

reviewing the earlier limitations of computers in map production.

The body of the paper is devoted to an explanation of how, in the 1980s, it "has become technologically feasible and cost-effective to assemble and use the data required to automate the mapping process." The application of graph theory to the creation of digital maps is outlined and the use of this digital data in the production of perspective views is graphically illustrated. Practical applications of this cartographic database, in the form of geographic information systems, are noted.

The paper is well illustrated by both color and black and white photography, and by a table on "Digitizing a map." The titles listed in the "Suggested reading" range from the general to the scholarly level. This article could be used in an introduction to cartography class that is aimed at an undergraduate or an adult education audience.

Bylinsky, Gene (1989). Managing with electronic maps.

Fortune, April 24, p. 237-254.

reviewed by Don E. Kiel

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It isn't often that cartography and geography have been featured in a leading business magazine. In a recent issue of *Fortune* magazine, however, electronic maps and geographic information systems (GIS) were reviewed and characterized as revolutionizing the way many governments and businesses operate. Illustrative, diverse examples of use of this technology include: a large forestry company managing 600,000 acres and 4,900 timber stands using GIS; researchers predicting the effects of an earthquake on rescue vehicle response times; transportation planners calculating effects of new roads and traffic signals on travel times; and a department store chain

determining new store locations based upon population, income, and other computerized demographic data. Perhaps most revealing about the growth of the automated mapping/GIS industry is a prediction by one market research analyst that sales of such systems will reach \$590 million by 1992 and potentially be expanding by as much as 35% annually.

The article also highlights the availability of previously digitized maps and associated databases. In addition to well-known digital products from the U.S. Census Bureau and U.S. Geological Survey, mention is made of a private firm, Etak, Inc., which will be making available digital electronic maps to be used as automated navigational aids in automobiles. General Motors expects to begin equipping its luxury cars with "moving maps" in the next two years.

Fortune also profiles a few of the key figures in the GIS and automated mapping industry, most notably Jack Dangermond of the Environmental Systems Research Institute (ESRI) firm. The company's ARC/INFO software is the most advanced and widely used GIS package in the world, with reported sales of \$40 million for 1988. Other companies' strong sales are cited and the article focuses on the fact that automated cartography and GIS are becoming big business indeed.

The decade of the 1980s has seen an unprecedented change take place in the usage of computers in geography and cartography. The far-ranging application of automated mapping and GIS software in such fields as profiled in this article indicates that a new preeminence is being achieved by these disciplines. Continued development of this trend will positively affect collegiate geography and cartography programs and the number of professionals in these fields. As the article sums up,

"Geography has come a long way since you memorized the state capitals for Miss McGonagle in the fifth grade." It's good to see the business world recognize that fact.

Ganter, John (1989). CAD for cave mapping: a cautious assessment.

Compass & Tape, Spring 1989

Abstract:

It has been suggested that CAD packages may reduce the burdens of cave map drafting. I constructed some simulated caves and performed timing tests to investigate the suitability of CAD for cave map compilation and drafting. I discovered dramatic increases in processing time as the maps increased in complexity. While vector (line drawing) approaches have inherent limitations for present cave maps, some methods of breaking down large cave maps into parts (tiling, Blocks) may apply. It appears that CAD cave mapping is only practical with very fast microcomputers, and that a number of conceptual and practical problems remain. In particular the issue tends to highlight the distinctions between sophisticated tools and skilled tool users.

Abel, Robert and Kulhavy, Raymond (1986). Maps, mode of text presentation, and children's prose learning

American Educational Research Journal 23:2, pp. 263-274.

reviewed by Jeffrey C. Patton
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A study undertaken to determine the effectiveness of reference maps in aiding children in the recall of prose presented either orally or in written form.

The authors, both educational psychologists, proposed two basic

hypotheses. First, that maps would aid, in the recall of map-related text, those students who *heard* a prose passage more than those who *read* the same passage. This supposition was based on previous studies of graphic stimuli (non-map stimuli) which had suggested that conflicting cognitive processes may be involved when an individual tries to maintain a mental graphic image and read simultaneously. However, no such conflict had been found between maintaining a graphic image and hearing information. The second proposed hypothesis was that the perceptual elements of the maps would affect a subject's recall of the maps and of the map related prose.

THE TESTING PROCEDURE

To test both of these hypotheses three maps were created to accompany a prose passage presented to 113 fifth and sixth-grade students in a middle-class Phoenix, Arizona neighborhood. The different cartographic presentations were an attempt to vary two primary map components. First, the level of symbol abstraction (one set of maps had picture-like symbols while another used only geometric forms) and secondly the spatial distribution of features (one set of maps placed the map symbols in a "logical" spatial pattern according to the prose passage while the other was simply a pictorial list of features along the margin of an outline map).

Equal numbers of fifth and sixth-grade students were randomly assigned to a reading or listening group. Subjects in each group were then randomly assigned a picture, geometric, or list map. The subjects were asked to study their maps and told that the maps would be helpful in learning a story they were about to hear or read. The maps were then removed and a short prose passage was presented either orally or in

written form. When the story was completed the subjects took their maps out again and studied them for an additional two minutes.

Recall of the text information was measured by the use of 32 completion questions which could be answered in a word or two. Sixteen questions were related to map feature information and sixteen assessing information not related to the maps. Memory for the maps was measured by having the subjects attempt to locate the features on a blank sheet of paper by placing an "X" where each feature should be and then labeling that feature. Correct location was defined as being within two inches of the actual location.

RESULTS

Results of this study failed to support the first hypothesis, as subjects who read the prose had scores on the map-related questions and on the map recall test that were not statistically different from the scores of subjects who had the prose presented orally. Reading was found to be superior for the recall of non-map related information.

Results did support the second hypothesis that the perceptual elements of the map would affect the recall of map related textual information as well as the map itself. Subjects who had the picture-like map symbols "logically" spatially arranged scored significantly higher than those subjects who viewed either the picture-like map symbols in a list or those subjects that were shown geometric symbols that were arranged "logically". No significant difference was found between the last two groups indicating that spatiality or the mimetic level of symbols alone was not responsible for the improved scores, rather a combination of the two was necessary for increased learning.

COMMENTS

One must question the reasoning for allowing the subjects to re-examine their maps after the presentation of the text material. If the intent of a portion of the study was to determine if the subject could hold a mental construct of the map while simultaneously reading the text material the viewing of the map after the text had been read should clearly have been avoided. In addition the article would have been greatly strengthened if the test maps utilized in the study would have been included.

As a cartographer this article is particularly interesting; on one hand it is a main-stream cartographic study, and yet as it is the work of non-cartographers, it provides a perspective which can be highly beneficial and stimulating. Unfortunately the article also vividly portrays the ever present problem of specialization in academia as the authors appear to be totally unaware of the wealth of published cartographic research clearly pertinent to their study.

Spencer, Jim (1988).

Orienteering for deer.

American Hunter, December, 1988; pp. 32-34, 59.

reviewed by Kevin M. Kolb
Penn State University

Spencer recounts a hunting excursion on which his party conducts pre-hunt scouting of an unfamiliar forested region of north Georgia, using only USGS topo quads and their natural instincts. The party arrives after nightfall, leaves camp before daybreak, and succeeds in scoring two bucks by mid-morning.

Through the article, Spencer offers a brief explanation of magnetic declination, and the scale characteristics of USGS 7 and 15 minute quadrangles. He gives a few basics on how to use a map