Atlas..., exploring and sometimes even restructuring statistical data sources, exemplified modern science as a "search for a more rational ordering" of geographical phenomena. The Historical Atlas. . ., in contrast, was more demanding in terms of direction, objectives, and addressing a wide breath of audience. This contrast suggests the conditions behind the scarcity of historical atlases in strongly empiricist England (as was noted by Goffart). Dean's conclusion that the statistically driven economic atlas maintained a direct relationship to and enriched the understanding of social data, but that the design and juxtaposition of thematic maps can further our understanding of phenomena only within primarily spatial terms recalls Jomard's dilemma of exploring scientific patterns through maps.

In the sixth chapter of *Editing Early and Historical Atlases*, R. Cole Harris, editor of *Historical Atlas of Canada Volume I*, shares his thoughts about the atlas as an interpretation of Canadian identity. Despite the clear editorial principles and the management of facts, finances, and an editorial team and network, Canada emerges as the concept that shaped the historical atlas. The atlas is changed by and changes the dialogue of this editorial concept.

Historically we interpret from the evidence transitions from boundaries and nationalism, to social/spatial analysis. The last chapter, written by Deryk Holdsworth, shows us this distinction is an artificial one and is only more complex. Other dialectical differences are also unmasked. The authority of a single author can be established for economic reasons, not solely intellectual, and coexisted with an editorial process shaped by the client. Holdsworth explains what the political issues surrounding the Historical Atlas of

Canada were and the action taken in response to them, but not what constituted the outcome of these attempts at resolution.

The seven contributions of Editing Early and Historical Atlases work together well and build a cohesive history in themselves. Points raised by the authors both logically support what is known about atlases, yet challenges our present history of the genre as a whole. Editing Early and Historical Atlases is an excellent contribution-highly readable and wellwritten-and very welcome in the general history of atlases. It fills a valuable and very lacking need for information to further our understanding of this bibliographic genre, enhancing our appreciation of atlases without destroying the beauty and mystery of these works.

BOOK REVIEW

Proceedings of the Seminar on Teaching Animated Cartography Ferjan Ormeling, Barend Köbben & Rufino Perez Gomez, editors. Enschede, The Netherlands: International Cartographic Association / Association Cartographique Internationale at ITC. 1996. 113 pages. maps, diagrams, illustrations, screen captures, and a list of participants. \$10.00, paper (no ISBN).

Reviewed by Rex Cammack Department of Political Science and Geography Old Dominion University

The Proceedings of the Seminar on Teaching Animated Cartography is a bound collection of papers and abstracts by the participants at an ICA seminar held at Escuela Universitaria de Ingeniera Tecnica Topograpfica in Madrid, Spain from August 30 - September 1, 1995. The seminar was sponsored by various ICA commissions and working groups: the Commission on Multimedia, Commission on Education and Training, Commission on Map Use, and Working Group on Temporal Issues in GIS. The main thrust of the seminar was the teaching of cartographic animation techniques. Like many open invitation seminars, authors interpreted this central theme in their own unique manner and as a result, the proceedings is a collection of papers and ideas covering the broad area of dynamic cartography.

The book is divided into seven parts: Introduction, Basics of Animated Cartography, Use Aspects and Evaluation, Applications, Present Situation, Future, and a List of Participants. The introduction discusses the historical events leading up to the seminar, the groups involved in its sponsorship, and how the different contributions were categorized. The most exciting aspect of the introduction is the announcement that the material in the book is available on the World Wide Web at http://nvkserver.frw.ruu.nl/ ICA/madridiproc.html (Unfortunately, at this writing, the web site has not been completed).

The section on the Basics of Animated Cartography has five papers concerned with many different forms of digital cartography. The first paper (by William Cartwright) discusses in detail the issues of computer equipment and staff needed to complete a multimedia title. The next paper (by Michael Peterson) focuses on dynamic mapping over the World Wide Web. The paper covers the basic concept of the Web and plots its growth history. The article also provides numerous Web sites where basic and advanced information about internet resources and animated mapping can be located. The last three papers in

this section depart from the previous two by focusing on the theoretical concepts of hypermedia, instruction, and the integration with Geographic Information Systems (GIS).

In the next section, three separate papers, by Derek Thompson, Ferjan Ormeling, and Menno-Jan Kraak and Arjen Klomp, look at different theoretical aspects of dynamic mapping. Thompson's paper examines the "fusion of hypermedia and geographic information systems technologies in the particular domain of spatial reasoning" (page 15). Thompson's paper works through the use of the toolbox metaphor for both GIS and hypermedia. Ormeling's paper fits best under the title of the book and the seminar. This paper outlines a strong pedagogue by which teachers can teach students about animated mapping. Kraak's and Klomp's paper places cartographic animations into categories that lead to the development of dynamic maps within a GIS context.

The next section in the book is titled Use Aspects and Evaluation and contains five papers. The papers by Henry W. Castner and Jeffrey S. Torguson share the common thread of education and "geographic thinking." Castner's paper lays out two examples for developing geographic thinking while Torguson evaluates the quality of interaction between map users and an electronic atlas. Following in line with the evaluation theme, a paper by Barend Köbben and Mustafa Yaman sets out to evaluate the effectiveness of direct types of visual variables in animated mapping. The final two papers look at the use of animated maps for weather forecasting (James R. Carter) and virtual environments (Olev Koop).

Applications is the title of the next section. The five papers in this section report on developments of different types of animated mapping titles and their use. Three of the papers look at animated application designed for educating the public on issues such as: Cultural Resource Management (paper by Alexandra Koussoulakou), History of Cartography (paper by Auxiliadora Ramos Ruiz & Victor González del Castillo Dacal) and Global Change (paper by Leonard Gaydos). All three of the papers are brief, with the latter two being abstracts for demonstrations at the seminar. The former is also brief except for the 32 screen captures of the title. A paper by Catherine Mey, Lauren Anderson, Janet Murray, Christopher Steere, and Judy Olson, follows the efforts of a group of students in Olson's GEO 823 Automation in Cartography course at Michigan State University to develop a prototype interactive Atlas for the State of Michigan. The authors discuss in detail the methodology and drawbacks to the project. The last paper (by Thomas W. Holder) looks at the process for including choropleth map animation sequences into interactive atlases.

The final two sections in the book are Present Situation and Future. The former has three papers while the latter has only one. The Present Situation section reports about the development of cartographic animation in England, Russia and Japan. Daniel Dorling discusses the development of a video tape recording to depict the human geography of Britain and the fusion of maps, statistics, and graphics to form an effective means of communicating human geography. The other two papers in this section by Oleg A. Evteev, Vladimir S. Tikunov, and Leniniana F. Yanvareva and one by Kei Kanazawa and Masumi Watanabe look at the development of animated cartography in Russia and Japan. Both papers are a synopsis of the work done presently in both countries. In the Future section, Connie Blok develops the concept of scientific visualization. The paper explains

the development of a graphical user interface that is cognizant of the current thinking in geographic visualization.

In the context of teaching animated cartography, two papers in the volume provide specific pedagogue for educators. Ormeling does so by suggesting four primary topics to be discussed when teaching cartographic animation: theory, types, design and production and analysis of use. In this approach he connects numerous theoretical works in a manner that is understandable and helpful for students and educators. By interweaving the works of individuals such as Bertin (1967), DiBiase, et al. (1992), Dorling (1992), Havward (1984), Koussoulakou (1990), Kraak (1994), MacEachren (1994) and Peterson (1995), Ormeling provides guidelines for instruction in cartographic animation. The second paper that deals with instruction is by Catherine Mey, et al. This paper outlines procedures for developing a multimedia atlas within a graduate class. The paper provides a good course to steer instructors around many pitfalls by providing three specific goals for creating a multimedia atlas: 1) sharpen the planning, execution, skills, and knowledge to complete the task, 2) take advantage of the strengths of individuals involved in the production, 3) produce a prototype to demonstrate the capabilities of the product. By pairing the results in this paper with the system and staff guidelines in Cartwight's paper, an instructor will have a leg up on the task of teaching the production of multimedia titles.

Along with education, several other themes can be identified. One of these is current technology. As mentioned above, Cartwright provides a summary of the hardware, software, and personnel issues for producing multimedia titles. The strength of this paper is the coverage of the hardware

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consideration, however, hardware reviews are only good for a short period of time and here the review is still just a synopsis. Readers looking for a detailed discussion of issues such as DVD storage systems will need to seek out trade magazines for in-depth information. In the context of software issues, Koop provides a look at the current method of creating flythrough movies and he discusses the utilities of several programs: Virtus VR 1.0, KPT Bryce, VistaPro 1.0 and Scenery Animator. Koop's paper perfectly illustrates the frustration readers of this publication will face in imagining what the resulting product looks like. This is where the development of the WWW site with some of the examples from the conference will be helpful.

The last theme presented in the publication is the evaluation of cartographic animation. Köbben and Yaman summarize the results of preliminary tests on the perceptual properties of dynamic visual variables. The authors provide justification for the dynamic visual variables of moment, duration, frequency, order, rate of change, and synchronization and why it is important to understand perceptual effects. At the end of the paper is a table comparing the aforementioned dynamic visual variables and perceptual properties of association, order, quantity, and selection. Several of the cells of the table are scored as strong, fair, or weak and is based on the results of a set of experiments conducted in regard to an unnoted MSc-thesis at the Cartography Department of Utrecht University. After reading the methodology and the conclusion, one is not sure how the authors came to their conclusion. A more in-depth discussion of the testing design must be put forth in order to understand the merit of the authors' results. The authors' line of reasoning and questions are good, however, a more in-depth report is in order. In this context,

a second paper by Torguson looks at the education value of an electronic atlas as learning tools. The paper is only a brief overview of Torguson's (1993) unpublished dissertation. The research focuses on whether electronic atlases with cartographic animations are better educational tools. The results are mixed, but a number of the author's conclusions provide food for thought.

Though the title of these proceedings focus on cartographic animation, the volume offers insights into many other forms of dynamic mapping: interactive, multimedia, and internet media. The book brings together a set of papers that provoke the reader to consider the current state and the future direction of dynamic cartographic designs, research, and education. Through the contemplation of all these ideas, readers will gain insight that dynamic mapping involves the integration of mapping technology, cartographic principles and human cognition.

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