cartographic perspectives

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North American Cartographic Information Society

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in this issue

cartographic perspectives on the news

THE INTERNATIONAL TASK FORCE ON WOMEN IN CARTOGRAPHY

The Secretariat of The International Task Force on Women in Cartography, established in Ottawa, Canada early in 1989, is now embarking on its survey, report and recommendations on the status of women in cartography. The survey will examine societal trends in equality of the sexes, measure the status of women in cartography, provide an overview of the involvement of women in the ICA, determine what kinds of barriers have contributed to the disproportionately low participation of women in the ICA and in cartographic activities internationally, propose strategies for change, and make a variety of recommendations.

Created by ICA President D.R.G. Taylor, the Task Force is co-chaired by Dr. Eva Siekierska of the Canada Centre for Mapping, Energy, Mines and Resources, Canada, and by Ms. Edel Lundemo, Head of the Norwegian Exhibition, Norwegian Mapping Authority.

The Task Force itself is international, with members from ten

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countries: Australia, Canada, Finland, Hungary, Mexico, Norway, the People's Republic of China, Sweden, the United Kingdom and the United States. A series of formal and informal meetings held at the Budapest conference in August drew participation from many female cartographers as well as interest from a number of male delegates. Six of the ten Task Force members were present in Budapest, and with written or oral submissions from those not present, approaches to the survey and final report were thoroughly discussed. The Task Force is hopeful that a second meeting can be held before the survey recommendations are published.

Although the work of the Task Force on Women in Cartography focuses on cartographers, members have received much interest in the project from colleagues and scholars in the related fields of remote sensing, geodesy and surveying. The identification of professional, educational, personal and societal barriers to women's participation in the ICA and in the profession generally has implications far beyond the boundaries of cartography. Task Force members believe their final report will be of interest to all involved in the study of women in non-traditional occupations.

The Ottawa Secretariat, currently composed of three members, is designing the survey. It will be distributed to about 2,000 women in more than 60 countries and the results and recommendations made available before the next ICA international conference in September/October 1991. The Task Force Secretariat has to date received support and partial funding from the Geographical Services Division of the Canada Centre for Mapping, and additional support is being sought from Canadian industry and academia.

All women cartographers interested in participating in the survey should contact: Dr. Eva Siekierska, Chair, International Task Force on Women in Cartography, Surveys, Mapping and Remote Sensing, Canada Centre for Mapping, 615 Booth St., Ottawa, Ontario, Canada K1A OE9, (613) 992-4470.
Eva Siekierska, Co-Chair, ICA Newsletter 15, May 1990

INVITATION FOR COMMENTS ON DATA ACCESS AND CONFIDENTIALITY

Many users of Federal statistics are aware of the balance that must be struck between protecting the confidentiality of information provided by persons and businesses for statistical purposes and the need to make publicly-collected data widely available for legitimate research and statistical uses.

In search of new ways to deal with this issue, the Committee on National Statistics and the Social Science Research Council, with support from several Federal agencies, have convened a Panel on Confidentiality and Data Access. As part of its two-year study, the Panel, which had its first meeting in December of last year, will be compiling relevant information from both producers and users of Federal statistics.

The scope of this panel study includes publicly-supported statistical data collection activities on individuals and establishments, such as censuses, surveys, administrative record data (when used for statistical purposes), and epidemiological studies. Data from clinical trials, while very important, will not be considered in this study. There are some special issues associated with clinical trial data that would require a separate study focusing on the bioethical aspects of confidentiality and data access.

Readers are invited to submit short statements on any or all of the following subjects:

Access Problems. Specific examples of instances where Federal agency confidentiality laws or policies have made it impossible for you or your colleagues to obtain data needed in your work or caused excessive delays in arranging for access to the data. Please indicate the sources and specific kinds of data desired and the purposes for which the data were needed.

Suggestions for improving access. Have you had any experience in obtaining access to data not disclosed for general public use? How was this arranged? Do you have suggestions for improving data access with appropriate safeguards to maintain confidenti-

(continued on page 34)

featured article

Ethical Problems in Cartography

a roundtable commentary

The problem of defining and actualizing standards of ethical conduct troubles many professions, including cartography. In an attempt to formalize the ethical discourse in cartography the editors of *Cartographic Perspectives* invited five contributors to discuss what they perceive as important ethical problems in the discipline. The contributors were selected from the three major sectors of the cartographic enterprise: commercial mapping organizations, government mapping agencies, and university geography departments offering cartography programs. The contributors identify personal and institutional vigilance in product quality assurance, map plagiarism through violation of copyright law, and conflicts of interest as important ethical issues.

The commentary concludes by questioning the nature and validity of cartography's claim to truth ("accuracy"), and asserts that cartographic ethics cannot be extricated from the values of the larger society which commissions the production of cartographic information.

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Two anonymous employees of a federal mapping agency[†]

Cartography, as a discipline, has begun to pay an increasing amount of attention to ethical issues. Panel discussions devoted to ethics held at the annual meetings of the Association of American Geographers (AAG) and the North American Cartographic Information Society (NACIS) attest to this trend. Published discussions of ethical issues arising as a result of the adoption of GIS and computer assisted cartography include Dangermond and Smith (1988), Visvalingam (1989) and Dutton (1978). These examples point to an emerging discourse on ethics in cartography. We hope that this paper will further the discourse by providing a diverse collection of perspectives on ethical problems in the field and a tentative synthesis of their implications. As a working definition for the purposes of this discussion, we define ethics as "principles of conduct guiding the practices of an individual or professional group."

Cartographers may be required to interact professionally in a number of institutional/organizational milieus. The body of this article is comprised of three sections dealing with ethical problems within the commercial, government, and academic sectors of cartography. Our purpose will be to discuss a range of ethical problems which may develop from the normal practice of cartographers/information specialists in these three domains. A discussion of ethical problems in commercial cartography is contributed by Dobson. Two anonymous cartographers employed by a federal mapping agency address ethical problems in government cartography. Andrews considers ethical problems in academic cartography. Contributing authors were invited to present specific or hypothetical examples to illustrate the conditions which may lead to ethical dilemmas and to suggest strategies for their resolution. Impending ethical problems which may arise as a result of technological or broader societal changes are also discussed. The commentary concludes with McHaffie's summary and synthesis of the fundamental ethical problems faced by cartographers in these three sectors.

[†]These contributors were required by the terms of their employment contracts to seek the permission of agency superiors before publishing this paper. Permission was not granted (i.e., the paper was censored in its entirety). The authors have therefore consented to publishing their contribution anonymously. Their statements, therefore, should not be construed as representing the opinions of a major federal mapping agency, but rather those of two concerned private citizens.

Ethical Problems in Commercial Cartography

Michael Dobson

Although there are various definitions of ethics (indeed, one is provided by my colleague who wrote the introduction to this article) I feel most comfortable by assuming that an ethical cartographer is one whose products reflect the fact that the cartographer's activities during the map making process conformed to the standards of conduct of our profession. While that may sound very thoughtful, I am forced to admit that my undergraduate, graduate, and professional training in cartography did not include issues such as ethics. Further, I would be hard pressed to produce any document that clearly or unambiguously defines the standards of conduct of our profession, or perhaps, one that I could agree with on such definition.

In fact, I prefer to think of "ethical problems" as a working example of **scruples** and would be very comfortable if all cartographers were scrupulous sorts who paid careful attention to details and attempted to make products that were precise, accurate, and exact. I spent much of my teaching career attempting to convey to introductory cartography students the fact that maps are "generalizations" and that the appropriate cartographic processes do not necessarily produce results that are "right" as much as they help eliminate those that result in products that are "not quite right." In addition, it is my opinion that most of the substandard cartographic products are the result of individuals who have not been properly trained and not the work of individuals who are consciously trying to mislead their audience. It is in this sense that I couch my thoughts on ethical issues in commercial cartography.

I prefer to think of "ethical problems" as a working example of scruples and would be very comfortable if all cartographers were scrupulous sorts who paid careful attention to details and attempted to make products that were precise, accurate, and exact.

Commercial cartography is an interesting term. The range of commercial operations includes both the one-man or -woman shop and operations consisting of several hundred cartographers and the accompanying layers of cartographic management, not to mention marketing and sales staffs of several hundred individuals. As a consequence product development issues and the related issue of scrupulous behavior may range from an individual decision in the former case to team decision making in the latter case. The very nature of complex business structures (i.e. the division of responsibilities for certain functions) mandates that the product development process can be guided by the scruples of the corporate culture. Such structures cannot guarantee, however, that someone in one area of product responsibility will not make a decision that makes earlier decisions about product content less than appropriate. To be blunt, substandard products produced by large corporations are most frequently the result of inadequate communication on the part of marketing and sales personnel who are, in the main, unfamiliar with the cartographic process or the intricacies of cartographic production. Conversely, substandard products produced by "basement shops" most often reflect a lack of funds, rather than a real intent to mislead the customer. I suppose many may think that I have just painted a whitewash over commercial operations. There is, however, one indisputable fact about commercial operations: we exist to sell our maps to consumers. If we do a substandard job, they will respond by not buying our products and we will no longer be a viable commercial enterprise. Simply put, it is not in our best interests to be anything less than scrupulous in our cartographic activities, and we are extremely vigilant in the pursuit of ethical behavior.

It is true, however, that every corporation has its own unique culture, and I can only represent the culture that exists at Rand McNally. We spend a tremendous amount of money on quality control and quality assurance. Further, I spend considerable time with my team stressing excellence and working to improve those areas of our operations that are "not quite right." Perhaps more to the point, I have terminated the

employment of employees who do not aspire to the standards that we have set and thus have set a high penalty for those personnel who do not actively support our goal of excellence in product.

In my opinion, the single greatest ethical problem in our industry is one in which large commercial cartographers are victims rather than perpetrators: copyright infringement. You know, like the section of some atlas that you used as a base for one of your projects, or the road map that you xeroxed and handed out to direct people to your conference. Or perhaps maps that are used as the backgrounds in advertisements, or a recent recording artist that put a Rand McNally map on an album cover but did not request a licensing agreement. These examples pale in comparison to a number of cases where someone has simply photographed or color separated one of our maps, put their cover on it and then sold it as their product. If I could come back in another life, I would choose to come back as a copyright lawyer specializing in print products.

I suspect that the problem of copyright infringement will become one of the most significant issues related to the implementation of geographic information systems. After all, how many of you have not digitized a map copyrighted by a commercial publisher? Copyright law gives the copyright holder specific rights in respect to the product, and it is clearly the case that the copyright holder possesses the rights to derivative products and presentations (read that to mean "pick up a 'go to jail' card" if you digitize the original product). Similarly, suppose that you refer to a commercial source that is copyrighted in order to resolve an ambiguity found in a file. Copyright law precludes you from utilizing that sole source unless you seek and receive permission from that publisher (how often have you written for such permission?). Ah, but I am beating a dead horse since everybody (except commercial operations) digitizes copyrighted sources. Is it fair to conclude, then, that this common practice constitutes a principle of conduct guiding the profession and is thus one of cartography's ethical codes?

If I could come back in another life, I would choose to come back as a copyright lawyer specializing in print products.

Finally, I urge you and your colleagues to continue examining the ethics issue. It is an initiative of the greatest importance to our future success as a profession.

Ethical Problems in Government Cartography
Two anonymous employees of a federal mapping agency

The high volume of mapping and charting activity over the past thirty years, combined with the new technology, declining resources, and a volatile legal climate have indeed led to an ethical crisis in government mapping. It is sometimes difficult to do the "intellectually honest and correct" thing with the pressures being exerted on employees at local, state, and federal levels. Robinson (1984) stated the solution while describing the problem: "just as basic as the quality of the data is . . . the scholarly completeness and intellectual honesty of the cartographer."

The ultimate solution to ethical problems is the individual and his/her standards and values. No matter what the pressure is to produce products that are not conveying the "correct intellectual meaning" nor implying a greater impression of completeness, accuracy and reliability than is warranted, we as cartographers must resist and exert our own personal values and ethical conscience to ensure that products live up to industry and government standards.

The only way government or public cartographers will resolve the ethical crisis is, as individuals, to examine ourselves and:

§ Be sure of having our own ethical guidelines and standards in order
§ Be able to distinguish between ethical and legal actions (don't

assume the latter implies the former)
- § Continue to make ethical judgments and act in the public interest
- § Avoid being in any sort of conflict of interest situation
- § Continuously evaluate our own judgments using an ethical framework for decision making

If we want to serve the public well and not be at odds with our inner drives, our objective and subjective responsibilities must be closely aligned.

It is important that we have an understanding of the delicate balance between "objective" and "subjective" responsibility. Objective responsibility is an obligation to someone else or to an organization for a particular standard or category of performance (acting in the public interest); subjective responsibility derives from personal experiences, beliefs and values which lead us to act in accordance with our "inner drives" (conscience). If we want to serve the public well and not be at odds with our inner drives, our objective and subjective responsibilities must be closely aligned. Cooper (1938) defines the ethical process as the means by which these internal sources of responsibility are related to external demands. As cartographers in the public sector, we need to remember that we serve the public and should always act in the public interest (external demand) with a clear conscience (internal demand). This has become a dilemma for some, resulting in such serious problems as:

- § Continual product liability cases where the government is sued because it has the "deepest pocket" — not because it erred in product design or produced a defective product
- § Budget cutbacks in the face of mounting pressures to produce more, or to produce the status quo with fewer resources. This trend towards cutting corners and costs has reached the point where some cartographers may be tempted to turn out substandard products
- § Automation of activities that are not technically or economically feasible at this time with an attendant loss of funds and/or the failure to produce timely or acceptable charts or maps

Mention any of these in a gathering of public sector cartographers and a lively discussion of ethical issues will follow. Resolution or the best possible approach to minimizing the effects of such problems involves individual cartographers in each government agency acting in an ethically responsible manner and not yielding to the various "external pressures."

Where the question of product liability is concerned, we urge cartographers to ensure that solid standards are documented and put in place before a product is produced. If standards exist, and work performed and products produced meet tests for accuracy and authenticity, then litigants are not going to have an easy time of it. Go to court and exercise your rights — don't allow yourself to be browbeaten by the legal system! Remember that the decision to sue is not made on whether the plaintiff is "right" or "wrong" but on whether the "expected benefits of winning exceed the possible costs of losing" (Bradley 1983; McLauchlan 1977). This is a sad commentary but true. In short, fight if your design and product meet standards — don't compromise your values.

As stated, budget cutbacks are creating pressures to cut corners and costs on product lines. If these cuts can be taken through better methodology, technology, or less expensive materials without producing a substandard product, then we should take the cuts as good public servants. However, if the cuts do lead to substandard products with attendant liability and quality problems, then we should exercise our ethical responsibility. We have a duty to recommend restoration of funding to adequate levels or propose a halt to production. This takes intestinal fortitude but

allows us to exercise our prerogatives in serving the public interest.

Premature attempts to automate cartographic procedures before new technologies are adequately evolved is also a major problem in government circles. In many cases substantial financial losses have been incurred. In addition to the economic drain, some charts or maps that the public has funded the government to produce have been only partially delivered, delivered in substandard condition, or not delivered at all. We as public sector cartographers have a moral and ethical responsibility to stop these losses. How can we do this?

- § Perform brief but authoritative cost analyses and technical feasibility studies
- § Run benchmark studies or cases, if possible, to verify costs, timing and technical performance
- § Check vendor performance by talking to previous customers (even if their applications are slightly different)
- § If systems are to be procured and installed, run in parallel with current manual or automated system to ensure comparable results
- § If the new system is a partial or total failure, report it immediately to management. If they fail to take action, write to the Inspector General or your agency equivalent. How many times have we seen systems fail and more of the same equipment and software installed because no one intervened?

These are just a few of the many problems facing cartographers today in the public sector. The solution to these and other issues involves each and every one of us meeting his or her ethical responsibility in cartographic production.

Ethical Problems in Academic Cartography

Sona Karentz Andrews

Let me state from the onset that it is difficult to get a clear picture of how teachers of cartography define ethics; how they address ethical issues either through their lectures, exercise requirements, or grading; or even if they consider this topic to be an important or integral part of their role as an educator. Some ideas on cartographic ethics have been exchanged at professional meetings. This discourse has been diverse and at times controversial. Different points of view about ethics and what constitutes ethical conduct have arisen. This is partly because of the nature of how different individuals and groups view the role of cartographers and the role of maps,[1] and also because there are questions if cartography and cartographers really face any ethical issues.

Academic cartographers have been part of these discussions and they are beginning to form opinions, examine and debate old epistemologies and ideas, and view ethical conduct in new and critical ways. As cartography teachers we are confronted with all aspects of ethical questions regarding maps. The concepts put forth in this section are an attempt to formalize some ideas on the ethics of teaching cartography in order to begin an active debate on if and how we as educators should address these issues in the classroom. I will cite what I believe to be a few problems we are confronted with in teaching cartography and training future map makers and users. Along with these opinions I offer some examples of how we might make students aware of ethical issues and concerns surrounding maps. I have purposely avoided discussion of the ethics of mapping practices as they relate to metrical standards and accuracy, although I think these topics are important.

If we take the definition of ethics offered at the beginning of this article

(the principles of conduct guiding the practices of an individual or professional group) we can see that our cartography journals and textbooks are full of map making suggestions, guidelines, and conventions. There are guidelines based on empirical (and sometimes not so empirical) research for just about every element contained on a map; from symbolization, to lettering size, design hierarchies, and so on. These are usually presented via a set of decisions the cartographer makes about a particular map element and its relation to prior and subsequent decisions about other elements.

The majority of information we impart to students through these examples has little to do with ethics. Recommendations on what line widths or what lettering sizes are harmonious or discriminate from one another are perceptual and aesthetic issues, not ethical ones. Suggestions on title placement is a design issue, not an ethical one. Conventions on coloring a forested area green, or a water body blue are iconicity issues, not ethical ones. I do not want to even remotely imply that this type of information is not useful to the cartographer. It is. It is most reassuring to the novice cartography student who is faced with a multitude of decisions that seem overwhelming at the start. But our cartography textbooks provide very little information on ethical conduct. These books do address map accuracy, data, and data source reliability, topics which by definition to some constitute one aspect of ethical conduct; however, I think the approach taken even on these topics is misleading to students.

In many cases students are given the false impression that cartography is a science, based on objective principles and criterion.

In many cases students are given the false impression that cartography is a science, based on objective principles and criterion. The cartographer's role is schematicized as one of transmitting knowledge and facts; of taking realms and realities and generalizing them; and of forming a message. For example, Dent refers to maps as "a vehicle for the transmission of knowledge" (Dent 1990, 5), Robinson, Sale, Morrison, and Muehrcke as "a storage medium for spatially ordered information" *(Robinson, et al 1984, 12)*, and Campbell as "a retrieval system for spatial information" (Campbell 1984, 2). It is important to note that these phrases have been taken somewhat out of context. All of these authors acknowledge the complexity of the mapping process and define maps in much broader terms than quoted here. They also discuss the personal influence the cartographer has on the map, but I fear that what is synthesized out of this by many students (and some teachers of cartography) are sets of structured mapping principles that lead them to believe that maps are mirrors of reality, and the cartographer's role is to accurately depict this information through a set of objective decisions and processes.

This is where I think cartography instructors have a huge responsibility to tell and show students that maps are very subjective forms of expression. The cartographer is not performing a set of routine operations that always result in a true and accurate picture of the world. We need to let students know that there is not one solution or one way to say something. They need to know that maps can, do, and should reflect biases.

One technique that can be used to do this is to give students an exercise where each of them is required to create a wide variety of maps with different meanings and messages from the same set of data. The instructions for the exercise are short paragraph descriptions of one or two cartographic principles or conventions dealing with symbology, generalization, or categorization for each map in the exercise. One map, for example, conveys general patterns and contrasts by having students categorize data into three area-shaded classes. Seven area-shaded classes are used on the subsequent map. Another map uses evenly distributed point symbols. Another map has the shading scheme inversely related to

the values in the data set. In all, have them make about twenty or so different simple colored pencil or computer generated maps using a variety of graphic, linguistic, and iconic symbols. When they are done with the exercise they will have firsthand experience that demonstrates how appearances and meaning are structured by the cartographer and how resulting map images all represent something about the data, but from different viewpoints, different levels of detail, and different emphases. Having done this exercise, some students still ask "Which viewpoint is right? Which one is the best one? Which one is the most accurate one?" It is important to convey to students that the answers to these could be "all of them, some of them, none of them."

That what they need to do for each mapping situation and problem is to think about what they are going to say and how they plan to say it. Although it is risky to make map and text analogies too superfluously in the classroom, it is sometimes useful to remind them that the map maker is like the story teller, and the way the information is structured and told is their responsibility.

As cartography teachers we should try not to have such rigid restrictions on mapping exercises. These only help mislead students further into thinking there is only one way to depict a particular set of data, only one color scheme to use, only one scale to map it at. They need to learn to be independent thinkers, guided by their own ethical standards. The kinds of questions we should teach them to ask are "what are the consequences of what I have mapped? How do the decisions I make influence the decisions made by others? What is my role in shaping the image?" By asking these questions students learn that maps are very powerful tools and have tremendous influence on how people make decisions and form impressions of things.

Cartography instructors should also take the responsibility of teaching their students about the ethical issues involving map copyright.

Cartography instructors should also take the responsibility of teaching their students about the ethical issues involving map copyright. This information should be presented clearly to students in order for them to realize the importance of this issue, the ramifications of copyright violations, and the unethical practice of map plagiarism. It is useful to draw analogies to the plagiarism of written information, but even these examples need clarification since some students do not fully realize what constitutes plagiarism of written material, let alone maps. Students need to be told that copying a map (or part of it) is illegal. This pertains not only to making a reproduction of a map, but also to copying stylized features and design. In many cases one only need write to the copyright holder to obtain permission to copy all or part of a map. The exception to this are maps produced by the United States government and some state agencies. These maps are considered in the Public Domain and are not copyrighted. The copyright exception also generally covers outline maps (unless highly stylized), but students need to be careful here because the limitations in this area are vague at best.

Students should know that lawsuits have been filed and map copyright violators have been fined for their inappropriate copying of another's work or product. Cartography instructors can provide their students with a brochure prepared by the International Map Dealer's Association on copyright information.[2] The brochure answers many questions that students have, while also stressing the importance of this ethical issue in cartography.

Technology has introduced new dimensions to ethical issues in the area of map copyrights. We can now quickly and inexpensively scan a map image onto our computer screens and into our map files and use it to generate other maps. How the copyright laws will deal with this form of

plagiarism will greatly affect some of the ways this technology is applied to desktop mapping, and it will be important for us to keep our students abreast of these developments.

Technology has fostered other ethical concerns in cartography in the areas of automated cartography and GIS. The introduction of the article refers to some of the literature in this area (Dangermond and Smith 1988, for example). Articles like these provide an excellent forum for classroom discussion and debate on how data is collected, categorized, inventoried, displayed and used in an automated environment.

We should make students aware of all these ethical issues; however, the cartographic ethic our students develop once they are responsible for making and using mapped information is very much out of our control. The standards they adopt and/or accept are set individually; by groups, agencies, and governments; and cultures and societies. What we should teach them is that maps are powerful ways of communicating information.

Synthesis and Summary
Patrick McHaffie

Being the last to comment in a discussion of this type is quite a luxury. I hope I can avoid being accused of favoring one position over the other; however, given the subjective nature of ethical positions and indeed knowledge in general, any pretense at impartiality will more than likely be obvious.

These commentaries are a striking illustration of at least three characteristics of ethical discourse in cartography. First, they illustrate well the very different concerns of cartographers/cartographic information specialists in the three major sectors of commercial, government, and academic cartography. The commercial sector of Dobson, first and foremost, is concerned with the quality of the product, however quality may be defined by "market pressures." Government cartographers are concerned with product quality as well, but the perspective of our anonymous government cartographers is one which allows more freedom for the cartographer to act in response to "external pressures" without the strict requirement of corporate loyalty to product standards (not to mention the employment contract). Academic cartography, as characterized by Andrews, is essentially concerned with balancing a sound foundation for students in the techniques peculiar to cartography with a respect for the subjective nature of maps as information and the claims to truth which can be made from them.

Second, the discussion illustrates the personal, individual nature of ethical questions, even within the three major sectors. I doubt that any cartographer/cartographic information specialist could wholeheartedly endorse any of these positions without reservation. Each, in its own way, reflects the subjective predilections of the author(s) derived from their experience within a particular professional environment. But, rather than invalidate the respective arguments, these viewpoints make this discussion all the richer, and at the same time reveal much about the nature of ethical discourse. I believe we must at once hold firmly to the principles which we revere, whether derived from experience or our particular professional situation, and admit that there may be others which are equally as valid given the wide range of personal/professional circumstances encountered by individuals within the three major sectors.

Third, there are obviously common themes running through this group commentary. The nature and validity of cartography's claim to truth is the overriding concern which is always present in each of these commentaries. This concern is expressed by Dobson most obviously in his use of

quotations around phrases like "right" and "not quite right." This perhaps reflects an apprehension and a certain amount of reticence about the use of such subjective terms in referring to cartographic products. His later discussion of copyright law and its abuse in cartography (apparently only within the government and academic sectors) raises related questions regarding plagiarism, honesty, and ownership. These are addressed later by Andrews in a call for increased instruction for cartography students on copyright restrictions.

The anonymous contributors feel it is the responsibility of the individual to ensure that maps reflect a "correct" intellectual meaning. The meaning of "correct" in this instance is assumed to reflect some preestablished public or private standard of accuracy, precision, or fidelity. The "rightness" of a particular piece of information suggests a broader, more value-laden conception reflecting the "justness" or "fairness" of the map. However, as Andrews states, a concern with correctness or rightness only reflects one aspect of the ethical debate, one addressed mainly in technical/scientific discourse rather than personal/professional ethical debate. Obviously, the gap between what is "correct" and what is "right" can sometimes lead to unavoidable conflicts of interest, conflicts whose resolution apparently lies somewhere between an individual's "subjective" and "objective" responsibilities.

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Each contributor placed a high priority on the role of new technology, GIS and computer-assisted cartography, in defining new ethical agendas for cartographers/information specialists. The individual emphases were different, however. Both Dobson and Andrews feel that GIS will be the new terrain where questions of map copyright will be contested. The concern of the anonymous contributors, however, centered on the appropriate or inappropriate application of these technologies in relation to public cost. Interestingly, none of the contributors addressed the interface between GIS and remote sensing and the unresolved questions of surveillance and privacy which arise therefrom.

A recent PBS radio program heralded an increased interest in ethical issues in both the public and private sectors. Does this increased interest in ethics signal a more ethical society? No, actually most ethicists agree that society is no more ethical than it was in the past (as if anyone could measure something as nebulous as societal ethics). Instead the individual is faced now with complex and difficult choices in all areas including professional life. Recent widespread concern over ethical issues reflects the realization of the enigmatic character of many of these choices which we are forced to make. Perhaps, then, the reason we as cartographers and cartographic information specialists are paying more attention to ethical issues is a reflection of a larger trend, something outside the bounds of government, academic, and private sector cartography. In fact, if we consider the nature of what we do and its embeddedness within the larger society, it is difficult to imagine how cartographers can create ethical standards which do not in some way refer to values created outside the discipline. For example, government cartographers create maps — cartographic information — as a part of a larger state apparatus. This information is produced as a response to the needs of the state, needs defined through some sort of rationalized decision-making process. So the rationale for the production of the product is imposed upon the government cartographer/information specialist from outside the discipline. A similar example could be drawn for the private sector cartographer who is not involved as either an owner or manager. Academic cartographers may feel compelled to structure their curricula in response to the perceived needs of students preparing to enter a competitive

employment market in which the largest number of opportunities has historically been provided, directly and indirectly, by the defense industry. All this is only to illustrate the difficulty of separating the activity we pursue from the larger society around us.

Cartographers have worked to produce more precise and accurate maps and map accuracy standards reflect the concern which we have paid to questions of our product's fidelity. True ethical questions are much broader than mere questions of accuracy and precision. Accuracy standards, when considered generally, are indistinguishable from other claims to truth made by similar disciplines involved in the production of information such as surveyors, engineers, and photogrammetrists. In other words cartographers, as a discipline, cannot produce ethical standards which do not in some way reflect the general standards of conduct of the larger society. So it is important to remember that any true consideration of cartographic ethics must be made with the understanding that we are after all an important but small subset of a larger community with common individual and shared responsibilities. ℗

NOTES

1. *Robinson, et al. (1984, #11)* discuss some of these conflicts in writing about the complexity of cartography. Their "five focuses of attention" — the *geometric* (emphasizing metrical accuracy of cartography), the *technologic* (emphasizing technical innovation in map preparation), the *artistic* (emphasizing creative expression), the *presentation* (emphasizing map design), and the *communication* (emphasizing the map's ability to provide meaning) — might be a useful framework for future ethics discussions.

2. A copy of this publication can be obtained by writing or calling the International Map Dealer's Association, P.O. Box 1789, Kankakee, IL 60901, phone (815) 939-3509. Additional copies can be purchased at a nominal fee.

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El problema de determinar y formular una medida de conducto ético causa dificultad en muchas profesiónes, incluyendo la profesión cartográfica. Para procurar y formalisar un discurso ético en la profesión cartográfica, los redactores de Cartographic Perspectives invitaron a cinco contribuidores a que examinaran sus percepciónes de los problemas éticos en esta doctrina. Los contribuidores fueron selecciónado de los tres mayores sectores de la empresa cartográfica: organizaciónes cartográficas comerciantes, agencias cartográficas del gobierno nacional, y universidades con departamentos de geografía que ofrecen cursos de cartografía. Los contribuidores indentificaron la vigilancia que ellos y sus instituciónes siguierón en asegurar la calidad del producto cartografíco, el plagio cartografíco a través de la violación de la propiedad de una obra cartográfica, y el conflicto de intereses como temas éticos importantes.

El comentario concluye por cuestionar la inclinación y validez de la pretensión cartográfica a la exactitud, y afirma que los éticos cartograficós no pueden estar desconectados del significado exacto de nuestra sociedad que comisióna la producción de la información cartográfica.

Los Problema Éticos en la Cartografíca

Comentario

Extracto
Translation by Juan José Valdés
National Geographic Society

cartographic techniques

DESCRIPTION OF AN ENHANCED DIGITAL LINE GRAPH DESIGN AVAILABLE

In response to increasing information demands on its digital cartographic data, the U.S. Geological Survey has designed a new version of the Digital Line Graph, termed Digital Line Graph-Enhanced (DLG-E). Building upon the topological data structure of the current Digital Line Graph product, the DLG-E data model adds layers of feature objects which represent real world geographic and cartographic entities. Examples of these entities, such as the name of a stream, the number of lanes of a road, or the operational status of a building, are assigned to these feature objects. Relationships may be established between these feature objects. This data model will permit a more complete description of geographic and cartographic entities.

In addition to the data model, a new domain of features represented on Geological Survey map products was established. To establish these features, an approach using a set of classes, or views, of spatial entities was adopted. These views include those of entities portrayed on Geological Survey map products: cover, division, ecosystem, geoposition, and morphology. Using the five views, over 200 features were identified and defined. This system is expandable to include additional views of spatial features.

The data model, domain of features, and related background information are described in U.S. Geological Survey Circular 1048, "An Enhanced Digital Line Graph Design." The publication is free on written request from: USGS Books and Open File Reports Sales, Box 25425, Denver, CO 80225.

Stephen Guptill, FDC Newsletter, Summer 1990

CENSUS MAPPING CD-ROM PROJECT

The Census Mapping CD-ROM project is a cooperative effort of the Department of Geography, California State University, Northridge, and the Inter-University Consortium for Political and Social Research, Ann Arbor, MI. A principal goal of the project is to simplify the mapping of both recent and historical U.S. census data. The project has produced a CD-ROM disk containing over 500 Mb of data in a mix of ASCII and dBASE formats, readable with Macintosh microcomputers equipped with CD-ROM drives. Included are locational data for all counties in the United States since 1790, all cities and smaller urban places in the United States with at least 2,500 inhabitants in 1980, all named places in California, and all census geography contained in the Master Area Reference File (MARF) 2 of the 1980 census. Also included are datasets from the federal economic censuses of 1977, 1982, and 1987, the County City Data Book 1988, the federal agriculture censuses of 1977, 1982, and 1987, and the Public Use Microdata Sample (PUMS — .1% sample of all individuals and households) for the 1980 census. The CD-ROM disk may be acquired by sending a $90 check or money order (no cash or purchase orders, please) payable to "CSUN Trust" to the School of Social and Behavioral Sciences, 107 Sierra Hall North, California State University, Northridge, Northridge, CA 91330. For further information, contact: William Bowen (bitnet: rclp001a@calstate) or Eugene Turner (bitnet: rclp001@calstate).

CSG Newsletter and Gene Turner

SATELLITE MAPS

A global map of Earth based on multinational satellite imagery will be compiled as part of the 1992 International Space Year (ISY) Celebration honoring the 500th anniversary of Columbus' discovery of America. The $30 million project was approved during a meeting in Kyoto, Japan, of space officials representing all the major space agencies of the world. Austria proposed the idea, which was adopted by the Space Agency Forum on the ISY, the organization formed to coordinate cooperative ISY projects.

Aviation Week & Space Technology, July 9, 1990

SOFTWARE REFERENCE

R. R. Bowker (1990) *The Software Encyclopedia*. Two volumes, $189.95. Included are 21,192 entries on available microcomputer software packages: 3,448 are new and 6,129 are updated. This is the most extensive and up-to-date listing available. It is organized through five indexes: titles, publishers/titles, guide to systems, guide to applications, and system compatibility/applications. Software can be found under thirty-eight major application headings, which are further divided into 612 specific areas (such as linear programming and networking) in the guide-to-applications index.

Geotimes, November 1990

NTIS CITATIONS

The National Technical Information Service (NTIS) is a self-supporting agency of the U.S. Department of Commerce. It provides access to the results of both U.S. and foreign government-sponsored R&D and engineering activities.

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reports for most of these results.

NTIS also manages the Federal Computer Products Center which provides access to software, data files, and databases produced by Federal agencies.

To order reports and computer products, call: (703) 487-4650.

Line simplifications and digital cartographic databases. H. Walker. Lawrence Livermore National Lab, CA, November 1989, pp. 227, UCRL-LR-103168. Portions of this document are illegible in microfiche products. Original copy available until stock is exhausted. National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161. DE90010194/WNR, price code: PC A11/MF A01.

This thesis examines one component of the cartographic generalization process, line simplification, and its implementation with computer technology. The effectiveness of line simplification techniques in producing useful maps from digital map data is studied. Many techniques have been proposed to simplify lines; several of these have been implemented here. The approaches have been compared on their ability to simplify lines from two cartographic databases over both modest and extreme changes in scale. The comparisons are based on the simplification of individual lines, on the production of complete maps, and on mathematical measures of performance. One promising technique is enhanced to overcome certain limitations which are apparent during extreme scale change. The effect of map projections on the performance of such techniques is considered. While much additional work is needed, this study indicates that line simplification techniques can extend the range of scales over which certain cartographic databases can be utilized. 124 refs.

Computer Program for Converting Rectangular Coordinates to Latitude-Longitude Coordinates. A. T. Rutledge. Geological Survey, Tallahassee, FL, Water Resources Division 1989, 21 pp. USGS/WRI-89-4070. Also available from Superintendent of Documents. PB90-231796/WNR; price code: PC A03/MF A01.

A Fortran-77 computer program was developed for converting the coordinates of any rectangular grid on a map to coordinates on a grid that is parallel to lines of equal latitude and longitude. Using the program in conjunction with ground-water flow models, the user can extract data and results from models with varying grid orientations and place these data into a grid structure that is oriented parallel to lines of equal latitude and longitude. All cells in the rectangular grid must have equal dimensions, and all cells in the latitude-longitude grid must measure 1 minute by 1 minute. The program is applicable if the map used shows lines of equal latitude as arcs and lines of equal longitude as straight lines and assumes that the Earth's surface can be approximated as a sphere.

Guidelines for Running GRASS Benchmarks. M. O. Johnson. Construction Engineering Research Lab (Army), Champaign, IL, February 1989, 11 pp. CERL-N-89/23. AD-A221 332/0/WNR; price code: PC A03/MF A01.

The Geographic Resources Analysis Support System (GRASS) is a geographic information and image processing system originally designed to serve land managers and environment planners at Army installations. GRASS is public domain software distributed by several public and private organizations. Consequently, there are many different hardware configurations running GRASS. This guide documents current procedures used to conduct system performance tests (benchmarks), to provide users considering the acquisition of the system a reliable means to compare the many systems that run GRASS. Relevant data that accompany benchmark results are: machine specifications; system environment; GRASS program environment; GRASS graphics environment; operation descriptions; data description; and benchmark execution notes.

cart lab bulletin board

This forum is offered to encourage communication among practitioners at a time of rapid technological transition. Questions, comments, and announcements are invited.

INTRODUCTION TO MACINTOSH GRAPHICS FILE FORMATS

David DiBiase
Deasy GeoGraphics , Penn State

Maps and other information graphics can be produced with microcomputers, but no one microcomputer-based software package is adequate for all cartographic production tasks. No matter whether Apple Macintosh or IBM-compatible PC hardware platforms are used, microcomputer cartographers often must pass a digital map file from one special-purpose software package to another. Successful file transfers result when both the exporting and importing packages support the same file format specification, or when a file exported by one program is reformatted to a specification compatible with the importing program. Familiarity with characteristics of various

digital file formats is therefore useful.

This note presents descriptions of several file formats common to graphics and page layout software for the Apple Macintosh. It concludes with observations about the status of PostScript, a page description language that facilitates graphics data transfer between software packages as well as control of high-resolution output devices. The descriptions are based on articles in trade journals, technical manuals, and discussions with Macintosh graphics users and developers, as well as on three years' personal experience creating graphics with Macintosh software. The discussion deals with just the few most common formats. Many programs offer their own proprietary options. Further, there is no absolute standardization of formats; users will encounter numerous variations between formats implemented by different applications.

Two types of formats

Graphics data formats for Macintosh graphics programs are of two types: *grid-based* (raster) and *object-based* (vector). Grid-based formats (such as MacPaint and TIFF) store image data as matrices of numerical values which correspond to black and white, gray scale or color pixels, depending on the range of values assigned to each grid cell. Object-based formats (PICT, PostScript and EPS) store lists of instructions by which line segments are plotted, but can also incorporate raster image data. Both types can store high-resolution, near-continuous tone gray scale and color image data.

GRID-BASED FORMATS

MacPaint

The MacPaint format was developed for the original Macintosh graphics program. It is based on a fixed point-system grid of 72 dots per inch (dpi). A single binary value is assigned to each grid cell, so that MacPaint files can only store monochrome imagery. Gray values are roughly approximated by dithered patterns; lines and typography are caricatured by jagged mosaics of black and white pixels. The MacPaint format is supported by most paint-type programs for the Macintosh, and can be generated by most desktop scanners. Its fixed, low resolution makes it inappropriate for professional graphics applications, except perhaps for the temporary storage of scanned drawing templates.

TIFF

The 'Tag Image File Format' was developed by Aldus Corp. specifically for storing gray scale image data captured with digital scanners and making it compatible with page layout programs like *PageMaker*. Unlike the fixed MacPaint format, TIFF allows for variation in file structure by including a directory of 'tag' headers that describe image data contained elsewhere in the file. The format imposes virtually no limits on grid resolution or the range of grays or colors that can be stored. Practical limits are imposed on the resolution of TIFF images by scanning hardware, graphics boards, and the amount of random access memory (RAM) installed in the computer. Near-photographic image quality can be preserved in the TIFF format, but at an enormous storage cost. For example, an 8.5" by 11" 8-bit gray scale image scanned at 600 dpi would require more than 33 Mb of memory — too much to be manipulated on a Macintosh, even after its virtual RAM ceiling is raised with the forthcoming introduction of Apple's System 7. Fortunately, images are often smaller than page size, and the TIFF format supports various data compression schemes implemented in widely distributed utility programs like *StuffIt*. TIFF files can be generated and manipulated in paint-type packages such as *Studio/8*, *PixelPaint* and *DeskPaint*, image retouching packages like *PhotoShop*, *ImageStudio* and *Digital Darkroom*, and packages that integrate bitmap and object editing tools, such as *Canvas*, *MacDraw II* and *SuperPaint*. A version of the format exists in the DOS world (TIF), and utility programs are available to translate the DOS form to the Mac (such as Hewlett Packard's *TIF to TIFF*). TIFF is particularly useful where shading effects are required; *ImageStudio*, for example, can be used to create high-resolution shaded relief. TIFF files are not well suited for iterative revisions of linework and typography, however, since these elements (like all others) are stored as grid patterns and cannot be addressed as discrete objects.

OBJECT-BASED FORMATS

PICT

Graphics data are stored as a list of 'QuickDraw' drawing instructions in PICT files. QuickDraw comes as part of every Macintosh's firmware, providing a set of procedures by which graphics and text are rendered on the Mac's monitor. PICT files contain drawing instructions for several types of two-dimensional objects, including vector drawings, raster images, and fonts. The resolution of an image described by a PICT file is limited only by application software and the display device. More problematic is the limited (1/72") precision of coordinate definitions in the PICT format, which can frustrate attempts to import detailed CAD drawings into PICT-based drawing programs. The earliest version of the PICT format supported only 1-bit monochrome images, but latest version (sometimes called "PICT2") supports up to 24-bit color.

Some version of the PICT format

is supported by virtually every graphics package for the Mac. PICT graphics can be easily passed among Macintosh-based mapping, statistical graphics and drawing programs via the clipboard, a portion of the Mac's main memory reserved for data transfer. The format supports "picture comments," statements which describe object groupings. Software packages that take full advantage of picture comments can generate PICT files in which objects can be "ungrouped" and graphically manipulated in other packages. This feature enables Mac users to cut and paste maps generated (for instance) in Strategic Mapping's *MapMaker* into an Aldus *FreeHand* document, preserving enumeration units as discrete objects whose graphic attributes can be modified. Not all packages take full advantage of picture comments, however. Graphics generated in some spreadsheets and statistical graphics programs cannot be ungrouped and customized in drawing packages.

Users who rely solely on Macintosh-based software find the PICT format satisfactory for many, but not all, applications. A few important Macintosh programs (Adobe's *Illustrator 3*, for example) do not support the PICT format. Those who need to integrate more than one computing system will find file format conversion utilities that translate PICT files (Kandu Software's *CAD Mover* [which runs on Macs] and Inset Systems' *HiJaak* [which runs on PCs], for example) very useful. Since PICT files are coded in machine language—which fewer people know how to edit than ASCII text—they are not easily transformed by the end user.

PostScript and EPS

Along with microcomputers and page layout software, laser printers constitute the technological base of the $1 billion "desktop publishing" industry. More than half of the laser printers on the market are PostScript-compatible (Anderson 1990). Laser printers (including laserwriters and imagesetters) interpret graphics and text files sent from software applications as PostScript programs in ASCII text form into bitmaps that are imaged with toner on plain paper or direct to photographic films and papers. PostScript is a high-level programming language developed by Adobe Systems Inc. specifically for describing the appearance of graphics and text on printed pages. Like PICT files, PostScript documents can describe two-dimensional vector or raster objects whose resolution is limited only by the display device. Unlike the PICT format, however, PostScript does not limit the precision of coordinate positions to 1/72". PostScript also exceeds the PICT format in supporting process color separations.

Adobe has documented and released to the public domain most of the specifications of the PostScript language, but guarded details of its PostScript interpreter technology, which it licenses to laser printer manufacturers. The company has also produced a proprietary library of more than 550 fonts coded as PostScript objects with 'hints' that guide the necessary non-linear scaling of letterform proportions at extreme sizes. PostScript has become the *de facto* standard imaging model for printed text and graphics in the publishing industry. Nearly every text- or graphics-generating software package for microcomputers offers driver software that generates PostScript. The most powerful illustration programs for thematic cartography and information graphic design on the Macintosh (such as *Illustrator* and *FreeHand)* are those based on PostScript, because these are most compatible with high-resolution PostScript laser printers.

PostScript is an extensible language that does not require driver developers to conform to a standardized program format. The lack of a standardized format explains why PostScript files written to disk from mapping and statistical graphics programs usually cannot be opened and graphically edited in illustration programs. Fortunately, since PostScript files are coded in ASCII text, they can be reformatted by end users without expertise in machine language programming. Utility programs that convert PostScript files to the Adobe Illustrator file format show promise for linking mapping and illustration programs so that cartographers can take advantage of the specialized capabilities of both (DiBiase, forthcoming).

The "Encapsulated PostScript Format" (EPS) consists of ordinary PostScript ASCII code with a corresponding 72 dpi PICT-format screen image imbedded. The format was developed to ease the integration of graphics with text in page layout programs like Aldus' *PageMaker*. When a user places an EPS-format graphic into a page layout document, a bitmapped screen representation is added to the page layout file along with a link to the original EPS file. When the document is directed to a printer, the page layout program's PostScript driver ignores the screen image and sends the PostScript drawing instructions from the EPS file to the output device. This redundancy of image information has serious storage implications, and reflects the unfortunate duality in screen and printer imaging models adopted by both Macintosh and DOS-based microcomputer systems. Workstations like the NeXT and Sun avoid this problem by employing PostScript both as a display and printing model, though the relatively slow response rate of display PostScript

causes some dissatisfaction.

A powerful feature of the EPS format is that it allows the user to resize an image without affecting the resolution on the printed page. Unlike an ordinary PostScript document, however, the elements of an EPS file cannot readily be manipulated in a drawing or painting package, since two sets of image data (using different image models) would have to be modified simultaneously.

Implications of the "font wars"

At the Seybold Computer Publishing Conference held in September, 1989, Microsoft President Bill Gates announced an agreement whereby Microsoft would develop a clone version of PostScript's interpreter technology in return for the right to use Apple's newly developed "TrueType" scalable outline font technology in its OS/2 Presentation Manager and Windows user interfaces. Most accounts in the trade press have since focused on Macintosh users' concern for the future compatibility of their expensive collections of Adobe type 1 fonts (hence "font wars"). A more important issue seems to be the adverse effect this deal is likely to have on the prospect of a standard imaging model for desktop publishing and information graphics.

Adobe Systems has reaped enormous profits from licensing fees for its PostScript interpreter technology and sales of its proprietary PostScript fonts. The desktop publishing industry's reliance on these products, coupled with Adobe's unyielding defense of its proprietary rights, led to the perception that the industry was contending with a PostScript "cartel." The Microsoft/Apple agreement (along with increasingly successful clone PostScript interpreters like Custom Application's *Freedom of Press)* has broken the cartel, threatening both of Adobe's principal revenue-generating products. Future versions of Apple's LaserWriter series will be equipped with Microsoft's PostScript-clone interpreter firmware. Imagesetter manufacturers will be forced to support both Adobe and Microsoft/Apple PostScript imaging models. Software developers will also be compelled to follow market trends. While these events do not bode well for the prospect of a standardized graphics file format, commentators have predicted that "PostScript can be expected to remain an industry standard." Instead of one unified format, "look for two font and page-description standards coexisting with printer manufacturers generally supporting both" (Anderson 1990).

Predictions of this sort seemed to have been fulfilled in agreements reached between Apple and Adobe at the 1990 Seybold conference. While terms of the agreement have not been officially disclosed, one report suggests that ". . . Apple will make it easy for Adobe fonts to be used with System 7 Macintosh operating software, and Adobe will make it easy for TrueType fonts to be used with its PostScript printer language" (Lewis 1990).

Because the products we create are diverse, microcomputer cartographers must contend with a variety of software packages and digital file formats. I hope the information assembled above proves useful to new users who inevitably will be confronted with this knotty problem. It would be nice to see a comparable note for IBM-compatible PC file formats in a subsequent *CP.* Φ

ACKNOWLEDGMENTS

The comments of Tony Canike (Accu-Weather), John Krygier (Penn State), Bill Peterson (Penn State) and three anonymous reviewers are appreciated.

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fugitive cartographic literature

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

Buchanan, Rex and Don Steeples (1990) On-demand map publication. *Geotimes*, April 1990, pp. 19-21.
Reviewed by Terry A. Slocum, University of Kansas

This article deals with the advantages of computer cartography within the production environment of the Kansas Geological Survey (KGS). Until about 10 years ago, KGS published only two or three large-format maps a year, at a cost of several thousand dollars per map product. With the development of the GIMMAP automated mapping system and associated hardware, KGS is now able to provide a much greater variety of maps on demand; for example, for a request of a cartographic base map (e.g. county boundaries and hydrology) of a portion of Kansas, a customer can be given a hardcopy color map at a cost of $10-15 within 4 hours.

The GIMMAP mapping system is an in-house product developed at KGS over the last 10 years. It permits one to overlay, update, and correct geographic databases for Kansas such as the public-land survey system, political boundaries, hydrography, transportation networks, earthquake epicenters, gravity data, magnetic data, oil and gas field boundaries, and locations of dry holes.

A key hardware component of the automated production environment is a 44-inch electrostatic plotter with a resolution of 400 dots per inch, and a display palette of 1,024 colors at one time. Such a plotter is very expensive to purchase ($60,000 when KGS purchased it) and maintain (in excess of $1,000 per month), but it is useful because of its capability to produce high-quality unique (one-of-a-kind) maps from the GIMMAP system on demand. Many of these maps would be far too expensive to create in a manual environment. (Those wishing to develop a similar production environment should realize that cheaper smaller-format plotters are available.)

In addition to providing unique cartographic products to customers and the KGS research staff in a cost effective and timely manner, the automated production system 1) saves space by not having to store numerous hardcopy versions of maps, and 2) saves money by only producing the hardcopy maps that are certain to be used. There are some problems, however, in implementing an on-demand production environment. One is the nature of archival. For each unique map produced, should one attempt to store a hardcopy version, a softcopy version, or both? Currently, KGS is considering optical disk storage because of its 1,000,000 Mb capacity. Other problems include 1) whether one-of-a-kind maps should be designated as published or unpublished, and 2) the establishment of a referencing system for maps. With regard to the latter, should each unique map receive a new reference number, or should only major revisions receive different reference numbers? Others who are involved in an on-demand map production environment may wish to contact KGS to find out how they are handling some of these problems.

cartographic artifacts

ATLAS REVIEW
Kerr, Donald and Deryck W. Holdsworth, Editors; Geoffrey J. Matthews, Cartographer/ Designer. ***Historical Atlas of Canada, Volume III: Addressing the Twentieth Century, 1891-1961.*** Toronto: University of Toronto Press, 1990. xxiv, 212 pages. ISBN 0-8020-3448-9 (v. 3) $95.00 cloth. C87-094228-x. The French edition is available from Les presses de l'Universite de Montreal.
Reviewed by William G. Loy, University of Oregon

Canada is rich in atlases. The National Atlases of 1906, 1915, 1957, 1974 and 1985 give synoptic views for those dates and now a three-volume set of historical atlases will provide a time-phased view of the nation. This atlas is another jewel in the crown of Canadian atlases.

As a book this atlas is large, but not huge, and reasonably priced at $95. It measures 37.7 cm in height (14.8 in.), 27.7 cm in width (10.9 in.), 3 cm in thickness (1.2 in.), and it weighs 2.3 kilos (5.1 lbs.). The atlas comes plastic-sealed in a sturdy box. The cover is a very substantial binder board covered in a top-quality black cloth stamped in gold on both the cover and the spine. There are no endpapers. The paper is matte and unusually heavy, approaching the weight of index card stock. The eye-catching dust jacket is dark with shining railroad rails reflecting a sky lit by the sun below the horizon. The reader is left to ponder the significance. Perhaps the sunrise of a nation, perhaps the sunset of an atlas project, perhaps. . .

The three-volume historical atlas project began in 1969. By 1979 financial backing from the Social Sciences and Humanities Research Council of Canada (SSHRCC) was

obtained and research began. In 1987, *Volume I: From the Beginning to 1800* appeared to critical acclaim; now in 1990 we have *Volume III*; in 1993/4 we expect *Volume II: The Nineteenth Century*. The overall project is monumental — involving hundreds of people, decades of time, and millions of dollars in effort. While the SSHRCC provided the basic funding, significant amounts were obtained from other sources, notably from the Bank of Montreal for this volume.

The acknowledgments page contains four long columns of names of people who worked on this atlas from 1979 to the present. Gold leaf on the spine singles out the primary persons — editors Donald Kerr and Deryck W. Holdsworth plus cartographer/designer Geoffrey J. Matthews. The first name listed in the acknowledgments is the director of the executive committee, William G. Dean. The last Acknowledgments section, "Translator for the French Edition," reminds us that bilingual Canada has produced a French language edition simultaneously to the English language version. Yet another monumental task!

The contents are organized into two parts. Part One, *The Great Transformation, 1891-1929*, depicts the change in Canada from a rural, mostly British or French society to a more urban and multi-cultural land. Part Two, *Crisis and Response, 1929-1961*, chronicles the Great Depression, the Second World War, and the post-war boom years. The stage is set before these major parts by a short overview section covering territorial evolution, economic growth, and the composition of the population from 1891 to 1961.

The basic organization of each section or part is an introductory essay of three to five pages telling the story and referencing the appropriate maps. This essay is followed by the full-color double-page plates; there are four plates in the overview, thirty-five plates in Part One, and twenty-seven plates in Part Two. Supporting the plates is an extensive Notes section from pages 163 to 197. The Notes include comments, bibliography, and suggested further readings.

The sixty-six plates are the cartographic heart of this endeavor. Chief cartographer Geoffrey J. Matthews of the University of Toronto is credited with seventeen previous atlases. His experience shows in the variety and excellence of the design of the plates. Each plate is a unique and complex assemblage of diverse graphics masterfully juxtaposed into a visual feast of informational graphics. Color choices are uniformly excellent. Open the volume to any plate — you will see maps of diverse scale and positioning deftly separated visually from one another by devices such as feathered edges. There are many numerical and graphical scale notations but, no references to map projections. Blocks of text relate to the graphics naturally without boxes. An endless variety of symbols abound — proportional divided circles, flow lines, bar charts, graphs of all sorts, drawings and innovative diagrams.
All are produced to technical perfection.

For sheer volume of information presented it is difficult to excel plate 47, Military Activity in the Second World War. On one double-page spread information is presented on mobilization, military fatalities, war graves, and military actions down to where and when which ship sunk which U-boat! Incredible!

Can any cartographic flaws be discerned? This reviewer feels that the plates suffer a little from being over-full, and too many map scales are employed. Any project involving so many people over such a long time is likely to include too much in every topic. A little more space between elements even at the expense of some data would be welcome. A few other criticisms, in order of the plates, will be offered. On plate 5, I find the use of multiple-colored dots confusing. Also, red dots on the upper map equal black, red and green dots on the lower map. On plate 12, the legend of Industrial Generating Capacity, the word 'hydraulic' seems misused. Either 'water' or 'hydro-electric' seems better. On plate 14 and elsewhere the photographs are printed too dark. On plate 21 the drainage does not fit the shaded relief plate, especially in the upper Peace River drainage. Finally, slight misregistry may be seen occasionally where the linework does not trap the colors. Inattention by the printer is assumed to be the cause. In sum, however, the flaws are slight.

Canada has a right to be proud of this atlas. Every library and as many citizens as possible should own a copy. It will answer many questions and afford many hours of enjoyable and enlightening perusing. We look forward to the final volume of the trilogy.

BOOK REVIEW/COMMENTARY
Rimbert, Sylvie (1990)
Carto-graphies, Hermes, 175 pp. 260F. ISBN 2-86601-233-X
reviewed by Peter Gould, Penn State University

The hyphen in the title of this book should warn us that this is not a text on cartography in any of the usual senses. Rather, it is a series of reflections, couched in both written text and graphic illustration, by a geo-cartographer who directs one of France's major centers of cartographic research. Her subject is what I would like to call the 'missing potentialities' of the graphic revolution brought

about by the personal computer. This theme comes as a bit of a surprise to someone living on the high plateau of geographic illiteracy on the west bank of the Atlantic River, because in many ways the French seem to be much better than we are at getting powerful graphic images into the intellectual bloodstream. It is no accident that the book appears in a series edited by the geographer Roger Brunet, with a strong supporting Preface by Abraham Moles, a psychologist who helped so many of us to think towards the power of the graphic image. But recent developments, though encouraging, are not good enough for Sylvie Rimbert, and I agree with her. It is going to take prolonged and patient effort to mend the intellectual rent of the 19th century that tore the spatial domain from thinking in the human realm.

The book is structured in five parts (an Introduction, three chapters, and a short Conclusion), raising the question of the graphic imagination, and how this might be enhanced by transformations, generalizations and simulations, each 'genre' pointing to still-unrealized potentialities of graphic presentation. Some of these have been with us (in a sense of being technically available) for some time, but simple availability does not mean that these imaginative approaches are actually used. In a very deep-seated sense, this 'paradox of reluctance' is embedded in the larger educational and political sphere. Educationally, we have failed to put into place those conditions of possibility that would allow a person to take for granted the power of visualization. And I am not referring simply to the common, but never ordinary, 'person-in-the-street,' but to highly specialized professionals in many of the sciences. Too many seem to have been thrown into a world with their spatial thinking lobotomized from the material and historical dimensions of human existence. Epidemiologists grind out numbers with their differential equations, never asking **where** the epidemic might be; people in medicine collect what are in essence spatio-temporal data cubes, but then sit on them because they cannot think of anything better to do. Somehow we have to enhance peoples knowledge of the potentiality of visualization, and help them to become more familiar with the ready-at-hand tools that help them to see. As human beings, we have the capacity to create written, graphic and algebraic 'texts,' and then impress them with meaning. Our schools emphasize the first and last, language and symbolization. What has happened to that third leg of the tripos, the graphic? The democratization of information depends upon it.

One of the things we can do is transform one space into another, often with startling and thought-provoking results. Which, presumably, is the whole point. We want people to say "Hm, I never thought about it in that way before!" Pixels arrayed in a list are useless: mapped (literally 'mapped,' in both a mathematical and geographical sense) onto a 3D →2D 'projection,' and SEASAT's 'surface of wind velocity' appears. Sheer numbers arrayed in their x,y coordinates are pointless: but smoothed, interpolated (you had better know **what** you are doing!), and displayed as a 3D perspective, and the valley of a meandering stream appears. Want to show the geographical research power of Paris? Transform France in proportion to the scientific resources given, and we see how the 'Sun King' still lives in Versailles, surrounded by his satellites, more than two hundred years after the Revolution — the **second** Revolution, please. Where are the young people? Transform France again, and see the splendid expanse of northern France's maternal bosom, and the withered womb of the south. Thought you could picture Switzerland? Which Switzerland? The one on the schoolroom wall? Or the one of the bloated Zürich spider, a center with its peripheries if there ever was one? An 'imbalance' north and south? How can people visualize trillions of dollars? But show them how a contracted Latin America fits 8-10 times into an expanded Anglo America, and people say "Hm. . . That's what GNP means!" Nor are we confined to static images. Tobler's flows and 'winds of influence' might be animated, and many processes of spatial transformations might be visualized in moving images, so people can see how we get from 'here' to 'there.'

What about generalizations? Starting with Borgès' delightful story (or was it true?) of the map as big as the country it represented, we are led through a careful discussion of 'information loss' that paradoxically allows us to see more. Well, not 'more,' but more clearly, at least the forest now that the trees have been cleared away a bit. It involves us, of course, in the matter of hierarchical organizations; what shall we clump together and aggregate to see the major outlines; what general trends illuminate the particular residuals?

What about simulations, presented either in static or animated form? Here Sylvie Rimbert points to a future, a future of research, and a future of potentialities to come. Her purpose is to encourage thinking in this direction, and her approach is deliberately touched with the pedagogic brush. She creates Yonabourg, a small, quite imaginary village, named after the architect Yona Friedman, who created Machinebourg in 1975, a town taken over by the technocrats because the people, the unwashed 'they,' were not compe-

tent to handle their own affairs. Yonabourg is transformed into simple structures, numerical tables, surfaces of accessibility, transversed for its gradients, constrained by one-way systems, called to the center by day, pushed to the periphery by night, gridded, weighed, measured, and otherwise massaged in something close to a prurient manner — is that *'attractivité nocturne'* **really** just the Maison de la Culture? Finally, the poor little village is subject to an invasion of mice during one especially warm winter favoring their reproduction, an invasion fought desperately by the inhabitants of Yonabourg with barriers of cats! Along the way, we learn a lot about planar graphs, potential models, spatial constraints, gravity calculations, least-cost paths, diffusion simulation, predator-prey models, Markov chains, and even what happens to a central place under fractal disintegration. In animated, perhaps interactive form, we could actually change a barrier (stay there Minou!), or a one-way street, and see what happens to the invisible landscapes of probability and accessibility overlying the town. If **this** does not open the eyes of readers to new ways of seeing and thinking, I do not know what will. Unless, of course, we could put ***Carto-graphies*** into the VCR and play it.

Hm?

LIST OF MAPPING VIDEOS

Mark MacLennan of the Department of Geography at SUNY-Buffalo has compiled a list of video tapes about GIS, LIS, map-making, surveying and visualization. The list of twenty-seven tapes provides information on the title, format, length, date, sources, and subject description. The list is published in the *Newsletter* (16:2) of the Canadian Cartographic Association.

GESTURES FOR JARGON

Hand Signs for Technical Terms Used in Thematic and Topographic Mapping evolved from needs of hearing impaired employees at the Rocky Mountain Mapping Center, USGS. Co-authors Richard Will and William E. Krohn recognized the need for more accurate communication than possible in standard sign language and developed a book to show workable signs for the mapping industry. Single copies are free from the USGS, Books and Open-File Section, Box 25425, Denver, CO 80225.

Geotimes, November 1990

Rockwell, Ken (1990) Privatization of U.S. Geological Survey Topographic Maps: A Survey. Government Publications Review, May/June 1990, pp. 199-211.

Abstract: Topographic mapping is a long-established government activity. Libraries have been receiving maps from the United States Geological Survey for over 90 years; recently this and other map depository arrangements with federal mapping agencies have been consolidated into the Government Printing Office's library depository program. This long relationship could be jeopardized by an Interior Department proposal to privatize the mapmaking activities of the U.S. Geological Survey. This proposal is consistent with the philosophy prevailing during the Reagan administration that government should not compete with the private sector in the provision of products and services, including the publication of government information. Just as the cutback in government publications has negatively affected depository libraries in general, so the transfer of topographic mapping to private concerns could lead to the end of the depository arrangement, higher prices, copyright restrictions on users, with spotty coverage of areas and uncertain revision of maps due to variable demand.

EOSAT PUBLISHES TM BAND COMBINATION POSTER

A new poster created by EOSAT describes in words and images the technical capabilities and practical applications of Landsat Thematic Mapper data. On one side, the TM poster features color images of Charleston, SC, to illustrate the differences in applications of various TM band combinations. The reverse side uses graphs and charts to describe some fundamental aspects of multispectral remote sensing and how the Thematic Mapper sensor acquires imagery. EOSAT is distributing the TM Band Combination Poster at no charge. Contact your regional sales representative or call EOSAT Customer Services at (301) 552-0537 or (800) 344-9933.

Landsat World Update 3:8 August 1990

new maps

WORLD. Earth by night. Salt Lake City: Hansen Planetarium, 1990. $7.50. Hansen Planetarium, 1098 South 200 West, Salt Lake City, UT 84101.

WORLD. Economy of the World. Chicago: George F. Cram Co., 1990. $270. For more information, call 800-227-4199.

WORLD. Ecoregions of the continents. Washington: U.S. Forest Service, 1989. Scale 1:30,000,000. Supplement to Environmental Conservation, vol. 16, no. 4, Winter 1989. For copies, write to Robert Bailey, U.S. Forest

Service, 2825 E. Mulberry St., Fort Collins, CO 80524.

NORTH AMERICA. Crude oil pipelines of the United States and Canada. Tulsa: PennWell, 1989. Scale 1:3,600,000. $105.

CANADA. Environment in peril map. Vanier, Ont.: Canadian Geographic, 1989. Supplement to the December 1989/January 1990 issue of Canadian Geographic. $8.50. Canadian Geographic Products, 39 McArthur Avenue, Vanier, Ont., Canada, K1L 8L7.

CANADA. Map of Canada's eastern continental shelf. Vanier, Ont.: Canadian Geographic, 1989. Supplement to the June/July 1989 issue.

UNITED STATES. Forest industries mill map. Gilroy, CA: Freeman Publications, 1990. $48.

UNITED STATES. United States satellite view. National Atlas sheet. Reston, VA.: U.S. Geological Survey, 1990. Scale 1:7,500,000. $3.10. Maps on both sides: the image of the conterminous U.S. and the reverse side highlights twenty-four major areas in the United States.

UNITED STATES. Average annual runoff in the United States, 1951-1980. Hydrologic Investigations Atlas HA-70. Reston, VA: U.S. Geological Survey, 1987, repr. 1989. Scale 1:7,500,000.

UNITED STATES — SOUTHWEST. Experimental digital shaded relief maps of southwestern United States. Miscellaneous Investigations Series, Map I-1850. Reston, VA: U.S. Geological Survey, 1990. Scale 1:2,000,000. 2 maps: sheet 1, digital shaded relief with color-coded elevations; sheet 2, digital shaded relief. Maps are available for the following states: Arizona I-1821, Wyoming I-1846, Utah I-1847, Nevada I-1849, and California I-1848.

MASSACHUSETTS. A physiographic map of Massachusetts. Chelsea, VT.: John F. Berthelsen, 1990. Scale 1:380,160. $15. John F. Berthelsen, HCR, Box 12 A, Chelsea, VT. 05038.

PENNSYLVANIA. SEPTA'S Philadelphia street and transit map. Philadelphia: Southeastern Pennsylvania Transportation Authority, 1990. $3.00. SEPTA, 200 West Wyoming Avenue, Philadelphia, PA 19140.

EUROPE. The European Community: a community with no internal frontiers, deadline 1992. Brussels: Office for Official Pubications of the European Communities, 1990. Scale 1:8,000,000.

EUROPE. North Sea map. Tulsa: PennWell, 1990. Scale 1:1,000,000. $99.95.

SOVIET UNION. Ethnicity and political boundaries in the Soviet Union. Washington: Office of the Geographer, 1989. Scale ca. 1:20,000,000. Supplement to Geographic Notes, no. 12, June 1990.

SOVIET UNION. Soviet pipeline map. London, Ont.: Department of Geography, University of Western Ontario, 1989. $27.00. Milford Green, Department of Geography, Social Science Center, University of Western Ontario, London, Ont., Canada N6A 5C2.

SOVIET UNION. Soviet Union. Washington: National Geographic Society, 1990. Scale 1:10,140,000.

MIDDLE EAST. Middle East area: oil and gas. Washington: U.S. Central Intelligence Agency, 1990. Scale 1:4,500,000. SuDoc No. PrEx 3.10/4:M84/17.

MIDDLE EAST. Middle East oil and gas. Tulsa: PennWell, 1989. Scale 1:4,500,000. $85.

ISRAEL. Geological photomap of Israel and adjacent areas. Jerusalem: Geological Survey of Israel, 1990. Scale 1:750,000. $20. Geological Survey of Israel, 30 Malkhel Israel St., Jerusalem 95501, Israel.

PACIFIC OCEAN. Natural hazards map of the Circum-Pacific region. Circum-Pacific Series, CP-35. Reston, VA.: U.S. Geological Survey, 1990. Scale 1:17,000,000.

PACIFIC OCEAN. Pacific island nations and their 200 mile exclusive economic zones. Honolulu: Department of Business and Economic Development, 1990. Free from the State of Hawaii, Department of Business and Economic Development, P.O. Box 2359, Honolulu, HI 96804.

new atlases

AA 3 mile map series. London: AA Publishing, 1990. Seven volumes; each £2.95. Series includes the following titles: Scotland and borders, northern Scotland, Southwest, Midlands, Southeast and East Anglia, and Wales.

Asante, Molefi and Mark Mattson. ***Historical and Cultural Atlas of African Americans.*** New York: MacMillan Publishing Co., 1990. pp192; ISBN 0-02-897021-7. $90.

Atlas of the People's Republic of China. Foreign Language Press, 1989. pp122; $49.50. Distributed by China Cultural Center, P.O. Box 221658, Sacramento, CA 95822.

Baker, Felix. ***The History of London in Maps.*** London: Barrie

and Jenkins, 1990. pp192; ISBN 0-7126-3650-1. £19.95.

Benvenisti, Meron. ***The West and Gaza Atlas.*** Boulder, CO: Westview, 1990. $54.50.

Canadian Atlas F.S.A. Postal Areas. Scarborough, Ont.: Artscan Marketing, 1990. pp132; $125. Artscan Marketing, 56 Oakmeadow Boulevard, Scarborough, Ontario, Canada M1E 4G1.

Census Atlas: National Volume 1981. Delhi: Controller of Publications, 1988. pp212; $50. Distributed by D.K. Agencies P Ltd., H-12, Bali Nagar, New Delhi 110015 India.

Friesel, Evyatar. ***Atlas of Modern History.*** Studies in Jewish History. New York: Oxford University Press, 1990. pp160; ISBN 0-19-505393-1. $49.95.

Himalayan Trekking Atlas. Scales 1:180,000 and 1:2,500,000. Thirty maps L33. Distributed by Robertson McCarta, 122 Kings Cross Road, London WC1X 9DS, England.

Hugo, Graeme. ***Atlas of the Australian People: South Australia - 1986 Census.*** Canberra: Australian Government Publishing Service, 1989. pp396; ISBN 0-664-10569-0. $34.95. Distributed in the U.S. and Canada: ISBN Inc., 6502 NE Hassalo St., Portland, OR 97213-3640.

The Imperial Gazetteer Atlas of India. Delhi: Low Price Publications, 1990, repr. of 1931 edition ISBN 81-85412-29-2. $41.70. Distributed by D.K. Agencies P Ltd.

Lasker, G.W. (ed.). ***Atlas of British Surnames.*** Detroit: Wayne State Univeristy Press, 1990. pp96; ISNB 0-8143-2253-0. $16.95.

Maps and Mapping. The National Atlas of Sweden, vol. I. Stockholm: Kartbutiken, 1990. First of 17 volumes with a purposed completion date of 1995; price SEK 272; Kartbutiken, Kungsgatan 74, S-111 22 Stockholm, Sweden.

Mason, Robert and Mark Mattson. ***Atlas of Environmental Issues.*** New York: MacMillan Publishing Co., 1990. pp192; ISBN 0-02-897261-9. $90.

Mattson, Catherine and Mark Mattson. ***Contemporary Atlas of the United States.*** New York: MacMillan Publishing Co., 1990. pp142, including 62 maps. ISBN 0-02-897281-3. $90.

Murray, Jocelyn. ***Atlas of Africa.*** New York: Facts on File, 1990. ISBN 0-8160-2209-7. $17.95.

Nebenzahl, Kenneth. ***Atlas of Columbus and the Great Discoveries.*** Chicago: Rand McNally, 1990. $75.

Phillips' Road Atlas of Scotland and the Borders. London: George Phillip, 1990. pp100; ISBN 0-540-05567-0. £8.95.

RAC Atlas France. London: William Curtis, 1990. pp144; ISBN 1-87196-713-9. £7.95.

Sahab, Abbas. ***Atlas of Geographical Maps and Historical Documents on the Persian Gulf.*** Tehran: Sahab Geographic and Drafting Institute, 1990. Volume 3. pp150; 210 DM. Distributed by GeoCenter.

Scott, James W. ***Washington: A Centennial Atlas.*** Bellingham, WA: Western Washington University Center of Pacific Northwest, 1990. pp155; ISBN 0-929008-24-3. $42.

Stern, Geoffrey. ***Atlas of Communism.*** New York: MacMillan Publishing Co., 1990. pp256, including 75 maps. ISBN 0-02-897265-1. $90.

Wilkie, Richard. ***Historical Atlas of Massachusetts.*** Amherst: University of Massachusetts Press, 1990. ISBN 0-87023-697-0.

cartographic events

EVENTS CALENDAR
1991

March 23-29: **ACSM/ASPRS Annual Convention**, Baltimore, MD. Contact: ACSM, 5410 Grosvenor Lane, Bethesda, MD 20814, (301) 493-0200.

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

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

April 22-25: **NCGA 1991 National Computer Graphics Association**, Chicago, ILL. Contact: Michael Weiner or Sharon Sutton, 2722 Merrilee Drive, Suite 200, Fairfax, VA 22031, (703) 698-9600.

May 6-10: **84th Annual Meeting of the Canadian Institute of Surveying and Mapping and 14th Canadian Symposium on Remote Sensing of the Canadian Remote Sensing Society,** Calgary, Alberta, Canada. For CISM information contact: Dave McLintock, Shell Canada Ltd., 400 4th Ave. S.W.,

Box 100, Station M, Calgary, Alberta, Canada T2P 2H5; (403) 232-3004, fax: (403) 232-4955. For CRSS information contact: Diane Thompson, Intera Technologies Ltd., 2500-101, 6th Avenue, S.W., Calgary, Alberta, Canada T2P 3P4; (403) 266-0900, fax: (403) 265-0599.

May 31-June 3: **The Annual Conference of the Canadian Cartographic Association**, St. Catharines, Ontario. Contact: Alun Hughes, Department of Geography, Brock University, St. Catharines, Ont., Canada L2S 3A1. Email: ggfhughes@brocku.ca.

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

September 23-October 1: **Mapping the Nations - 15th Conference of the International Cartographic Association,** Bournemouth International Centre, Bournemouth, England. Contact: Conference Services Limited, Congress House, 55 New Cavendish St., London W1M 7RE, England, 01-4860531, fax: 01-935-7559, telex: 934346CONFAS G.

October 20-23: **North American Cartographic Information Society** Eleventh Annual Meeting, Milwaukee, WI. Contact: Sona Karentz Andrews, Department of Geography, University of Wisconsin — Milwaukee, Milwaukee, WI 53201; (414) 229-4872.

October 27-30: **GIS/LIS 1991 Annual Conference and Exposition and ACSM/ASPRS Fall Convention**, Atlanta, GA. Contact: ACSM, 5410 Grosvenor Lane, Bethesda, MD 20814, (301) 493-0200.

1992

March 22-28: **ACSM/ASPRS Annual Convention**, Albuquerque, N. M. Contact: ACSM, 5410 Grosvenor Lane Bethesda, MD 20814, (301) 493-0200.

Summer: **Fifth International Symposium on Spatial Data Handling,** USA. Contact: Prof. Duane F. Marble, Department of Geography, The Ohio State University, Columbus, OH 43210, (614) 292-2250.

August 9-16: **27th International Geographical Congress**, Washington, DC. Contact: Anthony de Sousa, 27th IGC, 17th and M Sts. N.W., Washington, DC 20036, (202) 828-6688.

October: **North American Cartographic Information Society** Twelfth Annual Meeting, Minneapolis, MN.

November 6-12: **GIS/LIS 1992 Annual Conference and Exposition and ACSM/ASPRS Fall Convention,** San Jose, CA. Contact: ACSM, 5410 Grosvenor Lane, Bethesda, MD 20814, (301) 493-0200.

1993

February 15-18: **ACSM/ASPRS Annual Convention**, New Orleans, LA. Contact: ACSM, 5410 Grosvenor Lane, Bethesda, MD 20814, (301) 493-0200.

CSG Thesis Research Fund

The Cartography Specialty Group (CSG) Research Fund has been established to support Master thesis work in cartography. CSG grants are intended to help defer the expenses directly related to the collection of data for research. Funding is restricted to items *necessary* and *intrinsic* to the applicant's thesis. Examples include travel to study areas, data tapes, maps, small items of special equipment, supplies such as materials for the production of test maps, and human subject fees. In the case of human subject research, evidence of human subject clearance is not required at the time of application *but must be submitted before an award is made* (i.e. within two months). Applicants must be currently enrolled in a geography Master's degree program.

Cartography must be the central focus of the research, and not merely a tool used in support of other research. Research proposals will be judged based upon (1) their originality, (2) their research design, or plan of work, and (3) their budget and justification. The research proposal must describe the research, and contain the following elements:

§ Personal data form
§ The research plan
§ The budget and its justification
(Applications missing any of these items will not be considered.)

The CSG will have three funding periods per year. Due dates for receipt of grant applications for each funding period are **November 1, March 15,** and **June 1**. Grant monies will be awarded to successful appplicants two months after the due dates for each granting period. Applications must be received by the CSG Non-Academic Director by the targeted due date (postmarks do not count); late proposals will be held until the next funding period. Proposals will be reviewed in a non-blind process, with reviewers selected by the CSG Non-Academic Director in consultation with the CSG chair. Award amounts will generally not exceed $300.

For more information and applications contact: Ann Goulette, CSG Non-Academic Director, Intergraph Corporation, 1051 Mercator Drive, Reston, VA 22091-3414; (714) 264-5600.
—*Cartography Specialty Group Newsletter 11:1.*

NACIS news

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program and abstracts

WEDNESDAY, OCTOBER 24
1:00-8:00 p.m. Registration
1:00-3:00 p.m. NACIS Committee Meetings
3:00-5:00 p.m. NACIS Board Meeting
5:00-7:00 p.m. Dinner Break
7:30-9:00 p.m. Opening Session

Welcome
James F. Fryman
Vice President and Program Chairperson
University of Northern Iowa

Keynote Address
Mr. Thomas Hammond
NASA
Kennedy Space Center

9:00-11:00 p.m. Reception and Cash Bar
9:00-11:00 p.m. Poster Session: Products and Resources of University Cartographic Labs

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THURSDAY, OCTOBER 25
8:00 a.m.-7:00 p.m. Registration
9:00 a.m.-Noon Exhibits
8:30-10:00 a.m. Sessions

SESSION A:
CARTOGRAPHIC PRODUCTION
A Cost-Benefit Analysis of Computer-Aided Map Design and Production
Charles P. Rader and Ellen R. White, Department of Geography, Michigan State University, East Lansing, MI

Within the last five years, microcomputer-based map design and production have become viable alternatives to manual design and production for cartographic production labs. A cost-benefit analysis between computer-aided map production and manual map production was carried out to determine their relative advantages. Two essential questions guided the analysis: (1) what are the relative capital investments in facilities and equipment, and (2) what are the relative costs of labor and materials in the design and production of maps between computer-assisted and

manual techniques? A survey of vendors was conducted to determine the investments in setting up two new labs, one which emphasized manual technologies and the other computer-assisted technologies. Two map design problems, a thematic map and a reference map, were each produced twice, once using traditional manual techniques and once using computer-assisted techniques, to determine relative production costs for each design. The results from this study indicate that the computer-assisted technologies and techniques compare favorably to more traditional ones. The results of the analysis are discussed in the context of the types of cartographic products that are customarily produced by labs, the expanding capabilities brought to cartographic representation by computer-assisted techniques, and the future role of cartographic labs in providing services. While no cost-benefit analysis is definitive, this study should contribute to understanding the tradeoffs in the ongoing change from older to newer technologies.

Communicating with a Cartographer
William G. Loy, Department of Geography, University of Oregon, Eugene, OR

Like an architect designing a building, a cartographer designing a map needs to establish clear communications with the client. As a city building permit department limits the size of a building on a lot, a publisher limits the image area on a page. Before a cartographer can design a map a copy of the publisher's 'Instructions for Contributors' setting the above limits and providing other information must be given to the cartographer. It is also useful to have a sample of a recent publication in the series for which the map is being designed to reveal actual publisher's practices regarding graphics. The client must also provide a recent good-quality somewhat oversize base map on which to compile. On a photocopy of this map the area of the thematic map to be created must be delineated (north to the top, if possible) in the proportion of the final image area. The information to be shown on the new map must be indicated clearly or referenced to the compilation map, probably in red on the photocopy. The cartographer must stress that it is the responsibility of the client to provide all of this necessary information before map design can proceed. Matters of schedule and cost should be settled at this time.

With publisher's information, client's information, and time/cost decisions made the cartographer can proceed to prepare an over-scale first-draft map using an easy-to-change method of map-making. Non-automated shops will probably use ink-on-mylar methods for linework and Laserprinter or Linotronic lettering. Key to this process is the expectation by both client and cartographer that the first-draft map will be modified and improved. Time for corrections and improvements must be allowed and money budgeted for producing second or third drafts of the original effort. The final product will probably be a PMT at printing scale.

Textbook Graphic Production
Bonnie Sines, Department of Geography, University of Northern Iowa, Cedar Falls, IA

The maps in geography textbooks appear to be the work of the cartographer, who must accept the compliments or the criticism. However, the fact remains that often the final product is the result of decisions made by other technicians, who may lack the cartographic knowledge needed in understanding the intent of the original graphic. This paper will examine the problems encountered in creating maps and graphics for textbooks. In addition, possible solutions and alternatives will be discussed.

SESSION B: DEMONSTRATION
Map Grafix demonstration. Detailed mapping software for the Macintosh.
Paul Toomey

10:00-10:30 a.m. Break
10:30 a.m.-Noon Concurrent Sessions

SESSION C: ANIMATED CARTOGRAPHY
Tips and Techniques for Maintaining Visual "Headroom" on Animated Maps
Don Pirius and Phil Gersmehl, Department of Geography, University of Minnesota, Minneapolis, MN

It is convenient to approach the topic of four-dimensional cartographic design by way of analogy: a televised map has a relationship to its narration that resembles the connection between a printed map and surrounding text. This analogy may help clarify the similarities and differences between the design decisions for print and television maps.

For example, establishing a visual hierarchy on a printed black-and-white map is a relatively simple conceptual problem: the cartographer can select from a range of grays that fall along a single continuum from the color of the ink to the color of the paper. That constraint can make it difficult to design type that is legible across several intermediate grays. This problem of providing contrast is more complex but often easier to solve in color printed maps. The cartographer can choose to use hue, value, chroma, or a combination of those attributes to help separate figure from ground information.

Designing a map for broadcast television adds a number of additional constraints and opportunities to the decision process. The low resolution of a television image makes type selection difficult, but simultaneous narration can reduce the need for on-screen type. Similarly, the ability to zoom in or out through time can make locational inset maps unnecessary. The analog nature of the broadcast signal poses some unique problems: the legal limits on color intensity are different for different colors, and the message should still be legible on black-and-white receivers. The designer of animated maps can employ a variety of techniques, including flicker, gradient screens, patterned backgrounds, and changes in intensity through time, in order to maintain visual headroom for the points that are to be emphasized. We will illustrate some of these choices by demonstrating a series of animated maps we have designed for a 10-part television-based correspondence course.

Visualizing Paleo Ocean Circulation
David DiBiase and William Peterson, The Pennsylvania State University, University Park, PA

Four-dimensional cartography enables earth system scientists to represent the behavior of dynamic environmental processes in space and time. This presentation will include a five-minute animated video simulation of Mid-cretaceous and Eocene ocean circulation patterns based on the research of Eric Barron and William Peterson at Penn State's Earth System Science Center. Discussion will focus on technical and design issues involved in producing the video with a Macintosh microcomputer at the Deasy GeoGraphics Laboratory.

Summary Graphics to Supplement Animated Cartographic Sequences
Mark Monmonier, Department of Geography, Syracuse University, Syracuse, NY

Viewers of animated sequences of maps might benefit from a single, more cognitively friendly graphic that summarizes dominant trends, salient relationships, and significant deviations introduced in the dynamic presentation. The theory of human information processing suggests that because the human eye-brain system does not instantaneously process patterns from short-term memory through to long-term memory, information presented toward the end of a dynamic cartographic sequence retards the memorability and comprehension of information presented

earlier in the sequence. Four types of summary graphics hold particular promise as animation supplements. The simplest and oldest of these is the *centrographic time-series map*, used since the late nineteenth century to portray the march westward of the center of the United States population. Useful modifications include disaggregation by population subgroups and point symbols for which size or value portrays relative dispersion about the geographic average. A second promising supplementary graphic is the *biplot*, a joint two-dimensional representation of time units and places based upon two principal components. Among the points in the biplot representing time periods, similar instants or periods of time plot as closely clustered points whereas highly dissimilar time units are more widely separated. Similarly, among the points representing places, similar places are close together and dissimilar places are far apart. A third strategy is *canonical trend-surface analysis*, which might extract one or two salient spatial trends, the canonical loadings of which can be plotted in a time-series graph showing when each trend was particularly prominent. A fourth summary representation is the *time-series correlation graph*, which reveals temporal variation in the apparent influence of given trends or regionalizations on a particular bivariate correlation. The time-series correlation graphic not only portrays the spatial coherence and temporal stability of a correlation but also fosters an understanding of geographic correlation, which is more complex than statistical correlation. Because an animated sequence of maps can promote understanding of an otherwise complicated summary graphic, the two approaches are complementary.

SESSION D: WORKSHOP
Color as a Map Skill and a Descriptive Tool
Henry W. Castner, Department of Geography, Queen's University, Kingston, Ontario, Canada

DESCRIPTION — A hands-on workshop using color cubes in various activities to demonstrate various perceptual principles of color and to develop concepts of color description useful in the application of color in graphic communication.
BACKGROUND — One essential 'map skill' involves the ability of children to use colors effectively in the maps and graphics that they produce in classroom assignments. There are a small number of perceptual principles that govern that use, and they can easily be demonstrated.

A related 'geographic skill' involves the ability to describe accurately the colors in our environment. For this, some sort of perceptual model of color space is useful as well as some experience in discriminating colors by their perceptual dimensions.

Both of these skills can be demonstrated and enhanced with a color box based on the Munsell color system. The box is made up of cubes whose facets vary systematically by hue, value and chroma. Fortunately for geography teachers, these perceptual dimensions of color can be related to the earth itself, its axis, poles and equator; latitude and longitude; and distance below the earth's surface.

The workshop will involve hands-on activities with the color box as a way of demonstrating these skills and suggesting how color can be more effectively utilized.

Noon-1:00 p.m. Lunch Break
1:00-5:00 p.m. Field Trips

FIELD TRIPS
American Automobile Association
Visit to newly opened headquarters of AAA with tour of their cartography facilities.

Orange County GIS
Orange County has an extensive GIS under development. Tour looked at all aspects of their program.

Local Area Tour
Trip included boat tour of the lakes of Winter Park. Opportunity to visit shops in downtown Winter Park and/or visit local art museum.

6:30-7:15 p.m. Reception and Cash Bar
7:15-9:00 p.m. Annual Banquet

President's Address
Diana Rivera
Michigan State Libraries
Michigan State University
East Lansing, MI

Banquet Address
Thomas Cosby
American Automobile Association
Orlando, FL

FRIDAY, OCTOBER 26
8:00 a.m.-4:00 p.m. Registration
9:00 a.m.-3:00 p.m. Exhibits
8:30-10:00 a.m. Sessions

SESSION A: AUTOMATION IN CARTOGRAPHY
Global Positioning System: Status and Issues
Ronald M. Bolton and Claudette M. Dellon, Aeronautical Charting Division, National Oceanic and Atmospheric Administration, Rockville, MD

System Status — The Global Positioning System (GPS) space segment has eleven satellites in operation, and another was scheduled for launch in January, 1990. If spaced properly in their orbits, these twelve satellites will provide 24-hour, two-dimensional (latitude and longitude) global positioning capability — a milestone in history! Around 1993, the entire GPS configuration of twenty-one satellites should be in place. Three active spares will be orbited sometime later to ensure system integrity and continuous operation.

GPS receiver developments have been astounding — over 100 models are now manufactured. These sets allow precision survey and time transfer, and development of marine and aviation navigation equipment is gaining momentum.

Issues — The key issues affecting the future of GPS are:
(1) DOD clarification of its commitment to provide GPS signals and related coding information to the civilian community.
(2) The development of international standards that allow GPS and USSR's Global National Satellite System (GLONASS) to be used interchangeably by the user community.
(3) The planned selective ability (S.A.) which provides a civil signal at an accuracy of 100 meters as opposed to the current civil military signal with 30-40 meter accuracy.
(4) GPS integrity related to frequency, modulation of the frequencies and content of the satellite message sent to users is a significant issue. The Radio Technical Commission for Aeronautics (RTCA) is studying these issues.
(5) The final issue is the full participation of the GPS civil community in GPS planning, implementation and operation to ensure that the DOD does not overlook cost and technical considerations of civil users.

The GPS will service more users than any surveying/navigation system in the history of the world. It can meet survey or 3-D needs with the use of signals from four satellites, or it can meet less stringent 2-D navigational requirements by monitoring the signals of three satellites. All told, GPS is an important national and international resource.

Implementing a Cartographic Database to Enable Automation
Virginia Galvin, National Oceanic and Atmospheric Administration, Rockville, MD

The Aeronautical Chart Branch (ACB) of the National Ocean Service is beginning to automate the production of some of its charts. The transformation of the production process is an ongoing effort, depending on human considerations and technical

factors for success. Currently, production techniques for the Branch's products range from traditional manual compilation, engraving, and stick-up to the use of various levels of computer-assisted cartographic tools. Each chart series, with its standard scale, complexity of feature representation, revision cycle, and other characteristics, poses more or less of a challenge in the process of automation.

This paper describes the extent of current automation at ACB and evaluates the feasibility of introducing further automated solutions with regard to various types of charts. By implementing a cartographic database, using a commercially available relational database management system, increased efficiency and flexibility can be realized in the production of a significant number of charts. The paper summarizes the concepts that define a cartographic database and how these concepts serve to resolve problems of redundancy in the revision of charts, increase flexibility in the creation of new products, and enable the automatic flow of cartographic information from the database to the digital chart product.

Finally, the paper presents an overview of the operation of a commercial cartographic database developed for production of aeronautical charts by the Intergraph Corporation. It describes the software components of the Intergraph Aeronautical Charting System (IACS) to be installed by the Branch and provides a scenario of the cartographer's interaction with the system, emphasizing the expansion of his responsibilities in controlling the automated compilation process.

Cartographic Change at National Geographic
David Miller, National Geographic Society, Washington, DC

The discipline of cartography is being buffeted by technological change. These changes have transformed National Geographic's Cartography Division over the last ten years from an elite group, vested in traditional mapping methods, modestly producing some of the best maps in the world — to an elite group, sustained by digital revolution, modestly producing some of the best maps in the world. Our Scitex system brought us the benefits of raster technology in 1982, but it was not until the introduction of ARC/INFO in 1988 that computer technology began affecting every single person in Cartographic. ARC/INFO has changed the way we manipulate the fundamental qualities of a map: projection, symbolism, and scale. The Society's new *Atlas of the World* provides numerous examples of how our new technology has been applied in updating and creating maps.

SESSION B: ROUNDTABLE — ETHICS IN CARTOGRAPHY
Ethics in Cartography Roundtable Discussion
Organizer: Sona Karentz Andrews, University of Wisconsin-Milwaukee.
Panelists: Patrick McHaffie, University of Kentucky; Elke Owen, Head Cartographer, American Automobile Association; Mark Williams, Editorial Art Director, Orlando *Sentinel*.

McHaffie reviewed the origins of the Ethics Roundtable, pointing out that cartography's increased interest in ethics is part of a larger societal trend. Williams described how short deadlines affect decisions about the use of copyrighted materials: "it is easier to ask forgiveness than to ask permission." Andrews discussed ethical implications of cartographic education, arguing that cartographic expressions are impressionistic, and that "it is not our role to act as cartographic police." Subsequent comments from the floor were diverse, but tended to revolve vaguely around the question of the perceived responsibilities of cartographic educators.

10:00-10:30 a.m. Break
10:30 a.m.-Noon Concurrent Sessions

SESSION C: ATLASES
National Atlas of Mexico
Atlantida Coll-Hurtado, Instituto de Geografia, UNAM, Mexico, D.F.

The National Atlas of Mexico will be finished in December, 1990. It will show the actual knowledge we have of Mexico's nature, society and economy in the 1980's through more than 600 maps, scales ranging from 1:16,000,000 to 1:4,000,000, published in 164 separate sheets.

Being the first atlas of this kind in Mexico, its construction presented interesting aspects — academic, financial, organizational, etc. — which could be discussed within the Latin American realities: the main contents; analysis of quantity and quality of data available; mastering of cartographic language with or without the use of hardware and software; editing and publishing aspects; etc.

From another point of view, this National Atlas is the result of teamwork involving academic personnel of the National University of Mexico as well as other professionals from academic and government institutions. The inner organization is worth discussing: 120 authors working in more than 15 different institutions in Mexico City, Guadalajara and Monterrey.

The main contents of the National Atlas of Mexico are: I. General maps; II. History; III. Society; IV. Nature; V. Environment; VI. Economy; VII. Mexico and the world.

Changing Directions: Historical Atlas of Canada
Geoffrey J. Matthews, Department of Geography, University of Toronto, Toronto, Canada

Volume III of the *Historical Atlas of Canada* is scheduled to be published in October 1990 after four years of intense production and is expected to emulate the critical success achieved by Volume I. Rising production costs, a depleted budget and a paucity of new funding have compelled the project to examine more cost effective methods of production than are now being utilized. As a result of that study, the atlas executive and the University of Toronto in order to rescue the remaining volume in the project, have decided to cease operations for one year while the cartography office is refitted to a computer-based operation. A drastically smaller nucleus of computer trained cartographers will commence production of Volume II in 1991 with the goal of completion within two years. The style, design and integrity of the two previous volumes will be maintained, only the method of production will dramatically change.

The Climatic Atlas of Michigan
Hans J. Stolle, Department of Geography, Western Michigan University, Kalamazoo, MI

The Climatic Atlas of Michigan is the product of a nine year cooperative undertaking of two Western Michigan University faculty members, the state climatologist, and one member of the Michigan State University faculty. The atlas was published by the Notre Dame University Press and it is one of just a few existing state climate atlases.

This paper summarizes the production of the atlas from its early planning to the print-ready color separations. Problems of data collection and compilation are explained, the design of the atlas format as well as individual maps is illustrated, and the methods of cartographic production and project management are discussed.

Helpful insights gained during this project are pointed out and a sabbatical research project which is a direct result of work done for the atlas is briefly described.

SESSION D: ROUNDTABLE — CARTOGRAPHY LABS IN THE NINETIES
Cartography Laboratories in the '90s Roundtable Discussion
Organizer: James Anderson, Florida State

University. Panelists: Greg Chu, University of Minnesota; Will Fontanez, University of Tennessee; Craig Remington, University of Alabama; Ellen White, Michigan State University.

The panelists described their laboratories' staff, clientele, products, rates, and equipment, then discussed trends foreseen for the coming decade. In general, computer-assisted techniques are preferred for small format production, but most panelists felt that traditional methods would continue to be required for large format work. The appropriateness and value of off-campus contract work was the central topic of subsequent discussion.

Noon-1:30 p.m. Luncheon
1:30-3:00 p.m. Concurrent Sessions

Luncheon Speaker
Dr. Robert Aangeenbrug
Chair, Department of Geography
University of South Florida
Tampa, FL

SESSION E: GEOGRAPHIC INFORMATION SYSTEMS
GIS Applications for Transportation Planning
Eckart F. Leistikow, Pennsylvania Department of Transportation, Harrisburg, PA

This presentation will identify and describe the essential components that define an automated cartographic operation. It further introduces the concept of computer assisted cartography and describes the relationships between manual and automated ones. Special emphasis focuses on the cartographer's role in facilitating cartographic automation within the framework of an ever growing Geographic Information System for Transportation. The paper will demonstrate the idea of teaching cartographers to use computers - rather than teaching computer operators to make maps; thereby promoting the rapid proliferation of automated cartography among State DOT's and leading Metropolitan Planning Organizations.

Computer Mapping for Decision Support in Facilities Management and Environmental Compliance in Spite of Shrinking Funds and Increasing Requirements
Diane Drigot, and Karen Glyn, Marine Corps Air Station, Kaneohe Bay, HI and Marge Elliott, Insight International, Ventura, CA

As staff and budgets shrink and environmental requirements grow, facilities managers face a critical need for more timely access to geographic-based information to achieve regulatory compliance. Geographic Information Systems (GIS) can successfully satisfy this need for large municipalities. But for managers at smaller-scale facilities, a traditional GIS often exceeds what is needed and affordable. One can gain similar benefits of a GIS with minimal staff, budget, and equipment investments by developing a microcomputer-based system, using CAD/CAM software as a mapping package linked with third-party database management software.

This paper describes how a military installation in Hawai'i — an urban microcosm influenced by a myriad of environmental issues — successfully built such a system using AutoCAD and dBASE III+. A team led by a government environmental specialist and a geographer, with the support of cartographers, facilities managers, and engineers, used a unique developmental approach resulting in an automated graphic and non-graphic environmental information management system. This system allows for: (a) working within a modest budget to procure minimal and expandable equipment; (b) on-the-job staff participation in the creation and use of real-time products as the system evolved; (c) further refinement by the user as additional requirements surface; and (d) later expansion from environmental compliance to all areas of facilities management applications.

Examples show use of this system in the areas of: wildlife law enforcement, environmental impact assessment, endangered species management, historic preservation compliance, hazardous waste training, oil and hazardous substances spill contingency planning, selection of sites for military housing and training, and leak detection management of underground storage tanks.

Recommendations cover: (a) other practitioners with similar needs and constraints; (b) novice and professional cartographers who know of others with similar requirements; (c) GIS system designers regarding the needs of beleaguered bureaucrats and other potential users with little or no computer literacy.

SESSION F: ROUNDTABLE — MAPS AND THEIR KEEPERS IN THE NINETIES
Maps and Their Keepers Roundtable Discussion
John D. Sutherland, University of Georgia Libraries, Athens, GA

Handling of non-standard cartographic formats and new technologies in cartographic information delivery was discussed.

3:00-3:15 p.m. Break
3:15-5:00 p.m. Annual Business Meeting

SATURDAY, OCTOBER 27
8:00-11:00 a.m. Registration
8:30-10:00 a.m. Sessions

SESSION A:
CARTOGRAPHIC INFORMATION
Cartographic Information Sources on Topographic, Hydrographic and Cadastral Maps
A. J. Brandenberger and S. K. Ghosh, Laval University, Quebec, Canada

Topographic, hydrographic and cadastral maps are indispensable tools to provide quantitative information on the earth's surface on land and under water. However, in the context of the enormity and complexity of such mappings, the obtaining and retrieving of such information remain perpetual exigencies. The paper identifies the specifics and pertinent map production organizations. The information sources and their limitations are discussed. Finally a data bank developed at Laval University with world-wide potentiality is presented. Its feasibility is discussed.

Main Factors of Land Degradation in Mexico
Maria Concepcion Garcia Aguirre and Graciela Perez Villegas, University of Mexico

In Mexico, problems related to pollution and land degradation became more notorious in the beginning of the fifties. However, it was until the seventies when several institutions undertook projects to study and solve these problems. Most of the present information about this topic refers to local studies. For this reason, the coordinator of the project *Atlas Nacional de Mexico*, devoted a special section to thematic maps about impact of human activities on land resources, water resources, air, etc. The map of land degradation shows the main factors causing the deterioration of land resources, such as deforestation, fires, erosion, grazing activities, several types of industry (oil, thermoelectric, chemical, etc.) and the effect produced by human settlements and tourism. It indicates the distribution of these factors and its level of impact (medium or severe) throughout the Mexican Republic. In the top right side of this map, there is a small map scale (1:16,000,000) that indicates the level of degradation of natural resources. The

evaluation was based on the measurement of area transformed into grassland, crops, secondary vegetation and soil erosion. Impact on wildlife was estimated considering species extinction, level of endemism and percentage of disturbed habitat. Finally, a table indicates the land cover change in three periods. It was estimated by measuring existing vegetation maps with a digitizing program (AU220).

Recovering an Ancient Hawaiian Cultural Landscape for Purposes of Modern Land Use Planning

Muriel B. Seto, Donna Wong and Mikilani Ho, Hawaii's Thousand Friends, Kailua, HI

Hawaii is target for a host of investment interests, but our land use planners too often find evidences of native culture lying where least expected in pathways of modern progress, **after** construction is well underway. Unfortunately, early cartographers brought bias to Hawai'i mapping: "The names of many geographical features in the islands known to the Hawaiians are not given in the gazetteer — outstanding cliffs, rocks, small streams and gulches, and some trivial land marks. Such names were thought not to be of enough importance to include in the work." (*A Gazetteer of the Territory of Hawaii*, J. W. Coulter, 1935, University of Hawaii, Honolulu). This attitude comes home to haunt us.

Hawaiian activists, applying historic preservation and environmental laws, are occasionally able to modify, delay, or halt public and private developments perceived detrimental to cultural, land-centered value systems. Acrimonious confrontations have resulted at great financial cost to development interests, but without generating long term solutions.

For five years, Hawaii's Thousand Friends has authored an ambitious effort to fill the void through federal Library Services funds employing knowledgeable native Hawaiian researchers for a computerized database of cultural sites. In our paper we show how we developed criteria for rediscovery of the original Hawaiian cultural landscape through recording sites mentioned in publicly available standard texts, many of which are early observations made by post-contact western residents and visitors, or are from the writings of early literate Hawaiians.

We will also describe how, with a small state grant for a pilot project, we concentrated on inventorying early maps for the Island of O'ahu, recording their locations, conditions, and public availability. Many early maps are not officially recorded, controlled, nor are they properly archived. Some are believed to have been lost, strayed, or stolen. We show how, using our data collection forms, we recorded those cultural sites which **are** shown on the maps, including them in our database collection.

In this paper, we describe how wedding data from the literature to information contained on O'ahu maps serves to create a mappable **pre-historic** record of sites for use by native Hawaiians, and by land use managers and developers, among others. We also analyze future steps to be taken, utilizing computers, for greater public accessibility to expanded cultural maps, and toward obtaining greater protection and maintenance for unusually vulnerable early maps of Hawai'i.

SESSION B: ROUNDTABLE — AUTOMATED CARTOGRAPHY IN THE NINETIES

Automated Cartography in the '90s Roundtable Discussion

Organizer: Ronald M. Bolton, Aeronautical Charting Division, National Oceanic and Atmospheric Administration. Panelists: Will Fontanez, University of Tennessee; Dewey Hicks, Alexandria Drafting Company; John Krygier, The Pennsylvania State University; David Miller, National Geographic Society; Elke Owen, American Automobile Association; Craig Remington, University of Alabama.

Remington described the technical and institutional implications of the Intergraph GIS and mapping system at the University of Alabama. Krygier described the all-digital production scenario at the Deasy GeoGraphics Lab, and argued that human interaction with computers, rather than automation *per se*, is the important issue for the future of computer-assisted cartography. Owen described the on-going computerization of cartographic production at AAA as an evolutionary process that never quite reaches equilibrium due to continuing technological developments. Fontanez presented the 'small lab perspective' on combining photomechanical and computer-assisted production methods. Miller recounted the ten-year history of computerization at NGS, observing that the blurring of previously discrete design, research, editorial, and production functions requires difficult structural adjustments in a large institution. Hicks stressed the necessity of generating profit as a private-sector mapping business; valuable existing stocks of film-based artwork and the exorbitant costs of suitable output devices compels ADC to combine computer-assisted and traditional production methods. Bolton presented perceived trends in computer hardware and operating systems for mapping, and focused on implications of automation on personnel and institutional structures. Expecting that 'hybrid' production technologies will persist, Bolton discussed the importance of developing flexible attitudes in individuals, and replacing the traditional hierarchical management structure with a 'team approach.'

10:00-10:30 a.m. *Break*
10:30-Noon *Sessions*

SESSION C: GENERAL CARTOGRAPHY

Deconstructing Brian Harley (Or, How Cartography Lost Its Innocence)

Jeremy Crampton, The Pennsylvania State University, University Park, PA

At first glance, it is surprising that a practical discipline like cartography should greet Brian Harley's exhortations toward probably its most radically theoretical (and theoretically radical) 'elements of cartography' if not with total acceptance, then at least with a dawn chorus of recognition unparalleled for the discipline. Yet it is that very practicality, in comparison with academically more prestigious (and theoretical) colleagues in the humanities that no doubt fuels the welcome. Out of insecurity, cartographers have sighted/cited a tasty fad to call their own. Yet while the praise is justified, it would be a mistake to have cartography shape itself around his exact formulations. For one thing, Harley is only one voice among the clamor of 'postmodernists,' 'poststructuralists,' and 'deconstructionists,' and brings his own particularly historical agenda to the discipline. Harley does not pretend to be offering 'The Way' in the evangelical manner (pace Godlewska), but is offering an example. For another, he has not yet come close to pushing the boundaries of exploration that, map in hand, we expect of cartographers. By this, I refer to the theoretical side of his writing (which is, after all, what has caused the excitement). While Harley has begun the critique of maps as records of the landscape to be examined mathematically (for example, he rejects the cartographic criticism of the Gall-Peters projection as scientific reductionism) he would still allow maps, problematically, to have full representational status. That is, that graphic symbols simply 'stand for' something else ('reality,' 'the world,' 'the landscape,' or whatever). This position, to me, is outmoded and difficult to sustain convincingly. I would like to propose an alternative to the 'maps as representations' position, one which more radically incorporates postmodern critiques of representation; perhaps even to subvert it altogether.

Affordances and Invariants in Navigation and Landscape Analysis

Henry W. Castner, Department of Geogra-

phy, Queen's University, Kingston, Ontario, Canada

Information processing and constructivist approaches to environmental cognition have been challenged by James Gibson's theory of direct perception of the environment. His theory is based upon the idea that structures in the environment are present in the ambient light reflected from surfaces in that environment.

For animals, sensitivity to a structure makes possible certain actions; the evolution of that sensitivity would then define the animal's ecological niche. Aspects of the environment which have functional consequences for the animal are called affordances. From this, perception can be viewed as a process of directly perceiving the affordances of one's ecological niche.

This paper examines some implications of Gibson's theory for map skill research and education. Two specific ideas are examined: affordances, which may provide a way of identifying landscape attributes that are functionally meaningful to a body in motion; and transformations in the ambient array which facilitate the detection of invariant structures, structures which geographers seem particularly responsive to in landscape description and analysis.

Patterns of Cartographic Materials Usage
John D. Sutherland, University of Georgia Libraries, Athens, GA

One of the traditional ways of measuring library performance, or how well a library meets its objectives and goals, is the measurement of user satisfaction. User studies have focused on either users or use. The user-focused study attempts to survey user behavior while the use-focused study measures material used. This paper will describe both types of studies. Using data from a long-term use research project at the University of Georgia Library's Map Collection, use patterns in this Map Collection will be defined. Combining this study with other published and unpublished data patterns of use in United States Map Collections will be outlined.

SESSION D: ROUNDTABLE — COMMERCIAL MAPPING IN THE NINETIES
Commercial Mapping in the 1990's Roundtable Discussion
Bertram Green, The Map and Globe Store, Orlando, FL

What are the major issues and problems that face commercial mapping in the 1990's? This, plus many other relevant questions will be discussed by a panel of personnel engaged in commercial mapping.

1:00 p.m. Post-Conference Trip to Kennedy Space Center

MINUTES OF THE BOARD MEETING, AUGUST 18, 1990
President Rivera organized a conference call and the following members participated: J. Anderson, D. Rivera, F. Fryman, G. Chu, E. White, P. Gilmartin, P. McHaffie, N. Ryckman, D. DiBiase.

A motion was made to accept the minutes from the previous board meeting by Anderson. Second by Fryman. Unanimous. Rivera reported that she has been in touch with two potential candidates for the office of Executive Director. Requirements are 2-4 hours per week and some institutional support. This person is responsible for the day to day conduct of NACIS business. Gilmartin suggested spending NACIS money to support operations of the office. There was general sentiment in support of this idea and it will be discussed further at the October board meeting. Rivera asked about the status of the Constitution. Anderson reported that the Constitution had been reviewed by Marsha Selmer and Ron Bolton for errors and it was ready to distribute to the membership at the annual meeting. Question was asked about the non-profit status of the organization. Chu will investigate and report at the October board meeting. Anderson was authorized to distribute copies of the Constitution at the October meeting.

Treasurer's Report
Chu distributed a copy to board members prior to the conference call (see following). Anderson moved to accept. McHaffie second. Unanimous.

1992 Site
Bolton distributed letter prior to meeting with airfare costs to selected cities. Cities under consideration were Philadelphia, San Antonio, and Minneapolis. Gilmartin asked if we had site coordinators for these sites. Anderson suggested that local arrangements be separate from program planning so that the Vice President would not have so many responsibilities. Gilmartin suggested a questionnaire be made available at October meeting asking membership about site preferences and their ability to assist with local arrangements. Jeff Patton will be asked to prepare questionnaire.

Nominations
Proposed nominees for the Board of Directors are Ron Bolton, Will Fontanez, and Hull McLean. Ed Hall was proposed for Treasurer. A nominee for Program Chair was not yet available. The question was asked if a past president could be nominated for president again. After reviewing the Constitution, the board's opinion was that they could not. Anderson suggested that Bolton prepare appropriate language to amend the Constitution and the matter be discussed further at the October board meeting.

Membership
Chu reported that we would be exchanging lists with ACSM. ACSM's list contains approximately 4,000 names.

Publications
DiBiase reported that questions have been asked about subscriptions separate from membership. Anderson suggested looking at this issue as well as definitions for Institutional Membership. Ryckman and Rivera will investigate and report to the board in October as to how other organizations handle these issues. DiBiase also raised the issue of charging for back issues and some general comments concerning the cost of *Cartographic Perspectives*. DiBiase would like to have a new editor identified by the Milwaukee meeting.

1990 Program
Fred Fryman has organized fourteen sessions. Anderson commented on field trips and other local arrangements.

It was reported that the contract had been signed for the 1991 meeting in Milwaukee. The local arrangements committee has requested time at the business meeting in Orlando to make a brief presentation.
—James R. Anderson, Jr., Secretary

TREASURER'S REPORT
AUGUST 14, 1990
As of this date, our membership stands at 290; there are 30 institutional members, 223 individual members, and 37 student members. I suspect many 1989 or previous members still have not paid their 1990 dues. The Spring, 1990 issue of *Cartographic Perspectives* were sent only to those who have paid their 1990 dues (anyone who has not received this issue should check to see if dues have been paid through the 1990 calendar year). There has been some confusion in the past that some members thought the registration fee for the previous annual meeting includes the following year's membership dues; this is not true. We ought to make a special effort during the Orlando meeting to let members know that the registration fee for the annual meeting does not include next year's membership.

The balance in our bank account today is $16,157.04. The interest gained from this account between 1/1 and 7/13 (date of bank statement) is $553.67. All major bills have been paid. The cost of producing the last two issues of *Cartographic Perspectives* was $3850. As we head into the Orlando meeting, our financial situation is very stable.

—Gregory Chu, Treasurer

NACIS BOARD MEETING MINUTES, OCTOBER 24, 1990, Orlando, Florida

President Rivera called the board meeting to order at 3:10 p.m. The following members were present: Pat McHaffie, Ellen White, Jim Anderson, Fred Fryman, Diana Rivera, Nancy Ryckman, John Sutherland, Pat Gilmartin, Jack Dodd, Ron Bolton, Jerry Thornton and Craig Remington.

Minutes of the last meeting were approved with one correction. Fryman reported that meeting planning was progressing well. The Census Bureau has been forced to cancel their presentation due to federal budget problems and Mapgrafix has been substituted. Anderson reported that the budget for the meeting was being met. Rivera opened discussion on search for new CEO by summarizing what had occurred to date. Two candidates have been proposed but they have not been able to accept at this time. Gilmartin proposed allocating money for the Executive Director. Anderson proposed up to $400 a year for Executive Director expenses. Gilmartin seconded. Unanimous. Bolton agreed to serve as CEO until a successor was appointed. White moved to allow Fryman to appoint new CEO from candidates suggested. Unanimous.

Bolton reported that the straw vote on the constitutional change had passed by an overwhelming margin. He suggested that this fact be mentioned at the business meeting, but that according to the Constitution the membership would have to vote.

Chu presented the Treasurer's report. He stated that for the year we had basically broken even. The cost of *CP* has increased and may be a problem in the future. Chu reported that we are not listed as non-profit according to the IRS. Chu consulted with an accountant who provided him with necessary forms. Chu volunteered to work with the new treasurer to file the necessary forms.

Rivera asked about the status of the data base. Chu highlighted some problems. The issue of membership being paid at the meeting was discussed. It was suggested that dues be for calendar year only. It was recommended that explanation of dues be made in *CP*, dues notices, and new society brochure. An effort will be made to produce a more current data base during this next year.

Bolton reported on the results of the election. Bolton, Fontanez, and McLean were elected to the Board. Ed Hall was elected Treasurer and Jack Dodd was elected Vice President.

Ryckman reported on subscription services. She stated that these services were given a discount by the organization or charged a fee to the library. Ryckman suggested getting the journal indexed. Ryckman also recommended that we not offer *CP* on a subscription basis. Sutherland moved that we not offer *CP* on a subscription basis. Ryckman seconded. Unanimous. Rivera asked about distinction between individual and institutional memberships. Sutherland moved that we do not offer subscription services at a discount. Second by Chu. Unanimous. Bolton commented that if we offer discount to one we needed to be able to explain why we didn't offer to all. Rivera asked about paying for back issues. Chu suggested for back issues that the requestor be asked to join NACIS. Ryckman moved that we charge 1/4 of the current institutional rate plus $2.00 postage and handling. Ryckman withdrew motion after further discussion. Sutherland moved that we charge $10 for each back issue. Second by McHaffie. McHaffie moved that we define a back issue as any issue before the current issue. Passed 2-0 with the remaining members abstaining. Anderson suggested that we monitor the purchase of back issues. McHaffie moved that we limit sale of back issues to 10 copies per buyer. Second by White. Unanimous. Ryckman will research indexing of *CP*.

Rivera discussed the replacement of the *CP* editor. Pat Gilmartin was approached about the position. Gilmartin declined due to a possible conflict with her assistant editorship of another journal and the fact that she had turned down their offer of an editorship. Rivera asked Gilmartin to assist incoming President Fryman in proposing names for a new editor.

Sutherland reported that Bob Lyon would like to have exhibitors given better consideration. Anderson reported that we are not encouraging exhibitors and that they were offered exhibit space in exchange for registering for the meeting. Rivera and White asked about the use of the NACIS name and logo without Board approval. Bolton suggested that we draft a letter stating that any future use of our logo be approved by the Board. Lyon also expressed a desire to advertise in *CP*. Chu reported that advertising could jeopardize our non-profit status.

Thornton on behalf of the Inter American Committee reported that participants from Mexico had asked about the possibility of co-sponsoring a conference with NACIS to be held in Mexico City. Bolton suggested that we present the idea to the membership.

A questionnaire is going to be circulated to the membership concerning future meeting sites. Bolton cautioned that membership should be told that final decision would be made by the Board based on criteria such as hotel cost, airfare cost, and local arrangements availability. Bolton reported that Minneapolis, Philadelphia, and San Antonio had been asked to submit bids. White suggested that we go to Minneapolis since Chu has volunteered to do local arrangements. Anderson moved that we go to Minneapolis in 1992. Fryman seconded. Unanimous. Rivera thanked Pat Gilmartin and Ellen White for their service on the Board.

—James R. Anderson, Jr., Secretary

NACIS BUSINESS MEETING , OCTOBER 26, 1990,
Orlando, Florida

The meeting was called to order by President Rivera at 3:26 p.m. Anderson made local arrangement announcements. Bolton reported that 72 people had voted. Jack Dodd was elected Vice President, Ed Hall was elected Treasurer. Ron Bolton, Will Fontanez, and Hull McLean were elected to the Board. Rivera asked for vote on the proposed change to the Constitution. Unanimous. Anderson reported that approximately 100 had registered for the meeting. MacEachren reported that Jeff Patton would be the new chairman of the Publications Committee. MacEachren asked that anyone who would like to have their paper considered for publication submit a copy to Patton. Rivera announced that we would need a new editor for *CP* next year.

Sona Karentz Andrews, co-chair of local arrangements for next year's Milwaukee meeting announced that the meeting would be held at the Astor Hotel. The dates will be October 20-23. Room rates are $61 for a single. The luncheon will be on Monday with the banquet on Tuesday. Suggestions for field trips include GIS facilities, BLM, Forest Service, AGS, breweries, and the public art museum. Andrews asked for input on the Milwaukee meeting. The 1992 meeting will be in Minneapolis with Greg Chu serving as local arrangements chair. Rivera reported that an invitation had been extended from Costa Rica to meet in San Jose. Mexico has also extended an invitation to have a joint meeting in Mexico City. These meetings would be in the form of a mid-year meeting. Rivera asked for members to submit nominations for NACIS officers and board members.

Chu presented the Treasurer's report and reported that our balance was about the

same as this time last year. Current membership is 317. Expenses are up due to the increased costs of *CP* but this has mostly been offset by increased dues and membership. DiBiase suggested allocating money to fund students to attend meetings or to provide scholarships. MacEachren noted that the production costs of *CP* were being absorbed by Penn State's Deasy Lab.

Rivera reported that the Board was searching for a new executive officer to replace Ron Bolton. Remington thanked all of those who had participated in the poster session. Donna Schenstrom objected to introducing the Latin American visitors at the banquet since the organization encompasses those countries. Sutherland suggested introducing all first time attendees instead. Andrews suggested publishing meeting participants in the program. Rivera introduced new officers. Bolton urged everyone to attend the Milwaukee meeting. The meeting was adjourned at 4:10 p.m.

—James R. Anderson, Jr., Secretary

CP WINS AN OZZIE

The trade periodical *Magazine Design & Production* has recognized *Cartographic Perspectives* with an "Ozzie" award for Design Excellence, Honorable Mention, Best Overall Design, New Association, Nonprofit or Government Publication. *CP* also is featured in the "Gallery" section of the September/October 1990 issue of *Aldus Magazine*, a periodical for users of Aldus Corp.'s *PageMaker* and *FreeHand* desktop publishing software. *CP's* original design was realized by David DiBiase with crucial encouragement from Alan MacEachren. Editorial assistant Suzanne Peterson has been responsible for the look of the bulletin since issue number 5. The production, printing and distribution of *CP* is supported with the annual dues of NACIS members.

INVITATION FOR COMMENTS ON DATA ACCESS AND CONFIDENTIALITY

(continued from page 2)

ality and without undue risk of adverse effects on public cooperation with censuses and surveys?

Persons or business harmed by disclosure. Do you know of any instances in which persons or businesses were harmed by unlawful or unintended disclosure of information they provided to the government under the condition that the information was to be used only for statistical purposes? How did this happen? What were the consequences? (This category differs from the first two in that statements need not be based on your own personal experience.)

Please submit your statements to George T. Duncan c/o Committee on National Statistics, National Research Council, 2101 Constitution Avenue N.W., Washington, DC 20418. If you have any questions, please call Virginia de Wolf, Study Director, at (202) 334-2550. We look forward to hearing from you.

AAG Newsletter 25:9 November 1990

EXCHANGE PUBLICATIONS

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

ACSM Bulletin. Offering feature articles, regular commentaries, letters, and news on legislation, people, products and publications, the American Congress on Surveying and Mapping's *Bulletin* is published six times a year. Contact: Membership Director, 5410 Grosvenor Lane, Bethesda, MD 20814; (3012) 493-0200.

Bulletin of the Society of University Cartographers. Published twice a year, the *Bulletin* features articles on techniques and ideas applicable to the cartographic drawing office. Contact John Dysart, Subscriptions Manager, Room 514, Middlesex Polytechnic, Queensway, Enfield, Middlesex, EN3 4SF, England.

Canadian Cartographic Association Newsletter. A quarterly publication offering news and announcements to members of the CCA. Contact: Canadian Cartographic Association, c/o Jim Britton, Sir Sandford Fleming College, School of Natural Resources, PO Box 8000, Lindsay, ONT K9V 5E6; (705) 324-9144; e-mail: britton@trentu.ca; fax: (705) 324-9716.

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

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

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

Cartography Specialty Group Newsletter. Distinguished biannual publication of the Cartography Specialty Group of the Association of American Geographers. Features vital news announcements and comics. Contact: Ellen White, Executive Editor, CSG Central Office, Department of Geography, Michigan State University, East Lansing, MI 48824; (517) 355-4658.

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

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

GIS World. Published six times annually, this news magazine of Geographic Information Systems technology offers news, features, and coverage of events pertinent to GIS. Contact: Julie Stutheit, Managing Editor, GIS World, Inc., P.O. Box 8090, Fort Collins, CO 80526; (303) 223-4848; fax: (303) 223-5700.

Information design journal. Triannual publication of the Information Design Unit. Features research articles reporting on a wide range of problems concerning the design and use of visual information.

Contact: Information design journal, P.O. Box 185, Milton Keynes MK7 6BL, England.

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

instructions to contributors

FEATURED PAPERS

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

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

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

Papers ranging from the theoretical/philosophical to methodological/applied topics will be considered providing that ideas are presented in a manner that will interest more than a narrow spectrum of members.

To be considered for the paper competition, papers should be prepared exclusively for NACIS, with no major portion previously published elsewhere.

TECHNICAL GUIDELINES

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

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

PostScript graphics generated with Adobe *Illustrator* or Aldus *FreeHand* for the Macintosh or Corel Systems' *Corel Draw*, MicroGrafx *Designer*, or Computer Support Corporation's *Arts and Letters* are most preferred, but generic PICT or TIFF format graphics files are usually compatible as well.

For those lacking access to microcomputers, typed submissions will be tolerated. Manually produced graphics should be no larger than 11" by 17," designed for scanning at 600 dpi resolution (avoid fine-grained tint screens). Continuous-tone photographs will also be scanned.

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

COLOPHON

This document was desktop-published at the Deasy GeoGraphics Laboratory Department of Geography, Penn State University, using an Apple Macintosh IIcx. Word processing was accomplished primarily with *WordPerfect 1.03*; page layout with *PageMaker 4.0*. The *PageMaker* document was output by a Linotronic 300 at PSU Printing Services. The bulletin was printed by offset lithography on Warren Patina 70# text stock. Text type is set in Palatino, a face designed by Herman Zapf. The featured color is PMS **139C.**

BRITISH CARTOGRAPHERS SEEK WORK EXCHANGE

Two employees of university drawing offices (cartographic laboratories) in England are interested in pursuing six-month work exchanges with cartographers in the United States. Elaine Watts, of the University of Nottingham, has seven years of cartographic design experience using traditional drafting techniques. Robert Bradbrook has worked for two years at University College London, producing a variety of maps, diagrams, and publications using primarily Macintosh technology. Anyone interested in discussing an exchange with either person may contact them at: **Elaine Watts,** Department of Geography, Nottingham University, University Park, Nottingham N98 2QW, England; **Robert Bradbrook**, Drawing Office, Department of Geography, University College London, 26 Bedford Way, London WC1H 0AP, England.

NACIS membership form

North American Cartographic Information Society
Sociedad de Informacion Cartografica Norte Americana

Name/Nombre: _____

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Membership Fees for the Calendar Year*/
Valor de nomina de socios para el año:
Individual/Regular: $28.00 U.S./E.U.
Students/Estudiantes: $8.00 U.S./E.U.
Institutional/Miembros institucionales:
$58.00 U.S./E.U.

Make all checks payable to/
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NACIS
c/o Edward J. Hall, Treasurer
University Libraries
406 McGilvrey Hall
Kent State University
Kent, OH 44242-0001

***Membership fees include subscription to *Cartographic Perspectives* and are due January 1.**

The North American Cartographic Information Society

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

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

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

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

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

§ to influence government policy on cartographic information.

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

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