tedious. These software packages relieve some of the tedium of applying codes. The index system in NUD*IST is designed to store and locate codes, or categories, for thinking about data. The codes are stored at a node, a "container" that references text units coded for that code. Codes can be created in advance; they can also emerge from exploration of the data (for this project, the data were first coded in ATLAS/ti, so all codes were created in advance for use in the NUD*IST portion of the review). Previous versions of NUD*IST structured all coded nodes into a hierarchical index tree that showed relationships in the data in parent-child format. This form still dominates in version 4.0, but there is an option for free nodes—codes not hierarchically linked to others. Coding can be performed manually by selecting text and attaching a code to it, or by entering text unit numbers directly into the index system. Codes in use are letter and number combinations that are related to position in the index-system hierarchy. As coding grows complex, working with the abstract letters and numbers in earlier versions required a cross-reference list to the terms or concepts they stood for; version 4.0 has begun to make visible the natural language codes. Codes in ATLAS/ti are natural language terms or any

terms created by the user. As coding of documents proceeds, it is easy to create, assign, modify, and merge codes through pop-up and pull-down menus and click-and-drag functionality. Both programs have aids to search and code repetitive occurrences. Both programs show text and codes in side-by-side display; see Figure 1 (NUD*IST) and Figure 2 (ATLAS/ti) for sample displays.

The equivalent of the NUD*IST index tree display is, in ATLAS/ti, the object explorer, which enables a

hierarchical, tree view of families, codes, memos, and more. Exploration and theory development in ATLAS/ti, however, typically proceed through use of other grouping devices. Families, for example, are user-selected subsets of codes that filter the large set of codes and quotes for focused analysis. The researcher also may employ supercodes; these store the method to "calculate" collected entries rather than storing hard-wired links as normal codes do. ATLAS/ti features a network editor to pro-

mote experimentation with grouping of codes, quotes, and memos; one uses drag-and-drop capabilities to bring components into a network editor window, then creates connectors to indicate the type of relationship between network components (e.g., is-a-kind-of, is-a-cause-of, contradicts). The query tool is another grouping aid; the researcher can develop queries and the software will assemble quotes from all documents that meet the query criteria. Queries may be Boolean, may search on proximity (e.g., one within another, one following another), or may be semantic (searching for meaning among the components assembled in a network).

In NUD*IST, one can nominate up to (but no more than) 26 coding categories to compare for one or more documents. These are maintained as coding stripes (references to particular nodes keyed by a letter of the alphabet that appear in the margin alongside text units; see Figure 1). Thus it is possible to see where coding at a particular node begins and ends, as well as where it overlaps with other codes. Margin codes, the letters used in coding stripes, are identified by a key at the top of the report.

Figure 3 is a NUD*IST project with five windows open. The document explorer indicates that there are five imported documents and shows the header for the selected document. The node explorer shows that there are 52 free nodes (structure collapsed) and 65 nodes within the index tree (structure expanded). The right-hand side of the node explorer gives information about the selected node (2 1 1, Used/Land/Agriculture; here "used" or "not used" is the first level of coding on all codes which were created in advance as explained above) indicating that fourteen text units from three documents are coded at the node. Viewing the text associated with node (2 1 1) in the node browser brings up

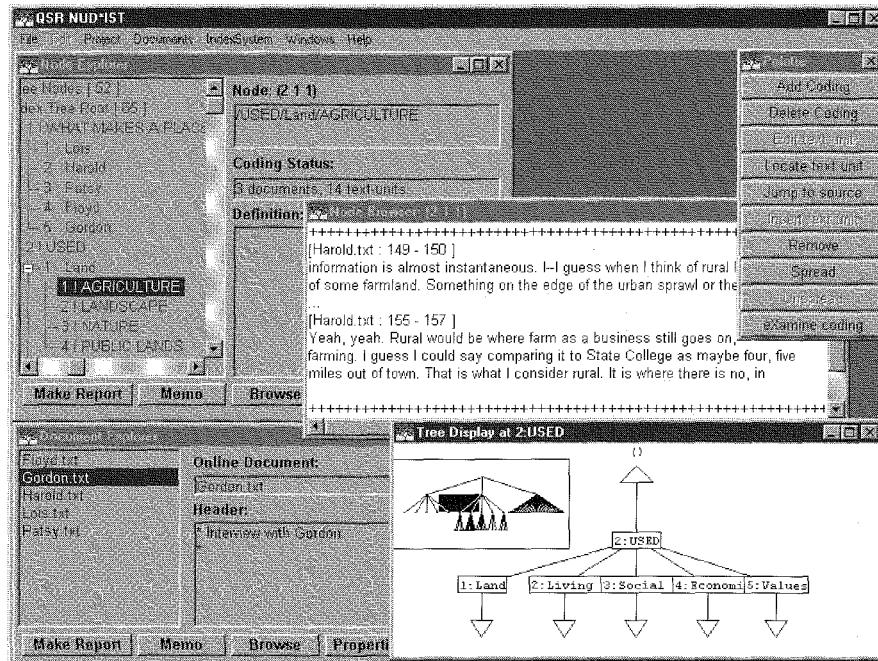


Figure 1.

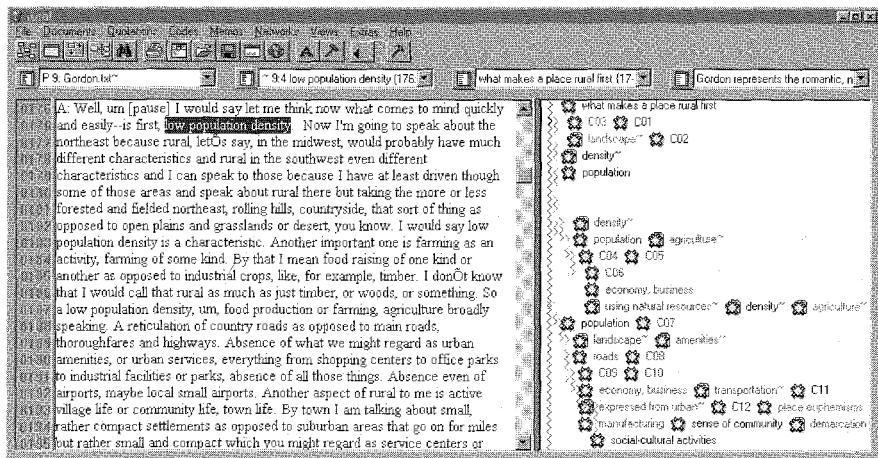


Figure 2.

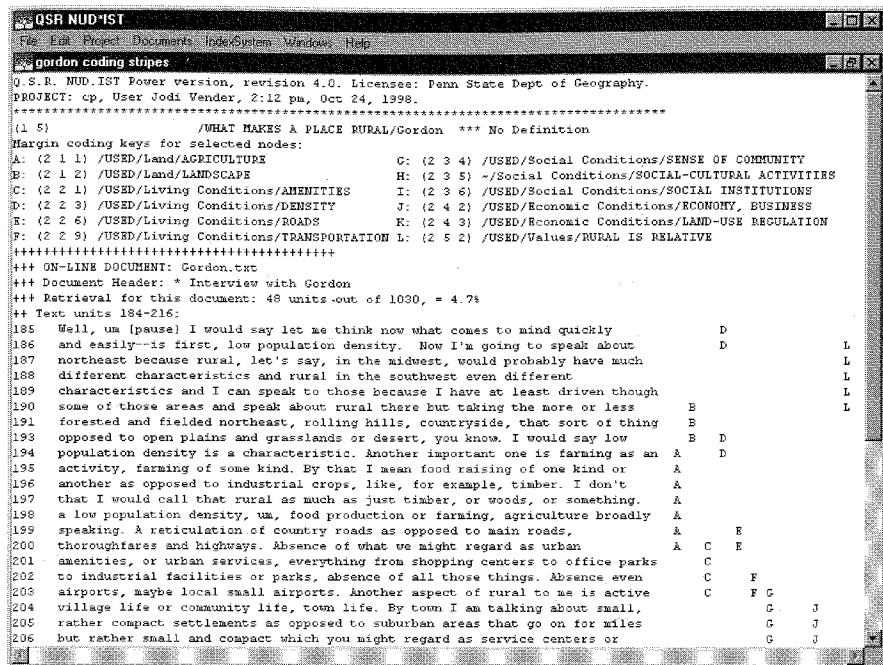


Figure 3.

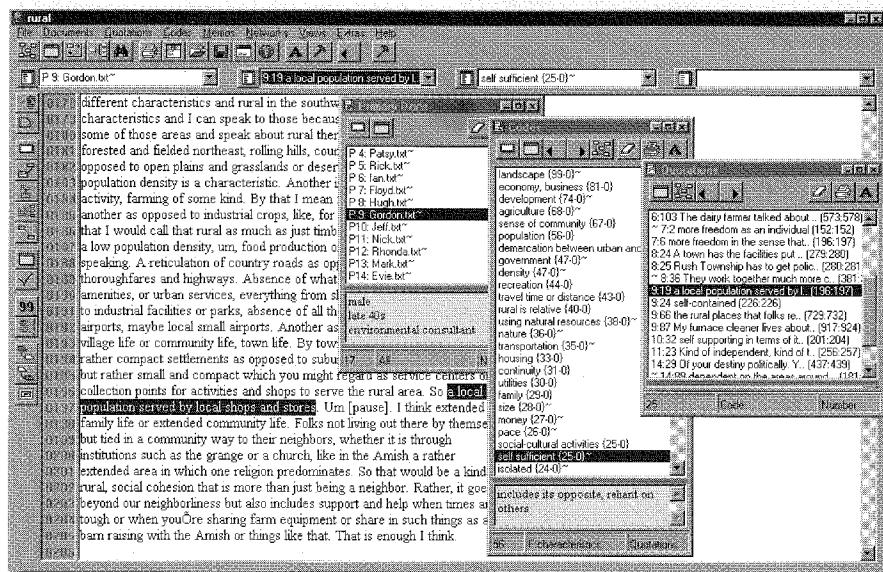


Figure 4.

the text units for the three documents coded at the node. For example, the interview with Harold contains five text units relating to the category agriculture. Coding of this or any other passage can be viewed or manipulated through the coding palette. The tree display depicts the hierarchical relationships among the nodes in the index tree.

Figure 4 is an ATLAS/ti hermeneutic unit (project). We have displayed three lists as detached windows simultaneously, but the same lists are accessible, one at a time, through drop-down lists above the large document display window. The primary documents window shows the list of documents (one for each interview transcript) linked to

the project. The tilde indicates where a memo is attached. The comment for the selected document is shown in a text pane below the document list. Self sufficient is highlighted in the codes window. {25-0} after self sufficient indicates that 25 quotes from all of the documents are coded self sufficient and there are as-yet zero links from within network editors to this code. Again, a memo for the highlighted item shows in the text pane. The bottom margin gives information about the window: 56 codes are listed; the current filter is the family ("F:") called characteristics; and the list sort criterion is set to order by number of quotations. Bringing up the quotations window for the code self sufficient and selecting one item opens the relevant document and highlights the full quote in the large document-display window. The numbers preceding and following the quote segment in the quotations window indicate document and coding sequence (i.e., ninth document, 19th passage coded) and location (lines 196 to 197) respectively.

The make-report feature in NUD*IST generates a copy of any part of a document's text. One may choose to include any combination of the document text, document header, and document memo. Coding options for display include: no coding; summary only (list of nodes referenced and the number of text units coded at each); coding stripes; and cross references (with or without node titles) to all other node addresses coding a text unit. It is also possible to create a report listing all documents in the project, with options to include the header, coding status (no coding, or the number of documents and text units coded at a particular node), and data for each node (coding status plus node definition). Reports generated on particular nodes can show either a general data (definition, date of creation and modification, sibling and child codes) for the node with op-

tions to display associated memos and / or document summaries; or b) references for the node with options to display headers, text, coding stripes, cross references with or without node titles, for all documents or only one. A report (or any section of it), or anything else one creates on screen, because everything is a text document, can readily be printed or exported to a word-processing application.

Several default reports are easy to produce in ATLAS/ti: The user can choose a code and print all quotes for it, similar to the ability in NUD*IST to report on a node. ATLAS/ti includes a system-generated coding history; it records who assigned the code to a quote, useful with multiple coders on a large project, and it retains the lineage of merged codes in a system-generated comment attached to affected quotes. A matrix of each document by each code with counts in cells of coding frequencies also is easy to produce. But beyond basic lists, print functions in ATLAS/ti are scant. It is evident from browsing the ATLAS/ti listserve that researchers are frustrated with the lack of print capability, particularly wanting to print out a full document with its codes for project documentation. The software developer's bias is toward on-screen work rather than large print jobs. While using fully the graphic network capabilities is easy and important to exploratory thinking, the only ready way to capture that work is with the computer's print screen function, which in our experience truncates all but small displays.

ATLAS/ti was developed to make full use of Windows graphics capabilities, so its appearance is modern. NUD*IST has DOS roots, and in this version, the tree display that graphically depicts hierarchical relationships among nodes remains crude and rather annoying in its inflexibility; this is especially vexing using the package on a

Macintosh computer. Fortunately, Version 4.0 offers several alternative methods of working with the system not previously available. Both NUD*IST and ATLAS/ti are focused on qualitative data analysis so make provision for export to other software for other functions. NUD*IST, for instance, exports to Inspiration and Decision Explorer, among others, for more sophisticated graphical display and model building. Both NUD*IST and ATLAS/ti export to SPSS for further statistical analysis if appropriate.

For further reading on these two software packages, and other software adapted to qualitative data analysis, see *Computer Programs for Qualitative Data Analysis* by Eben E. Weitzman and Matthew B. Miles, from Sage Publications, Inc. (1995).

reviews

Cartographic Encounters: Perspectives on Native American Mapmaking and Map Use. G. Malcolm Lewis, ed. Chicago: University of Chicago Press, 1998. xx, 318 p., illus., maps, index. \$60.00. Hardcover (ISBN 0-226-47694-4).

*Reviewed by Jovanka R. Ristic
American Geographical Society
Collection
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From the earliest days of the encounter between native North Americans and Europeans, maps and mapmaking have played a significant role in the exchanges between peoples with vastly different world views. This book brings together the ideas of a number of scholars representing a variety of academic disciplines in an attempt to trace the history of mapmaking and map use by native Americans, and especially how they were influenced by contact with whites.

The book grew out of a series of lectures which comprised the eleventh Kenneth Nebenzahl, Jr., Lectures in the History of Cartography, held at the Newberry Library in Chicago in 1993. G. Malcolm Lewis, in addition to organizing the program which included talks by Elizabeth Boone, Patricia Galloway, and Peter Nabokov, gave the keynote lectures and served as the editor of this volume. Realizing the need to expand the scope of the work beyond what had been covered at the Nebenzahl Lectures, Lewis solicited contributions from four other scholars who approached the subject of native American cartography in different ways and from different perspectives.

Arranged to reflect the chronology of events concerning this topic, the book is divided into three parts. Part 1 focuses on the 400-year period of the first encounter, Part 2 deals with the ongoing second encounter, and Part 3 attempts to predict future encounters.

Part 1 consists of three chapters written by Lewis which review the history of past encounters. He discusses maps and mapmaking among native North Americans as described and transcribed by whites in the field between 1511-1925, native maps studied by scholars in government bureaus, archives, museums, and libraries between 1782-1911, and perceptions of native cartography ca. 1970, when a 60-year hiatus in scholarly interest in the field was about to come to an end.

After a discussion of possible pre-encounter indigenous mapping, Lewis goes on to describe numerous examples of the types of cartographic encounters which occurred between natives and whites in the field. Evidence of native American maps, mapmaking, and map use during the first 400 years of contact exists for the most part only as described and transcribed by whites. Much of native mapping

was ephemeral, consisting of maps drawn in the ground or snow with sticks, "message maps" drawn on birchbark or left on blazed trees, or even words and gestures. Descriptions of these have come to us almost exclusively in the writings of white observers. Those few examples still extant of maps by indigenous peoples were most often collected and interpreted by whites, who were more likely to preserve artifacts which came closer to their own definition of what is "map-like."

In Chapter 2, Lewis concerns himself with early encounters which did not involve direct contact with the native mapmakers. This includes the use of native maps as sources of information by European cartographers, a practice which dates back to the early sixteenth century. Lewis differentiates here between the acknowledged "incorporation" of native information and the more frequent and unacknowledged "assimilation" of such information by Europeans.

In the late eighteenth century, scholars began to take an interest in native maps, working for the most part with published accounts of maps and mapmaking housed in archives, museums, and libraries. Lewis discusses the many contributions of both German and North American scholars. The Germans were more inclined to study published reports on native maps and mapping, looking for evidence to support the idea of a global evolution of cartography through various stages of development. In contrast, the Americans concentrated their work on the surviving examples of native maps, how they were made, and how they were used.

Lewis characterizes the years from 1911 to 1970 as a "hiatus" in research on native American cartography. He takes stock of encounter scholarship as it was in 1970, before moving on to look at more recent research. At that time, it was dominated by the white point of

view. Some important aspects of native cartography had barely been examined. These included the place of maps in the larger pictographic tradition of native Americans, the variety of contexts in which indigenous peoples made and used maps, and the influence of contact with whites on native mapping. Additionally, studies done up to that point failed to establish the provenance of surviving maps, and lacked an appreciation of the geometry of native maps, which, though different from Western conventions, did have validity. But in Lewis' opinion, the biggest problem which hindered progress in research on native cartography was the whites' adherence to such a narrow definition of what makes a map.

Part 2, by far the largest section of the book, consists of seven independent essays describing research conducted by the seven other contributors to this volume. The diversity of backgrounds represented by these authors, among them art history, literature, law, archaeology, and anthropology, demonstrates that scholarship in this field is no longer limited to the narrow province of the history of cartography. In fact, only one of the contributors besides Lewis is identified as a geographer.

Chapter 4, written by Lewis, serves as an introduction to this part of the book. He surveys the considerable amount of scholarship which has appeared recently, and divides it into what he perceives as three general areas or directions of research: historical (including exploration, archaeology, and history of cartography), anthropological, and current mapping activities of native Americans. He shows how the seven essays to follow fit into these broad subject areas and provides additional information and examples, especially for those areas, such as current mapping by native Americans, which are not treated in a separate essay. Admittedly, most of the research pre-

sented in the remainder of the book is concerned with the historical context of the cartographic encounter.

Elizabeth Boone's essay discusses Aztec maps, or "cartographic paintings." No such maps have survived from the pre-contact period, but the hundred or so that do remain from the early colonial period show varying degrees of European influence. Indeed, the Aztecs did not distinguish between maps and other kinds of "writing" prior to the Spanish conquest, and had to adopt the Spanish loan-word "mapa" to describe something which had not previously existed in their own vocabulary. Aztec maps were used not only to show travel routes for present or future movement, but also as historical documents on which to record past movements and actions, and to depict the spatial organization of their territories.

In a chapter that begins with an examination of native American influences on four eighteenth-century European maps of North America, Barbara Belyea draws attention to the problems that result when attempts are made to translate cartographic conventions from one culture to another. The world view represented in native maps is vastly different from that depicted in Western scientific cartography. Too often, whites have equated "different" with "primitive," and have not been willing or able to accept as maps artifacts which did not conform to their conventions of what a map should look like.

Because there are so many different indigenous cultures in North America, it is dangerous to make generalizations about them. In spite of this, Belyea feels that native maps exhibit some constant characteristics across cultures, the most important of which is that, unlike European maps, they are "unframed" and therefore independent of a spatial grid. In her view, we defeat the purpose of learning about

native cartography by first insisting on trying to translate it into our own terms. Instead, we should be concentrating on establishing a dialog with the native cultures which still exist.

Margaret Pearce sets out to investigate "Indian deeds" as a source of information on native mapping of southern New England in the seventeenth and eighteenth centuries. Hundreds of such documents, known as native land transfers or Indian deeds because they recorded land transactions between colonists and native Americans, have survived and can be examined for evidence of indigenous peoples' involvement in the mapping of this region.

Pearce notes that European maps "... portrayed a landscape in which colonial settlement advanced and became visible, and Indians and wilderness receded and were erased." Native mapping was mostly "erased" as well, except in the form of unacknowledged contributions to European maps. Therefore, to find evidence of native mapping one needs to go beyond the conventions of traditional Western cartography and approach other types of mapping activities, such as Indian deeds, with an open mind. Examining these documents in this way, Pearce concludes that both natives and whites mapped property predominantly through words rather than graphics, but they did so in ways which were very dissimilar. While whites relied on written descriptions of the land, natives utilized the spoken word. Although there were few native "maps" in the sense of artifacts conforming to Western ideas of what a map should look like, native "mapping," expressed through words rather than graphically, was common, and, Pearce argues, should not be ignored in the study of native cartography.

In the next essay, Morris Arnold examines one particular artifact, a painted buffalo hide preserved at a

museum, and makes a case for the possibility that the scenes depicted in this painting are put there in a way which corresponds to their actual spatial relationship. Interpreted as a graphic representation with "deliberate cartographic content," this painted hide could thus be the oldest surviving example of an original native American map. Arnold goes on to establish a Quapaw provenance for the painting, and presents convincing evidence that it depicts a battle between the Quapaw and Chickasaw tribes which took place ca. 1740-1750.

Gregory Waselkov discusses native American mapping from an archaeological perspective. North American archaeologists have tended not to make much use of indigenous maps, mainly because such maps are both scarce and hard to understand. Looking at the small number of extant maps made by the indigenous peoples of the southeast, most of which exist only as European copies, Waselkov distinguishes between two kinds of maps which were used for different purposes. One kind related the locations of native villages to other features in the landscape. These were more easily understood by Europeans and also contained the type of information that was useful to them as explorers, settlers, and soldiers. The second kind of native map portrayed social and political relationships in a symbolic manner with which Europeans were not familiar. Since the colonists found them difficult to understand, only a few examples were preserved, more as ethnographic curiosities than for their cartographic value. Waselkov argues that both types of native maps have potential as useful tools for archaeologists, and he presents two examples where this has been demonstrated.

Next, Patricia Galloway discusses the influence that indigenous maps and geographic information from southeastern North

America had on European cartography, specifically the Delisle cartographic establishment. North American mapping at the end of the seventeenth century was dominated by the Delisles, and their maps continued to be widely copied for many years afterward. Southeastern native Americans produced at least two types of maps. Galloway terms them "sociograms," which show the geography of both physical and social space, and "event transcriptions," which show specific activities with a geographical or social reference. She goes on to show how the Delisle maps may have assimilated information from both sociograms and event transcriptions into their cartographic representations of North America.

In the final essay of Part 2, Peter Nabokov concerns himself with some of the ways in which native American depictions of space have played a role in confrontations between whites and natives, in offering a view of native American cosmology, and in providing guidelines for the proper conduct of life. He points out an important contrast in cultural approaches to mapmaking. For many indigenous peoples, it was necessary to learn and know a landscape, to experience its environment first-hand, before being able to depict it on a map. The opposite was true of the European practice of conquering a completely unknown territory by first naming and drawing it on maps, and only then actually experiencing the land or settling on it. Nabokov goes on to describe various aspects of native American architecture, rituals, songs, and stories as they relate to the conceptualization and depiction of space.

As is to be expected in a work written by a group of different authors, the individual essays comprising Part 2 vary in their style and quality. Overall, however, the tone of serious and rigorous scholarship established by Lewis in the

first four chapters of the book has been matched by the other contributors. Their subject matter ranges from the very specific, such as Arnold's detailed examination of one native American artifact and Boone's thorough description of one culture's mapping practices, to more general commentaries on native cartography as a whole, such as those by Belyea and Nabokov, which discuss native mapping across different cultures and through different ways of expressing spatial concepts.

Some recurring themes are evident in almost all of these essays. This group of scholars is much more sensitive to the biases inherent in attempting to analyze and interpret native American mapping from a white perspective. They recognize that the cartographic encounter was a two-way process. Not only were native maps and mapmaking influenced by contact with whites, but European maps of North America were often derived from information and maps provided by native Americans. Several of these essays mention an apparent dichotomy in the types of maps natives produced. One type, conforming more to the traditional Western concept of a map, was used for way-finding or to portray the spatial relationships of landscape features. The other type, more likely to employ a symbolism unfamiliar to whites, depicted a culture's history or described its social organization. Finally, the authors of these essays are willing to expand their definition of what comprises a map far beyond the narrow rubric of traditional Western cartography. But can these boundaries be extended far enough to include even such things as gestures, spoken words, and performance art in a discussion of the history of cartography? These authors would probably argue that they can, and must, if we are to get past a Western-biased view of native American mapping.

The third and final part of the book presents Lewis' predictions as to what may emerge as future encounter contexts. He presents five probable areas: the legal context; language, linguistics, and semantics in translational contexts; cognitive science contexts; social science contexts; and artistic, literary, and performance contexts. He also outlines certain conditions which he feels are necessary for making significant progress in the future study of native American mapping. In agreement with the other contributors to this volume, the first condition he mentions is a new operational definition of "map." This could not be as narrow as the definition held by many cartographers and historians of cartography, but would have to be broad enough to include such things as language and behavior patterns, as long as they contain a spatial component. Secondly, he feels that those interested in North American native mapping must make a greater effort to share their findings with those who are researching traditional cartography in other parts of the world. Along with this they must involve a broader community of scientists and specialists from other fields in their studies. Above all, Lewis believes that the native peoples themselves must be encouraged to become involved in the study of their own cartographic history. In future encounters, it is hoped that descendants of the people who made these maps will offer their own unique insights on them, in order to correct the bias which is contained in most studies conducted thus far.

Along these lines, it is unfortunate that no native North Americans contributed to this book. Perhaps this simply reinforces Lewis' point, that native Americans have not as yet been engaged in the study of the cartographic encounter. He apologizes for not having made more of an attempt himself to discuss his research with native

North Americans, and admits to his frustration at not being able to find contributors willing and able to write about Inuit maps and mapmaking.

This does not diminish the value of this book as an important contribution to the study of native American cartography. It joins other recently published works, including *Cartography in the Traditional African, American, Arctic, Australian, and Pacific Societies*, edited by Malcolm Lewis and David Woodward, which is volume 2, book 3 of *The History of Cartography*, and *Another America: Native American Maps and the History of Our Land* by Mark Warhus which provide further evidence of the renewed interest in this field. Carefully chosen illustrations and a comprehensive index augment this scholarly treatment of a complex subject.

Cartographic Encounters would certainly make a valuable addition to any library concerned with the history of cartography or with native American history and culture. It is not necessary to have a specialized knowledge of native mapping or culture in order to appreciate this book. Indeed, it challenges the reader to rethink some of the most fundamental concepts of cartography, such as what defines a map. Although its scholarly tone and copious footnotes may limit its appeal to a more popular audience, the serious reader will find a wealth of interesting and well-documented examples of research in a field which appears to be on the verge of an exciting, if somewhat controversial, future.

Flattening the Earth, Two Thousand Years of Map Projections.

John P. Snyder. Chicago: The University of Chicago Press, 1997. Pp. xviii + 365, 160 maps, 11 illustrations, 6 tables. Softcover, \$19.95. (ISBN: 0-226-76747-7).

Reviewed by
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If John Snyder's book, *Flattening the Earth, Two Thousand Years of Map Projections*, were a rock 'n roll record, if I were on Bandstand, and if Dick Clark were asking me to rate it, I would have to say: "It doesn't have much of a beat. It's not very good to dance to. I'd give it a thirty-five." This is not the book most of us would select if we wanted to curl up by a fire on a cold winter's night for a good read. But, if I were researching any aspect of map projections for a presentation, for a cartographic project, or for personal edification, this would be the first source I would consult. Snyder does not write simply as an observer, and an aficionado, of the history and science of map projection, but as a participant in the process. He has several projections to his credit, including a modified stereographic conformal and a satellite-tracking.

The book's four chapters are arranged chronologically, either by conceptual period (Age of Mathematical Enlightenment) or by century. Each chapter is further divided into two parts. The first part describes all map projections used during the period, and the second details the map projections introduced during that time. Each chapter ends in a table listing in chronological order the name of the projection, figures, if any, the inventor's name(s), the date, and significant design elements (i.e., conformal, standard parallels) for each map.

Readers who desire additional information will welcome the extensive bibliography. In short, Mr. Snyder makes it very easy for even the beginning researcher to find the details for any type of map projection created between Claudius Ptolemy's writing of *Geography*, circa A.D. 150, and Mitchell J. Feigenbaum's Hammond optimal conformal of 1991.

This work contains a large selection of illustrations, most of which are maps, but a few are portraits of some of the later inventors. Comparing the first illustration, a T-O map by Isidore of Seville, 1472, with the last, a gnomonic projection of the world on an icosahedron by Irving Fisher, 1943, presents a contrast in world concept that is interesting to contemplate. Isidore's world map is symbolic. Unlike the twentieth century inventors, he was not trying to depict the planet's surface with the greatest accuracy and least amount of distortion. He was delineating his world as he understood it to be. If it were possible to show Isidore a copy of Fisher's map would he know what he was looking at? Would he be able to recognize Africa, Europe and Asia, continents he outlined on his own map? Isidore had a decided advantage over modern creators of map projections, twenty years before the voyage of Columbus, he was depicting a flat earth.

From the development of calculus in the late seventeenth century, to logarithms, slide rulers, mechanical calculators, and personal computers, advancements in the field of mathematics, as Mr. Snyder points out, have strongly influenced the number and variety of projections that were being created. Prior to the beginning of the twentieth century, there were 85 different projections. Since 1900, 180 projections have been created. Mr. Snyder provides the formulas for many of the projections he describes, detailing the steps the inventors went through to produce the final calculations. The

speed of calculation, resulting from the introduction of the personal computer in modern times, eliminates the need for having a practical application. Maps bounded by rhombi, ellipses and regular polygons are created for the sheer pleasure of it.

The only change I would suggest to this volume would be the addition of a glossary. Otherwise, the high quality of writing, the depth of information and the low price on the paperback edition make this a book worth owning for anyone with an interest in cartography or the mathematics of flattening the earth.

Maps and Politics. Jeremy Black. Chicago: The University of Chicago Press, 1997. 188 pp., Index, Maps, References. \$35.00 hardbound (ISBN 0-226-05493-4)

Reviewed by
Valerie Krejcie
Cartographic Consultants
Skokie, IL

Does our profession or my library need yet another essay about maps and the compromises that cartographers make practicing our craft? Well, yes, we do. Jeremy Black has thoroughly reviewed the minefields of our profession and added evidence to support his thesis that "subjectivity is central to the production and understanding of maps." (p. 168) Maps must be considered in terms of their social and political context. Maps and politics, as Black sets out to prove, are inevitably intertwined.

In the first chapter, "Cartography as Power," Black acknowledges the limitations of the map medium and examines the choices which must be made that are more than technical. It is also important to recognize how space is understood by the map user and to take into account how people in the past perceived their world. After review-

ing the arguments promoted by the late Professor Brian Harley, that maps are tools of those in power, Black concludes that his search for conspiracies is counterproductive. For Black, "the notion that mapping was or is integral to hegemony requires careful analysis." (p. 22) Black's approach to presenting space focuses on the "multiple meanings of space" and how that ensures no one single cartographic strategy will suffice. In his broad definition of politics as "a metaphor for social processes that provide the context for cartography" he sets a course to examine how politics effect the content and the reception of maps (p. 28).

In "Mapping the World and Its Peoples," his second chapter, Black addresses the problems associated with Eurocentrism: projections, map content, nomenclature, and economics. Discussion of projections includes the controversy over which area will be shown at the top of the world map and in the center as well as the inevitable distortions in the size and shape of the continents. While atlases which have more coverage of Europe and North America seem to favor wealthy countries at the expense of the poorer countries, it must be remembered that publishers need to consider the marketplace and who is purchasing these maps. Black makes the point that Eurocentrism in mapmaking is partially redressed by a new emphasis on maps and atlases which focus on the cultures and history of non-Western countries by mapping them without concentrating on their links to the West as well as an increase in the mapping of indigenous peoples.

"Socio-Economic Issues and Cartography" includes the subheadings: the physical world; economic space; social issues; atlases for the environment; controlling resources; consumerism, value and values; tourism; and maps, history and sacred places. In this long third chap-

ter Black examines the specific problems of mapping topics which are subject to being politicized. For example, a degree of environmental determinism may be connoted by placing physical maps before other maps in an atlas. What might seem to be a relatively simple decision of how many rivers to show or what contour interval to use may become a political decision. Mapping economic activity often employs a limited definition of activity as maps reflect a preference for production over consumption, manufacturing over service or financial industries, heavy over light industry and work rather than ownership. Cartographers often have little control over their data sources or how the data is collected and what is excluded from a map may not be as much a political decision as a logistical one.

At the beginning of this century progress was measured in terms of the towns and roads that filled in and tamed the open country. In the last few decades human impact on the environment has become a major theme of contemporary atlases. Black reviews selected environmental atlases and concludes that environmental mapping has been politically aggressive. He feels an atlas like *The Gaia Atlas of Planet Management* (London, 1985) "works" due to the selection of arresting topics and treatments. Political and economic strategies of control and expansion are being questioned and recent maps reflect this change. An example of this more radical approach is Michael Kidron and Ronald Segal's *State of the World Atlas* (London, 1995) with its open hostility to the status quo.

In the next three chapters *Maps and Politics* moves into what are the core political topics: elections, frontiers and wars. Here the author consolidates his ideas. In the "Problems of Mapping Politics" he reviews the problems associated with mapping election results as compared to the greater problems of

mapping the political culture. In particular Black faults the use of choroplethic maps, which use demographic ratios in areas of greatly varying population density, for misleading the map reader. Maps convey objectivity and cartographers may fail to communicate the uncertainty in their data. The spread of powerful mapping software now enables those with little knowledge or interest in maps to produce maps which support their ideology. The cartography may be of a technically high standard, but the topics and symbolization employed are clearly partisan. As an example of this, Black discusses the *National Atlas of Mongolia* (Moscow, 1990), a Communist work. In this atlas the historical maps begin with the 1921-1923 revolution, ignoring the earlier history of the Mongolian people. Black acknowledges how the state uses and abuses maps, but he is hopeful that the development of 'critical geopolitics' will rethink geopolitics away from state-centric reasoning.

In the fifth chapter, "Frontiers," he investigates the mapping of international boundary lines and the role of frontiers as the cause, course and consequence of conflict. Since maps are an expression of a state's power, they establish the limit of control, the line of first defense and the range of demand for resources. Black notes many examples of controversies involved in establishing European borders over the past centuries. Additionally, the Middle East and Africa offer examples of powers trying to demarcate their authority over poorly mapped and difficult terrain. Maps drawn by treaty, peace accords and commissions have led to even greater conflicts as tensions escalate when local identities and loyalties are ignored or valuable natural resources are involved.

"War as an Aspect of Political Cartography," the sixth chapter, looks at how war is a boon to both the military and the commercial

cartography business. Since the Sixteenth Century, European maritime hegemony has rested on cartographic developments as maps were needed to plan and predict operations and newspapers needed to inform the public about the wars. In 1775, British readers followed the Battle of Bunker Hill from maps published in London four days after the engagement. Black cites other examples of maps made during the American Civil War and the two World Wars. Mapping a war as opposed to preparing for war is quite different. The lines and arrows used in the past to indicate troop movements will not suffice for the modern multi-dimensional war of land, sea and air operations.

Maps and Politics is a fresh look at an old topic. Although some of the ideas may not be new to readers of Mark Monmonier's recent books or Denis Woods' *The Power of Maps* (New York, 1992), Black provides numerous examples to substantiate his opinions. There are some criticisms to be made. The narrative is choppy and takes some unexpected detours. For example, I didn't expect a paragraph on gender differences in map reading in the midst of the chapter on mapping social issues. Some chapters, such as the third one, seem disorganized and try to touch on too many topics. I also have trouble with several map figures. They are not always easy to relate to the adjacent text, although the captions are lengthy and descriptive. There is no list of illustrations and the numerous examples are not numbered. Additionally, some of the figures are not referenced in the index. For instance, the 1933 *London Underground Journey Planner* map referred to in the text on page 15 is shown in the color plate section on page 49, but no such reference to the map appears in the text. It is in the index. Another figure, on page 135, *A New Map of the British Colonies in North America, showing the seat of the Present War* (1777), is not discussed

specifically in the text nor is there an entry in the index. The map on page 100 from Daniel Dorling's *New Social Atlas of Britain* (1995) needs to be in the 8-page color-plate section to be read effectively. I was also surprised that there was no mention of problems associated with reapportionment in the U.S.

Maps and Politics would work well as supplementary reading for a course with a unit on critiquing maps. It surveys the choices which must be made in mapping and can prepare cartographers to make difficult decisions or, at least, be prepared for difficult situations. The issues Jeremy Black addresses are an important part of professional evaluation and ethics; something each cartographer faces yet may seek to avoid. Cartographers should be comforted in knowing they are not alone in their efforts to please the client and the boss while remaining ethical. The book includes a very extensive notes / reference list which Map Librarians will appreciate. I learned that both the *Atlas of South Asian History* (Joseph Swartzberg, ed., 2nd ed. New York, 1992) and the *Historical Atlas of Africa* (J.F. Ade Ajayi and Michael Crowder, Harlow, 1985) are considered the 'best' for their fresh ideas and honest approach.

cartographic techniques

Maps.com: Solving the Base Map Problem Online

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Building the premier virtual map store with the best address on the world wide web, Maps.com (figure 1) has come about from the combi-

nation of emerging technology, futurist vision, timing, and, of course, creating your own luck. Our advantage is a giant 'map store' with the world's most extensive product list and the ability to be many things to many people. The challenge is to find, apply, or develop the technology needed to keep up with our own imagination.

Our goal with Maps.com is to create an intuitive (read simple) web site that creates a user community around maps, map products, geographical education, driving directions, and travel goods. By offering the ubiquity of the internet, our virtual store can be open 24 hours a day, seven days a week, and it's on every wired desktop in the world and available to anyone. Today we stand on the threshold of opportunity. We are transforming a ten-year-old idea that turned into a company and a new form of communication (the internet) into an expanding revenue stream and an entire department at MAGELLAN Geographix (MG).

Maps.com in its present state has existed since June of this year, yet the fundamental ideal of providing map data online is the premise on which MAGELLAN Geographix was founded.

In the late 1980s as the personal computer was becoming a standard desktop accessory for most graphic professionals, MG founder Chris Baker (University of Oregon) had the idea to create a library of digital maps and deliver them via computer through a subscription service worldwide. With help of Rick Wood (UC Santa Barbara) and Bill Spicer (University of Oregon) a business plan was developed and a meeting was arranged with the news information provider leader Knight Ridder in Washington, DC. The meeting with Knight Ridder produced a handshake and the assurance that the plan was sound, and that perhaps with an adequate prototype investment money could be available.

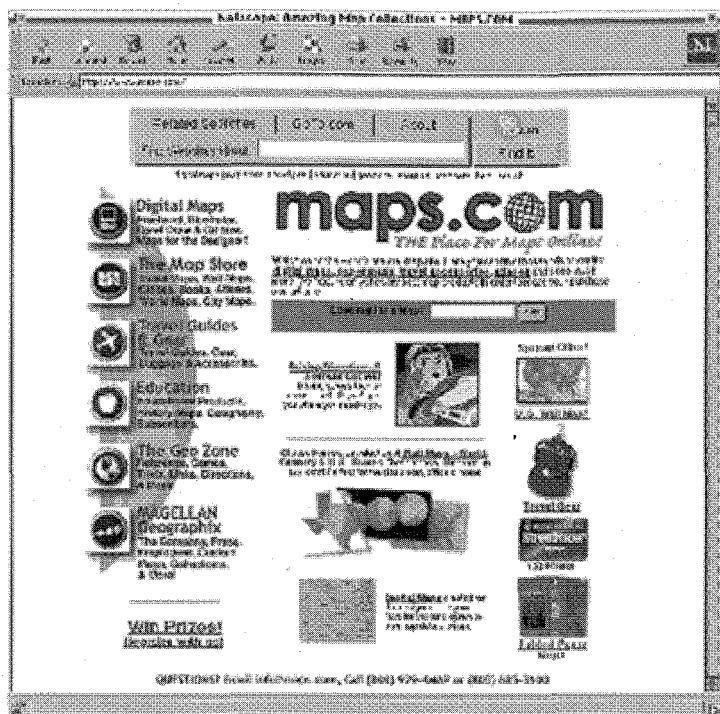


Figure 1. Maps.com home page. (The web is a dynamic environment, and to appeal to potential customers Maps.com is constantly evolving. The image above is what the Maps.com home page looked like in the Fall of 1998. Subtle adjustments are performed weekly and daily, with more comprehensive design changes occurring at least bi-annually.)

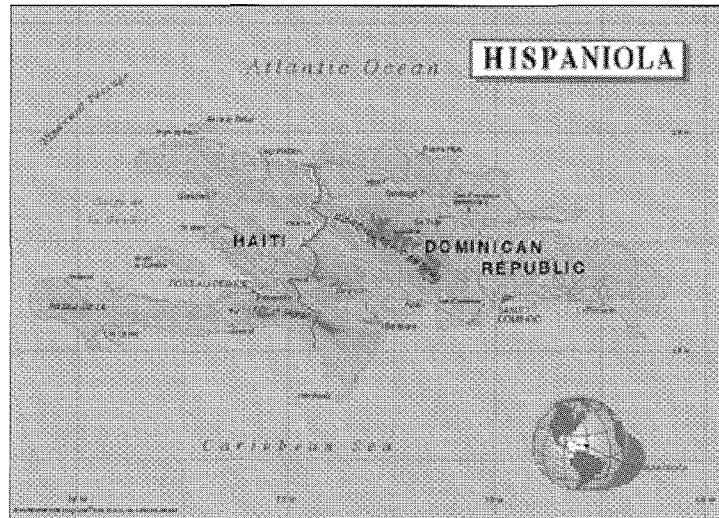


Figure 2. MAGELLAN Geographix prototype map. (MAGELLAN Geographix was founded by shopping around this prototype map. Black and white doesn't do it justice, but this map of Hispaniola was created at the Penn State Cartography lab in 36 hours, and eventually led to the landing of seed money to start the company.)

Our bags packed with optimism it was off to The Pennsylvania State University to create a prototype map graphic. We hired the services of the Deasy GeoGraphics Laboratory for three days to create the prototype (figure 2).

Immediately we faced numerous technical issues without the luxury of historical data or the resources for extensive research. It was clear that the Macintosh platform had quickly

dominated the graphics industry, and that became our target market. What wasn't clear at the time (and is still somewhat debated today) is the optimal native graphics software for creating maps that would be easy for end-users to manipulate. We chose Aldus FreeHand (now Macromedia FreeHand) version 1.0 over Adobe Illustrator for the simple fact that it had the ability to place different elements of information on different layers, a process that is fundamental for traditional or manual cartography.

In the following spring of 1990 we returned to Knight Ridder with prototype and updated business plan in hand. Expecting a triumphal return, we were met with the newspaper industry's biggest decline since the Depression. Increased paper costs and competition from other media for news severely reduced newspaper circulations nationwide. As a result, few news agencies had the luxury of being in a position to fund a new enterprise.

Down but not out, MG went through what is common for many a start-up business by opening in a spare bedroom while searching for private investment. Through diligence and word-of-mouth a visionary investor was found in Santa Barbara, California. This allowed MG to open an office and begin hiring employees in 1991.

While the map subscription idea wasn't dead, it clearly wouldn't pay the bills while we developed the 'product.' To cover our expenses and stretch our 'seed' money MG relied on custom cartography and work for hire. Today many industry professionals know MG for its custom cartography capabilities that range from college and high school text books, to phone book directories, to The Official State of California map—but that wasn't the original plan.

By 1992 MG had built up quite a library of digital map files. This greatly enhanced the chances of success for pursuing the original idea of selling map subscriptions. By the end of that year MG was able to sign a deal with the Los Angeles Times Syndicate (LATS) to do precisely what we intended; sell map files on a subscription basis and deliver them online.

LATS competes with Associated Press (AP) and at that time United Press International (UPI) to distribute news and graphics to all of its subscribing newspapers. Our idea of pre-made map graphics files designed for the graphic professional added value to their repertoire of products and services. We provide the files to LATS through their proprietary and closed online system, PressLink, allowing subscribing members to download any given file at any given time. Thus

the birth of MG's "Any time, on line" mantra.

As our subscriber list grew so did online technology and its ease of use. By the fall of 1993 CompuServe was ready to sign up, but with a catch; they wanted the entire MG library (600 maps) in a raster format and they had to have it in two months! Beyond the unrealistic time frame we were facing multiple challenges as map makers. We needed to turn 8.5 x 11 inch maps designed for print into screen display images in a size we didn't understand at the time—840 x 480. Much of the type on our 'print' maps was unreadable on a computer screen, as were the subtleties of many muted, or pastel colors.

Through round-the-clock efforts a rasterization process was created and a script distributed throughout the office. But for the issues of type size and readability no technical assistance was available. Each map had to be examined on an individual basis and type had to be generalized based on a minimum point size. We determined that 12 point was as small as we could go, with titles running at about 24 points. All blends and gradients had to go, as did any colors that were similar.

In addition to the cartographic hurdles, there was the issue of security. How do you discourage people from just taking images off of CompuServe without permission? Through experiments with Adobe Photoshop, MG pioneered 'watermarking' map raster images (figure 3). The theory goes that by placing an embossed company logo on the image it will deter somebody from stealing the image as it will show clearly where the image came from. While it is possible through the same program, Photoshop, to erase the watermark, it would be prohibitively labor intensive.

Since each and every map file was going to need to be adjusted, it was clear just 10 days into the project that the deadline was in serious jeopardy. To compensate for

the lack of production time and being eager to deliver on time, we closed our office doors for 45 days to concentrate exclusively on the CompuServe project. No other business was accepted during this time, and it paid off with an ontime delivery.

Building on the success of CompuServe and the emergence of the internet or World Wide Web as we know it today, MG launched its first web site in 1995. Designed to showcase our growing library of digital files, the site served as our corporate identification. Online traffic was modest considering that the URL was a mouthful at: www.magellangeo.com. Also at this time online commerce was an idea slightly ahead of its time, so individual map file sales didn't exist. MG subscribers were the only people able to download map files directly.

In 1996 MG launched an updated version of its web site complete with electronic commerce making any map available via the World Wide Web. But choosing a commerce solution didn't come easy. The original determination

was to go with an 'off the shelf' solution called iCat. For \$10,000 the buyer got the software to run electronic commerce on a NT or UNIX server that allows client-side access from any platform, Mac or PC. After purchase it was discovered that client-side access was only available via NT or UNIX, and that there wasn't a built-in database so third party software would be needed. It became quite clear to us that this wasn't the solution we were looking for. So we returned the iCat software and collaborated with a local company to custom build our web site's "backend."

While many view MG and our web site as an industry leader, we aren't the only players in the arena. Competition in the marketplace for pre-made map graphics has been, and continues to be, intense. Firms such as Cartesia or Image Club also offer maps online, pushing us to differentiate ourselves through the frequency of our map update cycle, data quantity, quality, and superior map design. Today there are literally dozens of different vendors for digital map data.



Figure 3. MAGELLAN Geographix watermarked raster map. (There is relatively little that can be done to keep others from 'lifting' any image or data posted online. At MAGELLAN Geographix we use a process known as 'watermarking' to discourage such practice. By clearly placing our translucent logo on all our web images that we offer for sale, we can at least determine if an image has been 'lifted' should we ever come across it.)

Through 1997 our web site matured, becoming more intuitive and easy to use. But it wasn't until we secured the URL Maps.com did our traffic seriously escalate. With the change in web address we needed to offer much more than our own products to take advantage of the number of visitors our web site was receiving. Through a partnership with the world's largest map wholesaler, also located in Santa Barbara, Maps.com became a virtual map store. While not the first website to offer map products online, Maps.com is a leader in creating a professional, commercial, educational, and reference site built around maps. Beyond our own products (digital maps) and third party products (paper maps) we offer maps and lesson plans for educators through our Maps 101 subscription program. As a reference destination Maps.com offers driving directions, address finders, an online atlas, and links to other map and geography related web sites that deal with map topics we don't cover.

With the growth of the web and delivery through the online channel, MAGELLAN Geographix has come full circle and is making good on our original business plan to deliver maps to the world online. An idea that may have been ahead of its time, we were able to diversify and survive while the technology grew into place for the everyday delivery of maps online. We believe and share the vision that sooner than most people think the internet will be a standard business tool like the telephone and fax machine are today. As I'm fond of saying, "With more hard work, Maps.com can be an overnight success!"

map library bulletin board

Bowling Green State University Map Collection

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Bowling Green State University (BGSU) was established in 1910 and began offering classes in 1914 as a teacher training institution. Over the years the offerings have grown to include the liberal arts, business, pre-professional and professional courses including both Master's and Doctoral degrees. In the earliest pictures of BGSU there is a picture of a room used as the Library. A case with many small drawers appears in the picture and was probably used to house maps. That case, or at least its double, is now in the Map Collection housed in Jerome Library.

However, the Map Collection was not kept with the Library but was housed in the academic departments most likely to use the materials. Over the years this resulted in various levels of support. Finally in 1981, the library assumed responsibility for this collection and it was moved to the Library building. Most of the map cases were also moved and that is how we acquired a collection of all sizes and types including home made cases as well as vertical and horizontal commercially made cabinets.

Over the years the Map Collection has been a depository for the US Geological Survey (USGS), the Army Map Service (AMS), the Defense Mapping Agency (DMA), and the National Oceanographic and Atmospheric Agency (NOAA). After the move to the Library was made these depository arrangements were updated and renewed.

The changes in the depository system have complicated the record keeping but we continue to be a depository for government maps from USGS, the National Imagery and Mapping Agency (NIMA)-DMA's successor, and NOAA. We now also house maps received through our government documents department, such as Forest Service maps. We try to select materials which will be useful for our students and the surrounding community.

When the Library received the Map collection, there were many duplicates in the collection. We did a needs survey and decided what materials were needed and therefore what should be kept in the collection. We spent several years weeding out duplicates and superseded maps. We then arranged the materials in pseudo-G Schedule order in anticipation of eventual cataloging. Many years later we have finally achieved that goal and are now in the process of adding our materials to the on-line catalog. Some are being added through an OhioLINK retrospective project with Marcive records and we have also initiated a local retrospective cataloging project for pre-1976 government document materials and other non-government materials. Maybe in a decade or so all our materials will be available in the on-line catalog.

We have approximately sixty-five thousand items in the collection including, around 1000 atlases and 800 government document materials. The bulk of the collection is flat maps including maps at scales from 1:24,000 to 1:3,000,000. We have received some materials on microfiche and are now receiving some electronic materials. We are just beginning to get into electronic mapping and do not yet have the equipment to do much except look at information. We have a proposal in the works which would get us to the first stages of electronic mapping and hopefully we will be successful so that we are not left be-

hind in this rapidly expanding field. We also have the traditional collections of road maps and local area maps.

Since our collection is housed in a basement room with no windows, we have acquired a fairly large collection of map related "stuff" which helps brighten up the space. We have agreements with two other collections here at BGSU to house historical materials. The North West Ohio Historical Collection includes local histories and map materials such as Hardesty atlases. We also have a Historical Collection of the Great Lakes which is involved with collecting records from the Great Lakes, particularly records involving shipping. They receive all our outdated Great Lakes Charts.

Although a fairly small collection, the Map Collection at BGSU is actively collecting materials which are needed by its users. The addition of the map records to the on-line catalog will alert people to the availability of the cartographic materials in the Map Collection. By working with other collections at BGSU we are trying to acquire the information necessary for current use and also build a collection which will be useful in the future.

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Map Library at Southern Illinois University at Carbondale

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The Map Library at Southern Illinois University at Carbondale is a unit of the Science Division at Morris Library. Officially (in online records, etc.) it is the "Map Room," although it is not and never has been in a room! It is, in fact, an open area collection with a growing trend towards locked cases and office holdings to provide security for items more prone to theft.

The formal collection dates from approximately 1946 with the convergence of new depository receipts and the contributions and support of several faculty in geography and geology, especially Professors Thomas Frank Barton, Stanley Harris, and George Fraunfelter. Early growth in the collection was slow, but the Map Room gained formal library recognition in the late 1950s. The first librarian with a measure of direct responsibility for the map collection was Eugene Graziano (1958-1961), followed by Mary Galneder (1961-1965), Janice Thompson (1965-1968), and Jean Ray (1968-1986). Harry Davis has been the Map and Assistant Science Librarian at Morris Library since 1987, assisted by Janice Fiorino (Li-

brary Technical Assistant II) since 1990. Both spend approximately 75 percent of their time in Map Library responsibilities and the remainder in Science reference desk and related division duties. In addition, the Map Library normally has student assistance up to a total of forty hours per week. The Map Librarian also serves as the library liaison (collection development officer) for the Geography and Geology departments.

The Map Library is on the 6th floor of Morris Library and is normally staffed 8 am to 5 pm, Monday through Friday, plus one evening (Wednesday) from 5 pm to 9 pm. Since the collections are in an open area, the unlocked materials are accessible anytime the Library is open and limited assistance is available through the Science reference and information desk (on a different floor) at other times. The Map Library Office is Room 608B. The telephone number is 618-453-2705 and the FAX number is 618-453-2704. The address for Morris Library is 555 West Grand Avenue, Carbondale, IL 62901-6632. E-mail may be directed to hdavis@lib.siu.edu or jfiorino@lib.siu.edu.

The Map Library has a total area of approximately 3680 sq. ft. in Morris Library, including 3077 sq. ft. for collections and collection use and assistance, 500 sq. ft. for office functions, and 103 sq. ft. in auxiliary storage (but not including remote storage). The map, air photo, and other non-book collections are housed in 165 map cases with 831 drawers plus 41 vertical file cabinets with 187 drawers. The book collections occupy approximately 564 linear feet of shelving, including 261 feet of standard shelving and 303 feet of folio shelving. There is also a small collection of globes, five atlas cases (most atlases are shelved flat on folio shelves), wall map storage, and a light table.

The Map Library has approximately 238,000 sheet maps and over 83,000 aerial photographs in

its cataloged collections. Because of substantial gifts in recent years, there is an uncataloged, but accessible, backlog of an estimated 20,000 maps and 25,000 air photos. Approximately 30,500 superceded editions of U. S. topographic maps are held at a remote storage facility. Approximately 98 percent of the collection is dated 1900 or later. Accession rates have varied considerably in recent years due to budget fluctuations and staff work priorities; 4300 maps and 14,298 aerial photographs were added to the collections in FY 1998, while approximately 3600 items were withdrawn because of supersedure, condition, currency, or loss. Collection strengths include: Illinois; geology; nearly complete old and new U.S. topographic coverage; extensive foreign topographic coverage; FEMA maps; complete wetland inventory coverage for Illinois; over 500 Illinois plat books; Sanborn maps; nearly complete aerial photography for Southern Illinois from 1936 to the present; extensive aerial photography for the same period for central and northern Illinois; aerial photography for the 1993 flood on the Illinois, Mississippi, and Missouri Rivers; and a substantial collection of early Illinois county atlases. Superceded U. S. topographic quadrangle maps are retained. A special resource is the Sang Collection containing original maps from the 16th to the 19th Century and illustrating development of the Mississippi Valley. Other special resources include the Rutledge Collection of Illinois Coal Mine Maps, the Crown Collection of Photographs of [Early] American Maps, and the Jean Gottmann Collection, a set of photographs of maps at the Bibliotheque National, intended to augment the Sang Collection. Southern Illinois University at Carbondale has an active Irish Studies program and the Map Library is endeavoring to enhance its holdings of Irish cartography and related materials.

The Map Library also has a book collection of approximately 3500 volumes, including local, state, national, and world atlases, gazetteers, cartobibliographies, and resources related to the history of cartography. Facsimile atlases are included. A variety of electronic atlases and mapping software programs are available at the Map Library and at the Science Division service desk.

A large part of the book collection is classed as reference material and circulates only by special permission. The majority of the map collection does circulate. There is also a non-circulating journal collection related to cartography, geographic information systems, and map librarianship. Aerial photography circulation is generally limited to photos dated 1955 or later. The collections enjoy widespread use by faculty, staff, and students. The count for individual instances of patron assistance in FY 1998 exceeded 2500, with approximately 1600 of those being more substantively reference in nature. Map and air photo loans and loan renewals in FY 1998 totaled 5585 (based on two-week loans). Principal academic use is by faculty and students in geology, the biological sciences, and archaeology, but there is also considerable use by researchers in a wide range of other disciplines. Community use and recreational use by students is also extensive. Requests for genealogical assistance are frequent. Many patrons are assisted with Internet searches to augment the geographical and cartographic resources available in the Map Library. Additionally, the Map Library staff is trained and expected to assist patrons with map resources included with books and serials in library locations outside the Map Library; this is especially true for maps included with various geological survey series.

The book collection in the Map Library is fully cataloged online as

part of the Illinet Online database. Only about two percent of the sheet map collection is cataloged online. None of the aerial photography is cataloged online. Library of Congress classification is used for all aerial photography and for almost all maps; a small number of maps are classed in the Dewey Decimal classification to maintain their linkage with accompanying Dewey-classed text. The earlier entries in the card catalog utilize a form card in combination with place-subject-date-scale entry, while the later cataloging follows the same form of entry but with a local approximation to AACR2 content. Efforts are underway to move to full online AACR2 cataloging for the majority of new accessions.

Although the Map Library holds the majority of atlases at Morris Library, significant thematic atlases (especially those with demographic, historical, linguistic, and socioeconomic content) are in various subject collections. Likewise, although the Map Library holds probably 95 percent or more of the maps at Morris Library, there are some holdings elsewhere at Morris Library, especially in the Government Documents Collection. This collection includes extensive holdings for the early Coast Survey charts and for U. S. Serial Set maps. The contact for this material is Walter Stubbs, Documents and Assistant Social Studies Librarian at 618-453-2708 or wstubbs@lib.siu.edu.

The Map Library avails itself of the excellent preservation unit at Morris Library and maintains an ongoing and rather extensive map conservation program. This includes paper repair, deacidification, and encapsulation, plus other forms of preservation. Older atlases and selected other items have been converted to "polyester books" with individually encapsulated pages. Planning is ensuing for digital image storage for spatial information preservation.

Morris Library has a Geographic Information Systems unit which operates independently of the Map Library. This unit is headed by D. Kevin Davie, (Researcher III, Administrative Professional staff). Office hours are 8:30 to 4:30, Monday to Friday or contact can be made by phone at 618-453-1248, by FAX at 618-453-3440, and by e-mail at kdavie@lib.siu.edu.

The GIS unit is well-equipped and includes the following:

- * One (1) Sun(UNIX)
- SPARCstation 5 with CD and 8mm tape drive running one licensed ESRI University Lab Kit
- * Two (2) Windows NT 4.01 workstations (64mb ram) running ArcView 3.1 with Spatial Analyst, Network Analyst, and a variety of other extensions
- * One (1) HP Designjet 650C large format printer
- * One (1) HP Laserjet 4si laser printer
- * One (1) AGFA Horizon color scanner
- * One (1) each of 2gb Jazz drive and 100 mb Zip drive
- * Two (2) 6-disk CD-Rom drives

The summation of storage space from all devices equals 21gb. All machines have full network/internet access.

Although the Map Library and the GIS unit make frequent cross-referrals for patron assistance and cooperate as fully as possible, the two units are separated by four floor levels, and extensive interaction is limited by this and by current organizational structure. The GIS unit has principal responsibility for housing and servicing the library's electronic and digital cartographic resources. The library is part of the ESRI ARL/GIS program and has extensive hardware and software to facilitate Morris Library's GIS program. The unit has been very active in providing special need map production both for researchers on campus and in external contract arrangements.

Although Illinois is well-blessed with a number of excellent map libraries with sizeable collections, the collection at Southern Illinois University at Carbondale is not geographically near any of them and is at least three hours' drive from any other map collection of significant size or diversity. Consequently the map and air photo collections at Morris Library serve not only the university users, but also a wide public clientele in southern Illinois and adjoining areas. Efforts are underway to try to achieve greater linkage and cooperation among the map libraries and map librarians of Illinois, so as to effect greater sharing of resources and expertise.

We in the Map Library at Southern Illinois University at Carbondale know how much more we would like to have in our collections, how much more we would like to do and achieve, how much more time we would like to have to do everything needing doing, but we also know that we have a good collection and we are glad that we are serving so many satisfied patrons. We invite you to contact us if we can assist you in any way.

NACIS news

NOTE: NACIS is represented on the Cartographic Users Advisory Council (CUAC). Following are the minutes from the May 7, 1998 meeting submitted by Dan Seldin.

Cartographic Users Advisory Council (CUAC)

The 1998 annual meeting of the Cartographic Users Advisory Council took place on the campus of the U.S. Geological Survey headquarters in Reston, Virginia. Rae Mueller of the Earth Science Information Center and Hedy

Rossmeissl graciously provided local arrangements. Between 10:00 and 11:30 in the morning, the Council was taken on a tour of the Survey's headquarters and of the USGS Printing Plant by William A. Radlinski, a retired associate director of the U.S. Geological Survey.

After lunch, CUAC members were given a demonstration of the U.S. Geological Survey's prototype National Atlas of the United States web site. Mr. Jay Donnelley of the Survey began the demonstration by examining the hard copy 1970 National Atlas. Approximately 16,000 copies of the atlas were produced. Of these, 60% were distributed to libraries; 26% to governments; 14% to the public. At \$100.00 in 1970 dollars, the percentage sold to the general public was quite high. The atlas was a product of the 1960s and included only 1 plate on crime and no maps on the national health—topics of considerable interest today.

Through focus groups, e-mail solicitations, and polls, the USGS has found that the citizens, businesses, and government want a National Atlas to provide a wider variety of information than presented in the atlas of 1970. First and foremost, they want graphic information illustrating quality of life issues such as health, crime, and the environment. They want to compare one region of the country to another to understand "How am I doing?" on such topics as distribution of federal tax dollars to the states or the quality of public schools. Also, there are "Geography for Life" standards issued by the National Council for Geographic Education that the USGS hopes to support through the new National Atlas program.

The USGS plans to incorporate these desires and interests into the new National Atlas. The Survey will also take advantage of the great advances made in electronic access, information management, and delivery technologies that did not exist in 1970 in the new atlas' maps.

As an example of how the Survey has used new multi-media technology in information delivery, Donnelly presented a map of the United States showing the monthly change in vegetation which resembled a film strip of 12 scenes automatically moving from one month/season to another.

At the present time, the Survey is working to make the National Atlas available on the web. The Atlas probably will not appear as a bound atlas and a CD-ROM version has not been entirely ruled out.

The National Atlas as demonstrated is not merely a collection of maps. The Atlas has a high degree of interactivity that allows users to select and view various data layers and to build queries around place names and thematic data. Links to data and other data sites abound.

In the 1960s the USGS cooperated with several governmental agencies to bring a variety of thematic data to the 1970 edition of the National Atlas. This tradition will be continued in the new National Atlas, but with even more cooperating agencies, such as the U.S. Dept. of Justice and the Centers for Disease Control in Atlanta. Mr. Donnelly also talked about the possibility of soliciting data from the governments of Canada and Mexico in order to produce authoritative North American maps. Beyond the government, the Survey hopes to bring in private partners to help develop appropriate software to view the atlas and the marketing expertise in order to distribute the atlas as widely as possible—two arenas where the federal government has lagged behind the private sector. What the Survey and other federal agencies want to concentrate on is their strength: accuracy and authoritative data.

The first offering of National Atlas maps on the World Wide Web should be available by June 1. In order to properly read and build maps, you will need Netscape 4 or Microsoft Internet Explorer 4 with

will ask for an email address. It is primarily designed for use by the public, but professionals may use it also. The passworded part will default to our depository number and institution name, so that we will not have to fill in that information. Inquiries on AskLPS@GPO.gov will be given priority over paper forms. Responses to questions should come within 10 business days to our inquiry. An immediate message will automatically be sent to acknowledge that an inquiry has been received. Web Tech Notes includes "whatever happened to..." updated weekly. FAQs and News consists of more news than FAQs. In the past this type information would have been put on GOVDOC-L, but now this information will be put on News. The FDLP Directory is the official GPO Library Program Service Directory. Robin recommends that we check Tech Notes and FAQs weekly before sending in an AskLPS inquiry to see if our question may have already been answered.

The shipping list files are now electronic and timely. They are currently in WP6.0 format. They will eventually be in Word format.

There has been a Memorandum of Understanding signed with NIMA to bring material back into GPO for distribution. GPO's DDIS (Depository Distribution Information System) was not being matched at NIMA, so depository selections were not being kept up to date. This means that NIMA will send maps and other material to GPO for distribution with other depository material. This will go into effect later this month.

In an update on the electronic transition, Robin reported that GPO is now ahead of the pack, or even with some agencies. On the administrative side a lot has been done to make the transition to a more electronic program. The shipping lists are now on the web. Item selections are now being made by selective depositories online. New passwords

will be used for the next update and these passwords will not be given to any outside agencies. The item lister has been available for about a year. It is updated monthly. The Union List of items selected is updated on the Federal Bulletin Board monthly.

There has been considerable activity in establishing partnerships. There are service and product partnerships. One service partnership is the Documents Data Miner (DDM). This service allows the users to create custom inquiries with a variety of GPO databases. For instance, list of holding libraries in a given state or region could be created for a particular GPO item number. The DDM is in partnership with Wichita State University. Examples of a product partnership can be found in the variety of Department of State documents mounted at the University of Illinois, Chicago Library and in the Department of Energy's Infobridge.

Since a meeting following the Federal Depository Conference with Donna Koepp, Brent Allison, Hedy Rossmeissl, Rea Mueller, and Barbara Poore, Robin has talked again with Hedy and Rea about a consortium to provide access to the DOQs. She expressed the importance of working on this to GPO. Permanent, long term access is a big concern to GPO. Minnesota plans to load the DOQs on the Internet. Kentucky and Pennsylvania are working on it but are not sure they are going to continue in this format. There is a probable need for compression software, but not relying on proprietary software, because GPO would have to pay the licensing fee for that software.

DOE Infobridge, a product partnership that will make Department of Energy reports available on the Internet will soon be in place. GPO picked up the cost of building the bridge, which is the actual distribution mechanism. Any agreement of this kind will have to go through the Congressional Joint Committee

on Printing or the Oversight Committee for approval.

Robin reported that the Digital map of the World (V Map level 0) from NIMA will be in the depository library program. Robin sent a request to Jim Lusby again recently for a status report on this product. The Department of Housing and Urban Development's 2020 CD-ROM will be in the program also, but LPS has not received this yet.

Robin distributed new Recommended Specifications for Public Access Work Stations in Federal Depository Libraries for 1998. There is a May 15 deadline for getting our comments back. This is also on the Web.

NOAA has moved to print-on-demand distribution only. In the past, 200-300 charts a year were distributed. They are going to update more often and this will result in about 6000 charts a year. Do we really want to receive that many paper charts? NOAA is doing this under a CRADA. GPO wants to build into the CRADA the ability for depositories to contact NOAA for charts on demand, so that we don't have to have 6000 charts a year. We could request on demand as often as we would need. We have until October to give GPO feedback on this issue. Robin asked us to consider what is best for our institution and what is best for the depository program.

GPO's offering of government information products available via the Internet through its Pathways Services "Browse Electronic Titles" was discussed (http://www.access.gpo.gov/su_docs/dpos/btitles.html).

URLs on this service are updated weekly. There are 19 pages now, and it is much faster than it used to be. There are about 3000+ titles. Agencies don't always let GPO know when things change. Internet resources are being worked on by two fulltime people. There are more fugitives in electronic resources than in paper. Part of the problem

is changing URLs or things that disappear or appear without the approval process.

If we have an electronic product, can we get rid of physical product? This issue is going to general counsel. If we are getting something in physical format, it will continue in physical format for the moment, even if the information is available on the Internet. This is according to the recommendation of the Depository Library Council.

The Serial Set will continue coming in paper through the 104th Congress. After that, except for Regional depository libraries, it will come in fiche. Regionals, posterity libraries, etc. will still get the Serial Set in paper. It will continue in fiche for others. Fiche still costs the same as it did 20 years ago.

Robin then fielded questions from the Council. Richard Spohn asked why more delicate paper is being used for CIA maps? Robin was not aware of this, but will check on it. There are paper specs that should be adhered to.

Dan Seldin brought up the subject of NOAA maps and their program of electrostatic copies of nautical charts on demand. Aeronautical charts are not being considered for on-demand printing at this time. Libraries could set up a standing order with NOAA, perhaps under GPO auspices but administered by NOAA. Robin expressed her concern about how GPO would catalog the charts. Another concern was about turn around time for on-demand NOAA nautical charts. Fred Anderson might have more information on this later this afternoon. NOAA wants to do the right thing by depository libraries and is putting a lot of effort into planning at this time.

The Federal Energy Regulatory Commission is trying to establish a subscription service for their reports.

U.S. Bureau of the Census

Tim Trainor

Census Bureau products are "changing dramatically" according to Timothy Trainor, Chief, Cartographic Operations Branch. He discussed development and dissemination of current and future products of the Bureau.

Chief among these programs now underway is Census 2000. Some initial changes in Census geography have been instituted including doing away with the BNA (Block Numbering Areas) in favor of Census Tracts. Census Designated Places (CDP) will have no minimum population threshold and census blocks will have 4 digit codes with an estimate of 8-10 million blocks in 2000. One of the principal means of dissemination for both the decennial and 1997 economic censuses is DADS, the Data Access and Dissemination System, an electronic system, based on internet technologies to deliver the information to the public.

DADS was first developed as a prototype in 1996 using a small dataset to test its architecture. Since then it has been updated substantially through suggestions from focus and user groups. DADS 1997 was the first to deal with geospatial data and included a geographic browser. Further advancements are proceeding and datasets will not be incorporated into DADS unless accompanied by metadata. It will be the main data delivery vehicle for Census 2000 data to the public.

Tim envisions a three tiered system. Tier one, presenting basic summary data, will be free. Tier two will consist of predefined data tables and will probably be fee based. Tier three will involve massive amounts of processing and cover the smallest level of data on a national level and will also probably be fee based. DADS will be the access mechanism for the 1997 Economic Survey and there will not be many printed reports.

The American Community Survey (ACS) has been designed to replace the information collected on the long form that should have its last appearance in 2000. The ACS is not a headcount and is not intended to replace the decennial census. When fully implemented in 2003, data collection for the entire country will be collected on an annual basis and compiled into annual and multiyear products. A prototype CD was completed in April including a mapping component.

Mapping products including TIGER/Line will be available on both CD and DADS. Maps of blocks, counties, and government units, will be available in MIM and PDF file formats and use color. Census maps will be accessed through CD ROMs, and hard copies will be available on demand from various sources. Work is currently underway on an electronic 105th Congressional District Atlas. It will be available on CD-Rom and will print on both color and black & white printers.

The Bureau is currently working on providing examples of their map products on their web page, however, the examples will not reflect everything that is produced or available. The Map Gallery site is accessible off of the Tiger Line page.

Federal Geographic Data Committee (FGDC)

Barbara Poore

The National Spatial Data Infrastructure (NSDI) is working to make the sharing of data easier through the establishment of clearinghouse nodes and the organization of metadata.

Use of a clearinghouse helps advertise the quality of your datasets and can address issues of quality in the metadata. The reasons for not using Web indexes are that they are limited. They are not able to target specific searches, have limited support for concept searches and

search engines don't support fielded searching (e.g. date, coordinate, other numeric). And finally, many databases used are not accessible through the web and a clearinghouse would help make them accessible. Establishment of nodes makes data available locally and the assumption is that most requests for geographical data are of your local area. A clearinghouse node uses a Z39.50 protocol server.

All federal agencies are required to document their data based on metadata standards. Implementation has been spotty with a better response from state and local agencies. There are 75 servers on the clearinghouse and the number is growing every day. Metadata forms the basic vocabulary for searching within the clearinghouse. It is possible to perform a fielded search. Metadata performs different roles including those of inventory, a catalog for search and retrieval with a format similar to MARC, and documentation.

The metadata standard contains 300 data elements of which many are compound and others have their own value. One problem is that many believe it to be too complicated. As a result, there is a struggle with the user community who, on one hand believes it to be too complicated and on the other hand are saying "but we need this".

Metadata standards have been taken up by the ISO (International Standards Organization) and there is committee draft in review now. It is expected that the FGDC standard will be adopted by the end of the year by ISO and will have even more widespread use than now.

To have it be machine readable, it is necessary to standardize fields. SGML (standard generalized markup language) is being used to enforce structure and help in presentation, while XML (eXtensible Markup Language) offers more flexibility in terms of programming and provides control over fields and

tagging.

Ms. Poore indicated that they would like to see a more active role by the Library community, especially Map Librarians on metadata issues. Reasons include our knowledge of cataloging; we know what our users want; and our focus on service. In addition, they would like to see some of the depository libraries become regional clearinghouse nodes with responsibilities of collecting information about local datasets and serving them to a more national audience or pointing users to national data. Gateways possibly could be located at GPO or USGS that would allow users to access the datasets we are holding. The benefit to federal agencies is that national agencies would have access to local datasets but would not have the cost of storing nationally.

Clearinghouse Grants

In order to continue to promote interest and participation in the regional approach to managing large collections of geospatial data, the FGDC continues its partnership-funding program. Awards have been given for four years and consist of three programs: the Cooperative Agreements Program, the Framework Demonstration Projects Program and the NSDI Benefits Program. The Cooperative Agreements Program supports development of clearinghouse nodes. Grants in the range of \$40,000 fund projects "to create clearinghouses of geographic data linked to the Internet, to advance the NSDI through education, to develop NSDI standards, and to help organize and strengthen statewide or regional programs for geographic data sharing". Programs are directed at different audiences with the primary goals of having this metadata collected and distributed effectively and efficiently to users.

Listings of current NSDI Clearinghouse Projects with libraries or

universities can be found on the FGDC web page at the address: www.fgdc.gov/Cooperative_Partnerships/ and include the state, year of grant, organization involved and project contact. The Cooperative Agreements Program awards require some matching funding from the recipient.

National Imagery and Mapping Agency (NIMA)

Jim Lusby

After a demonstration of Microsoft's Terra Server, CUAC reassembled in the conference room to hear James Lusby's report about the National Imagery and Mapping Agency.

NIMA's mission is to provide timely, relevant, and accurate imagery, imagery intelligence, and geospatial information in support of national security objectives. The core NIMA business is to perform imagery analysis and geospatial information production, to manage and task the collection operations, and to ensure dissemination of primary and secondary imagery, imagery products, and geospatial information. Organizationally NIMA resides between and is comprised of elements of both the Defense Department and the Central Intelligence Agency. There are thirteen different teams within NIMA and Mr. Lusby is part of the National and Civil Agencies Team.

Mr. Lusby is working with Robin Haun-Mohamed at GPO to improve distribution of NIMA map products. In May of 1998 the distribution center for nautical and aeronautical products in Philadelphia will close and the Defense Logistics Agency in Richmond, Virginia will become responsible for distribution. In the future it is likely that depository libraries will be re-surveyed for NIMA products and GPO will oversee the maintenance of library selection records and distribution to depositories. The Defense Logistics Agency will supply GPO with the

needed numbers of products.

There is a trend within NIMA to put more products into the depository program, including 1:250,000 scale maps of various places around the world. The U.S. Geological Survey now offers, for public sale, topographic maps of Vietnam. Current thinking is that the 1:250,000 mapping could also be sold by USGS, provided indexes / catalog entries are available as well.

NIMA, like many other federal agencies, is moving away from paper to electronic formats. As such, a decision has been made by the Board on Geographic Names and NIMA to discontinue printing the foreign gazetteers in paper. Microfiche will also be discontinued. Instead, names will be available through CD-ROM and the Internet.

In answer to a question, Mr. Lusby said that even though 1:250,000-scale mapping will soon be available, the restrictions that applied to earlier quarter million scale series 1501 "JOGs" still hold, namely, the copying and circulation prohibition.

National Park Service (NPS)

Nancy Haack

Nancy Haack, from the Division of Publications at the Harpers Ferry Center represented the NPS. The National Park Service has two service centers to assist the 375 parks across the country. The first is the Division of Publications at Harpers Ferry, WV and it produces visitor maps and maps current park information, roads, trails and other features. The NPS Technical Information Center in Denver (<http://www.nps.gov/dsc/tic/>) is responsible for planning, buildings, landscapes, and GIS activities.

The NPS makes maps of all NPS parks and sites that include a visitor guide on the reverse side. The NPS Cartographic Resources URL is: www.nps.gov/carto

The Harpers Ferry facility provides interpretative media, informa-

tion about the individual Parks, creates exhibits for the parks, outdoor exhibits, park films, and provides preservation of objects. Their facilities include a conservation laboratory. Preservation of historical objects includes things like George Washington's uniform, historic paintings, equipment, and flags. The goal of historic preservation is to stabilize and preserve for proper interpretation. The web page contains additional information on their activities.

In earlier times, there was no consistency in format, size, or content of the NPS site folders. A New York graphics designer and folks at the Harpers Ferry facility designed and developed *Unigrid*, to standardize graphics and production components. As a result maps have gone to a very high graphic look, and have come a great distance from the days of scribing and peel coats.

Maps are done in the graphic program Adobe Illustrator 6.0, resulting in colors and screens of a higher quality. They have experienced problems using Adobe Illustrator 7.0, so they plan to continue using 6.0. In the old days, their products were based on original maps, but now the NPS simply downloads DLG files and cleans up line work. They are able to portray shaded relief nicely using Adobe Illustrator.

Eighty-five percent of the NPS visitor maps are digitized or are in process of being digitized and available through the website and are available to download in the original Adobe Illustrator format or in Adobe Acrobat (PDF) format. The remaining fifteen percent have not been scheduled for different reasons, including the case of the Channel Islands, a question of how best to portray them given how spread out they are and the diversity of island sizes. Converting to the digital format and posting on the website is happening at a rapid rate.

The National Park System Map and Guide has been revised and the new version is available. The publication *Index to the National Parks* reflects NPS holdings based at the time of a particular Congress in session. Therefore, the index does not reflect changes that have taken place under a different Congress. Maps that are produced jointly by the USGS and NPS are determined by the NPS Washington Scientific Office, not the Harpers Ferry Unit.

National Oceanic and Atmospheric Administration National Ocean Survey (NOS)

Fred Anderson

Fred Anderson of the National Ocean Survey's Office of Aeronautical Charting and Cartography (AC&C) discussed the move of AC&C to the Department of Transportation's Transportation Administrative and Service Center (TASC), the NOS Nautical Chart print on demand CRADA (Cooperative Research and Development Agreement), and AC&C's direct distribution to depository libraries.

1. AC&C move to DOT

The National Ocean Survey wants to concentrate on coastal issues. Aeronautical Charting does not fit this focus. The Office of Management and Budget (OMB) asked the Inspector Generals of the Departments of Commerce (of which NOAA is part), and Transportation to see where AC&C should go. The Inspector Generals recommended that AC&C should go to the FAA. It was decided that the FAA was not a good fit either because the FAA is a regulatory agency and AC&C is a service agency. TASC was a better location. The legislation is at OMB and will go to Congress at the end of the fiscal year. The move will take place on October 1, 1998 if Congress approves.

One of the main advantages of TASC is that AC&C will retain the

revenues from sales that now must be returned to the U.S. Treasury. This additional funding will allow the development of new products. Through agreement, AC&C will continue to print and distribute nautical charts through FY 1999. AC&C will implement its modernization plan that will allow for a fully digital production process from chart compilation to the generation of negatives for printing. By 2002, the four locations of AC&C will be co-located along Metro's Green Line in College Park or Greenbelt. This new building will require 90,000 square feet of office space and 110,000 square feet of industrial space. This new building will include a government owned, contractor operated warehousing and distribution operation. TASC encourages expansion of business practices. This will allow AC&C to expand its customer base and product lines. AC&C will take over NIMA public sales. They envision a "National Navigation Information Center", where they would provide distribution of various government publications on navigation. NOS will continue to compile the nautical charts and AC&C will be a contractor to print and distribute the charts.

2. Printer Demand CRADA

Since AC&C will no longer be part of NOAA, they want to get out of the printing business. The plan is to give the raster files to a private third party who will reproduce them on a high-speed raster plotter. An overnight shipper will then send the charts to sales agents around the world. The prices will increase and the sales agents' discounts may decrease. Through FY 1999 AC&C and the CRADA partner will compete in nautical chart sales. The partner will do a market survey during this year. Large vessels are required to have the latest charts. Recreational boaters and other small craft are not required to have the latest charts. This market survey will see what the demand

for nautical charts is and a pricing structure. At the end of 1999, there will be an evaluation to determine where they are in the process. Richard Wilcox of NOAA is the project leader of the CRADA team. A team member, Barbara Grey, is working with Robin Hahn Mohamed of GPO to see if a plan exists to keep the nautical charts in the Depository Program. It is not certain that nautical charts produced by the CRADA partner are government publications. NOAA will continue to be legally responsible for the data in case of accident.

3. AC&C wants to initiate direct distribution to Depository Libraries. For several years, NOS has wanted to take over the distribution to Depository Libraries. This will allow receipt before the charts effective date. AC&C is also willing to distribute NIMA charts since they are already responsible for public sales.

4. Additional Items

The new chart catalogs will not come out until December 1998 because AC&C cannot put the Department of Transportation logo on anything until Congress approves. A new product is a Nautical Chart User's Guide, which will be in this summer's GPO survey. Coast Pilots will be upgraded with color graphics. Paper aeronautical charts will continue for the foreseeable future. NIMA has stated that it will need paper charts through the year 2007.

Library of Congress, Geography and Map Division (LC G&M)

Ralph Ehrenberg

The G & M Division acquired about 100,000 items last year, of which about 87,000 have been added to the collections. Many duplicates will need to be given away through the Summer Program, although there are only two participants this year. Last year's acquisitions included many topographic maps from captured documents, espe-

cially 1930's era topographic maps of primarily Eastern Europe and Asia. The Division has acquired many 1:200,000 Soviet topos covering Asia, Africa, and Soviet satellites, and has ordered 1:100,000 coverage of China. These are used heavily in the reading room, and ironically aren't restricted like many of the large-scale AMS/DMA series.

The division also received a donation of drawings of mid-nineteenth century Pacific Railroad Surveys done by Gustavus Sohan from a descendant of Mr. Sohan.

Another project underway is to remove maps from copies of the American State Papers and the Serial Set, with plans to scan them in the future. The Geography & Map Division has already removed some 17,000 sheets from the Serial Set and placed them in flat files.

Veterans Associations have been contacted as part of a solicitation program to acquire donations of World War II maps held by ex-military personnel. The Geography and Map Division has a collection of about 4500 CD ROM's and is working to increase it.

In the area of processing and cataloging, the Cataloging Unit is now fully staffed with 15 catalogers. Digital cartographic data is now being catalogued using USMARC. NIMA is converting its cataloguing to MARC, and LC is working with them to help in sharing cataloguing duties. Betsy Mangan is revising the Cartographic Materials Manual used for interpretation of the Anglo-American Cataloguing Rules II (AACR2). The main changes are in the area of digital cartographic data. The AACR2 Committee will be meeting at LC in September.

The Division is using "adequate level" cataloguing to process the backlog in the "single-sheet" or "title" collection, focusing currently on U.S. maps. The Heezen-Tharp collection of about 10,000 maps relating to plate tectonics is being

processed with contract help. Maps removed from books and journals during the brittle book program are being transferred to the Division, about 6,000 maps so far. Many of these are late nineteenth and early twentieth century thematic (e.g. geologic) maps. They are relatively unique items, not normally found in Map Collections.

Reference services were fully staffed again. There may have been a slight decline in walk-in use, but email questions have increased. GIS facilities, created within the last few years reside in the Reading Room. The facilities were funded by corporate donations and provide access to Freehand, Magellan, and Arc View. A reference technician has the duty to create maps for Congress and the Congressional Research Services (CRS). Contractors are assisting in setting up Arc View.

The National Digital Library Program has the goal of making five million items available on the Internet. It went online last June 9 with 26 maps and during the first week received 70,000 hits. The site has averaged 30,000 hits a month since. This compares with 2,000 readers per year and 10,000 phone and written requests for information. There are nearly 1000 Panoramic Maps on the site. Five full-time staff are focusing on scanning map projects relating to Americana and genealogy. Scanned maps are saved in three basic formats: huge TIFF files for archival purposes; much smaller GIF files for display on the screen; and compressed files utilizing MrSID, (Multi-resolution Seamless Image Database). MrSID reduces the large TIFF files down to about 5-7 Mb. This June, Lizard Tech will be giving away the MrSID viewer allowing users to download compressed images to their computer and view them, recreate the original TIFF files, or print them. (The Panoramic Maps are part of the public domain).

The American Memory Project is

targeting K-12 and future G&M scanning projects will include the City Ward Maps, National Park Service Maps and County Land Ownership Maps.

A recent CRADA (Cooperative Research and Development Agreement) with the E.D.R. Sanborn Company will allow them to scan the several hundred thousand sheets of Sanborn Fire Insurance maps in the Division's collections, along with the 250,000 in the company's collections, and put these on the Internet over the next 10 years. Users will be able to print a screen view or order a full copy from Sanborn. LC will archive the database after scanning is completed. The first images will go online this summer. They have scanned about 1,900 so far.

Two support groups actively helping the Division are the Philip Lee Philips Society, now publishing a newsletter and an Occasional Paper series, and the Center for Geographic Information, whose corporate members provide hardware, software, and technical assistance support to the Division. This technical support has included a workflow analysis that will allow the increase in scanning from 7 to 24 maps per day.

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