

University of Wisconsin-La Crosse has begun building the bridge into the Twenty-first Century.

reviews

Cartographic Design: Theoretical and Practical Perspectives.

Clifford H. Wood and C. Peter Keller (eds.). Chichester: John Wiley and Sons. 1996. 306 pp. Cloth, price \$110.00. (ISBN: 0-471-96587-1)

Reviewed by:

Julio Rivera

Department of Geography

University of Wisconsin—Milwaukee

What has happened to cartographic design and what is its future? These are the central questions raised through *Cartographic Design: Theoretical and Practical Perspectives*. This book is an anthology of papers from the "Symposium on Cartographic Design and Research" held at the University of Ottawa in August 1994. Each chapter is a paper presented by different cartographers at the symposium and the topics represent a wide range of thought about cartographic design.

In Chapter 1, "Design: its place in cartography," the editors voice concern over the recent neglect of design as a topic in the cartographic literature. They suggest that the quantity and focus of literature on cartographic design have fluctuated over the years, and most recently have been overshadowed by the strong and growing interest in automated cartographic methods and Geographic Information Systems (GIS). The authors suggest that there is an increasing realization among professional cartographers that many non-professionals are making

maps; maps which the authors contend are often inefficient and of poor aesthetic quality. It is also suggested that the technology of map creation has changed so dramatically that the design process itself has changed and is in need of examination.

Chapter 2, "Challenges and response in cartographic design," is Taylor's conference keynote address and, as such, sets the stage for the book. The author reviews a conceptual basis for cartography-based communication, formal techniques, and cognition and analysis. Taylor suggests that cartography must broaden itself beyond a paradigm of positivism into a greater variety of philosophical approaches.

In Chapter 3, "Geography and cartographic design," Krygier provides a brief review of the history of the relationship between geography and cartographic design. By use of a case study, he suggests that cartographic design and geography are linked in thought and practice based on their processes of data synthesis, research theory and philosophy, and the use of a variety of visual forms to communicate geographic ideas.

Huffman reviews some of the 'postmodern' critiques of cartography in Chapter 4, "You can't get here from there: reconstructing the relevancy of design in postmodernism." He points out that these discourses have affected design theory both in and out of cartographic circles. He articulates the view that because cartography and surrounding technologies are not politically or socially neutral, cartographic designers should be fully engaged in social issues in their communities.

Mackaness suggests in Chapter 5, "Automated cartography and the human paradigm," that the hope of automating visualization and GIS techniques by modeling previous human cartographers has

not been as fruitful as previously hoped. He does, however, encourage researchers to continue. In particular, researchers should recognize that computers have altered the design process, and that any design of a new computer system should take advantage of the human elements (e.g., knowledge, skills) of its users.

In Chapter 6, "The practitioner's view? A pilot study into empirical knowledge about cartographic design," Wood and Gilhooly report the results of a pilot study of professional cartographers. Their work suggests that not only academic cartographers contribute to thinking about design, but the practitioner who makes maps influences design as well. They also suggest that cartographic design is not always based on a systematic set of rules; rather, it depends on the feelings and emotions of the designers.

Monmonier illustrates his idea of cartographic complementarity in Chapter 7, "Cartographic complementarity: Objectives, strategies, and examples." Cartographic complementarity is the practice of using additional data, features, or graphic representations to provide the cartographic audience with a more coherent representation of geographic concepts in consistent and coherent ways.

Vasconcellos discusses her research on map design for the visually impaired in Chapter 8, "Tactile mapping design and the visually impaired user." She reviews some of the specific needs of tactile map makers and users. She modifies Bertin's variables by using elevation and texture in place of variables such as color. She also stresses that tactile map design is different from traditional design because it requires feedback between map users and makers.

Anderson examines Quebec's social studies curriculum in

Chapter 9, "What does that little black rectangle mean?: Designing maps for the young elementary school child." She suggests that the curriculum represents a belief of many educators that maps are not an important form of graphic representation in their own right; rather, they are merely a medium for understanding space. Using her research on the differences in interpretation of maps by kindergartners, she suggests that cartographers must become involved with the education of the next generation of map makers and users to remain a viable profession.

Kumler and Battenfield offer some interesting observations about gender differences in students' sketch maps in Chapter 10, "Gender differences in map reading abilities: What do we know? What can we do?" Based on preliminary results from a study they are conducting, these authors suggest that females may prefer to illustrate maps with perspective views. They offer their plan for studying this phenomenon and suggest further research into gender differences and map reading.

Vasiliev discusses design issues regarding mapping time in Chapter 11, "Design issues to be considered when mapping time." Different types of time phenomena are discussed (time as a moment, time as a period, time as a structured object, time as distance, and space as a clock). She also provides suggestions for mapping each of these concepts as points, lines, and areas.

In Chapter 12, "Re-examining the cartographic depiction of topography," Wheate reviews earlier work which suggests that shaded relief maps provide a more imageable surface, allow faster interpretation of relief surfaces, and help the map reader to structure the information. Since shaded relief is effective and can

now be produced by more sophisticated tools at lower cost, Wheate concludes cartographers should use these more modern techniques and include relief shading in their work.

In Chapter 13, "Cartographic symbolization requirements for micro-computer based geographic information systems," Mersey reviews the symbolization techniques used in traditional atlases for both quantitative maps and qualitative ones. She also examines and discusses non-map content. Mersey points out that all the design techniques found in traditional atlases have been automated; however, not all software packages perform the entire range of traditional mapping functions. She cites examples such as the need to often export GIS output to illustration software to gain the desired range of design flexibility.

McGranaghan, in Chapter 14, "An experiment with choropleth maps on a monochrome LCD panel," reports the results of his study on the display of choropleth maps on LCD panels. The results suggest that maps on lighter backgrounds were read faster than those on darker backgrounds. He also suggests that although there is a faster response time, when taken in total, the differences are unlikely to "add up to a good coffee break."

In Chapter 15, "An evaluation of multivariate, quantitative point symbols for maps," Nelson and Gilmartin report their results on multivariate point symbol research. Their study examines the effectiveness of various point symbols (Chernoff faces, circles, crosses, and boxed letters) and their results suggest that Chernoff faces may not be the best choice for cartographic representation. They suggest that traditional cartographic point symbols appear to work better than Chernoff faces and recommend further research.

Lloyd, Rostkowska-Covington, and Steinke discuss two experiments in Chapter 16, "Feature matching and the similarity of maps." The studies suggest that "maps representing categorical information are judged to be more similar if they share common features and less similar if they have distinctive features." They also suggest that "categorical information not directly related to the patterns on maps also affects how similar maps are thought to be."

In Chapter 17, "An examination of the effects of task type and map complexity on sequenced and static choropleth maps," Patton and Cammack report the results of a study which examines the effects of sequenced choropleth maps and subjects' abilities to perform memory tasks. The study evaluates the effectiveness of artificially guided 'chunking' for tasks which evaluate 'what' and 'where' tasks. They found that 'what' tasks were more accurately performed with less reaction time than 'where' tasks.

Belbin briefly reviews Gestalt theory and its contribution to graphics and cartography in Chapter 18, "Gestalt theory applied to cartographic text." He discusses such elements as figure-ground, grouping, and various Gestalt 'laws' and suggests that the whole is greater than the sum of its parts. In addition to his essay, he provides a number of visual examples of Gestalt principles applied to graphics and cartography.

Muehrcke's chapter, Chapter 19, "The logic of map design," includes a wide ranging list of comments about the preceding chapters. His comments focus on the following four points. First, maps are abstract representations of our environment. Those abstractions are not necessarily 'absolute truth'; rather, they are more 'truth to scale.' Second, he

suggests that care be taken to not make GIS into a system which is more real than our maps already appear. Third, map design has a dual nature in both analytical processes and intuitive (or, 'gut') processes. Finally, he suggests better education for maps users.

The real strength of the book is also its weakness. The editors have collected a truly broad set of perspectives. Within these pages, the reader moves between some very systematic approaches (Nelson and Gilmartin, Kumler and Battenfield, McGranaghan, etc.), to more broadly philosophical ideas (Huffman and Belbin), to very practical strategies (Mersey, Monmonier). This 'big tent' approach is good for bringing out ideas. On the other hand, the variety of foci does not allow a truly detailed exploration of cartographic design. The papers tend to not be in-depth and are not conceptually integrated with each other.

To compound the issue, the authors in this volume vary in their interpretation of cartographic design. Some put forth broad theoretical statements that define design as a process which is analytical and intuitive. Other authors focus on research questions dealing with narrowly defined design elements. There does not appear to be any organization to the order of these chapters. The result is that ideas are often juxtaposed with one another, requiring the reader move between contrasts such as postmodernism, Gestalt theory, gender differences, maps and children, and feature matching.

Another problem with the book is that some of the equipment used in the studies can now be considered 'old' (monochrome LCD panels, 486 computers). Likewise, there is little mention of the influence of the World Wide Web on cartography; a venue that was just emerging at the time these

papers were presented in Ottawa in 1994.

The best use for this book would be in an advanced cartographic design class or seminar (although the book price may be prohibitive for students). The chapters are each conceptually independent and all of the readings offer a number of opportunities for discussion about design in a number of contexts: communication, cognition, philosophy, aesthetics, etc. Because the book covers such a wide range of viewpoints, most of the essays are bound to raise the ire of someone in a group discussion while simultaneously pleasing someone else.

The cartographic professional may come away with a mixed evaluation. On the one hand, no startling new breakthroughs in design theory and practice are offered here. Nor is there any consensus on cartographic theory in general. On the other hand, the reader will find the chapters igniting research questions and philosophical ideas in their own minds. By reading these diverse viewpoints, readers are prompted to re-evaluate and re-consider their own theories about cartographic design. Most of the authors make clear there are a variety of questions about design which are yet unanswered, and they provoke new ones in their writings.

It is unfortunate that this book does not include any significant interaction between the chapter authors. Given the range of beliefs expressed here, it might have been interesting to have the authors critique and respond to each other. There are a number of differing points of view, but the reader is left with the idea that there is no conflict, or controversy among them. How can we discuss cartographic design without actively discussing the areas of agreement and especially disagreement amongst ourselves?

Geographic Information Systems: A Visual Approach. Bruce E. Davis. Santa Fe, NM: Onward Press, 1996. 374 pages, about 175 diagrams. Paperback. ISBN 1-566900-098-0.

Reviewed by:

Irina Vasiliev

State University of New York, College at Geneseo

In this day of proliferating Geographic Information Systems (GIS) textbooks, Bruce Davis provides an interesting departure from the norm in his book, *Geographic Information Systems: A Visual Approach*. Davis teaches at the University of the South Pacific in Fiji; English is often a second language for his students and their exposure to computer technology has not been as ubiquitous as most GIS book authors expect. With these limitations in mind, Davis has written a simple handbook of GIS technology and concepts that would satisfy the novice as well as those more technologically sophisticated.

The "visual approach" used by Davis is to present each concept on two facing pages: the left page has a graphic description of the concept, and the right page explains the concept verbally and makes reference to the graphic. This format is used for all eleven chapters of the book. The book is a quick read, two afternoons at most, and I found myself looking at the graphics first and then reading the text only if I needed more explanation of the visual presentation.

The book covers all concepts necessary to understand what a geographic information system is and how it works. Chapter 1, "GIS and the Information Age," is a brief introduction to information and the need to manipulate it. Davis articulates the importance of this by stating that "Information is the heart of GIS (pages 14-15)." It