

decision of which hat rack to place or organize the hats is critical because it determines the informational patterns that will be built. The juxtaposition of these patterns can lead to new understandings of the information. Effective graphic design is related to the selection of the appropriate hat rack, the one "which most easily reveals the aspect of a subject that you want to communicate."

While information may be hung on the five ultimate hat racks, the understanding of that information can only occur when the new information can be related to something you already understand. For example, most people do not have an accurate concept of how large an acre is. However, once shown that an acre is about the size of an American football field (minus the end zones), it becomes understandable. Wurman points out that too often in our graphic design and in our educational system there has been a failure to relate new information to what is already understood. According to Wurman, simplification or minimalization of information, rather than organization and clarification have become the norm, leading to what he calls the "dumbing of America." For example, maps designed for young children have often been designed to be "simpler," which has only made them more abstract and more difficult for the child to comprehend. The inability of the child to relate the map information to spatial concepts that they already understand also makes the maps less interesting to the child. Wurman stresses that it is interest that is the key to understanding. "Memory, interest, and learning to define our existence. Learning is remembering what you are interested in." Wurman feels that interesting design comes from illumination of the pattern and organization of the information, not from graphic decorations or

the addition of color to "spice up" a map (what he calls "rainbow worship"). The goal of graphic design should be "to let the data become information — to become active and expressive."

The remainder of the article summarizes Wurman's ideas on how to present information, much of it reminiscent of work done in the late 60's and early 70's by cartographers on cartographic communication. However, his viewpoint and insight may be fresh to most cartographers, particularly his comments on the use and abuse of color, and on how technological change effects not only how the design is created but also what the design looks like and its interpretation.

This article is not a scientific report based on extensive research, rather it is a mix of philosophy and anecdotes from 30 years of experience in graphic design. As should be expected, some of Wurman's most compelling arguments are made not with his words but through carefully selected illustrations. The article makes for thought provoking reading and viewing.

cartographic artifacts

NEW MAP PROJECTIONS BOOKLET

The American Congress on Surveying and Mapping (ACSM) has recently published a thirty-page booklet entitled *Matching the Map Projection to the Need*. The third in a series, it was prepared under the auspices of the Committee on Map Projections of the American Cartographic Association, a member organization of ACSM. The booklet addresses ways in which map projections can help make clear various geographic relationships and objectives, whether for technical or

popular presentations.

The text is non-mathematical, and more than seventy illustrations show numerous projections for world and regional maps. Edited by Arthur H. Robinson and John P. Snyder, twelve two-page chapters by ten leading cartographers are included in an 8.5 x 11 format. Common and rare map projections are used for a variety of different purposes, such as displaying continental drift, viewing Earth from space, showing routes for globe circlers, and enlarging the heart of a map.

Copies may be obtained from ACSM at a cost of \$15 for members and students and \$20 for nonmembers. Contact ACSM Publications, 5410 Grosvenor Lane, Bethesda, MD 20814-2122; (301) 493-0200, fax (301) 493-8245.

NETWORK RESOURCES FOR MAP PEOPLE

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Ever had a problem that your local library couldn't deal with and you needed some immediate help? Or, as a librarian, ever had a user ask you a question that got you stumped? And what about keeping up with the latest map information in a timely manner and keeping in touch with other cartographers? Interested in a quick and reliable resource that could give you an answer in hours rather than days or weeks?

In the past few years several network discussion and information groups have sprung up that allow cartographers and geographers to send in questions and answers and generally discuss topics as diverse as GIS, mapping, graphics and geography. Snag: you must have electronic mail capabilities (generally a computer account at your university or library, or a PC and modem). Once you've acquired these, you

can enter the 'net,' a colloquial name for the groups, news sources and email connections that exist in a variety of forums.

Say you're interested in GIS. The State University of New York, Buffalo (actually Ezra Zubrow of the Department of Anthropology and NCGIA-Buffalo) launched an electronic GIS discussion group (called a 'listserv') in June, 1988. Now co-owned with David Mark of the Geography Department, the more than 500 members currently exchange about five messages per day. GIS-L (as it is known) is made up of academics (about half its members), the public sector and the private sector, including ESRI, proprietors of the well-known ARC/INFO system. It is also strongly international, with about 40 percent non-US membership.

Another list, called GEOGRAPH, describes itself as being for and by geographers, and has over 300 members. Based in Finland, it was launched in the late eighties, and is easily accessible via the net. My own listserv, INGRAFX, which covers issues in information graphics, was launched in March 1991, and now has 250-300 members.

As of April 5, 1991, there is another electronic source of GIS information. *GIS World*, a trade magazine from Fort Collins, CO, now offers a "a worldwide information service . . . on the GIS industry, applications and people" (*GIS World*, 4, p. 81). Dubbed G/O (*GIS Online*), the service is available to people with a computer and modem . . . and the means to pay \$39 a quarter and \$14 per hour of connect time (\$25 outside the US). The service is only available to *GIS World* subscribers.

The forum which may be most interesting to NACIS members, however, is MAPS-L. It was set up earlier this year by map librarian and NACIS member John Sutherland at the University of Georgia. MAPS-L has over two

hundred members, comprised of map librarians (about 60 percent) and academic cartographers (about 20 percent), as well as a mixture of commercial firms, government employees and others interested in mapping who make up the balance. In the introductory file members receive when they sign on, MAPS-L is "dedicated to discussing ways of effectively and efficiently exploiting cartographic resources." With the advent of computer 'email' of course, this effort is made far easier, and many members can be reached easily and cheaply. Sutherland says that over "the last 3-5 years I have been trying to get a BB [bulletin board] or computer conference started for map information people." He said he spent time at various meetings satisfying himself that map information people had access to email before he set up the group, which was opened to subscribers in February 1991.

According to John, "the majority of topics [on MAPS-L] deal with reference, cataloging, or other technical questions that arise in map collections (or map information organizations)." But he emphasizes that issues of interest to cartographers as a whole are also part of MAPS-L. "Anything to do with cartography and cartographic information, from concrete cows to red tractors, from historic maps to GIS." Although anybody is welcome to join, he did add that "the list is not set up to be a discussion of theories." As moderator, he has not had any problems with "inappropriate" discussions.

As for the future, John says that "I would like to see MAPS-L become the quick map information source and connection for the map information community. I would like to see a weekly/monthly newsletter go out over MAPS-L. Email, electronic communications, and electronic publications will

change greatly in the near future. If MAPS-L provides a good communication channel for a few years and is then replaced by something from newer systems it will still have done the basic job I planned."

These kinds of resources are made possible by cheap and efficient network communications which enable them to pass ideas and information to each other over great distances. Network communication means that you don't have to be close to large metropolitan centers any longer in order to be well informed — the 'tyranny of distance' is effectively annulled.

On the other hand these developments raise crucial ethical issues relating to access and freedom of expression. Not everyone can afford a computer and modem (although prices are constantly falling), nor, more pertinently, is everyone who is interested in mapping and GIS located at a university or company with network access. And sometimes resources require a technical familiarity that may be time-consuming and effortful to acquire. Even those who may be able to afford the resources may find that the resources are simply not available in their part of the world. For example, the net, while being well developed in Europe and the Americas, has only marginally penetrated Africa and Asia. Is it 'fair' that western academics and a few companies can pass around information that will only reach other interested parties much later (if ever)? In other words, is this information, by virtue of being accessible only to those who can afford it and access it, privileged in some way? If so, what can be done that would alleviate this situation?

Most resources accessible from universities are available without charge. But like other private companies, *GIS World* charges for access to G/O, at rates it calls a

"pittance" but which in fact are higher than other popular networks such as Compuserve and Prodigy. Beyond the issue of charges however is that of the limits to what can be said on private networks. Criticism of a company's products or policy is sometimes discouraged or censored, such as a recent controversy at Prodigy, a network jointly owned by IBM and Sears, which ended up terminating some people's membership over a dispute involving 'censoring' of email. Prodigy is now under investigation by the Los Angeles County District Attorney for deceptive trade practices. From a company's point of view, such actions may seem necessary, but it does raise pertinent issues of free speech and censorship. Potential users of these systems should bear in mind that their money does not buy them the ability to deviate from company policy.

What can we look forward to in the future? I think a variety of network resources will be useful to cartographers. Some will come with restrictions, while others will be more open and critical. And network access will presumably become cheaper and more widespread. It is hard to believe that access will never involve some kind of 'start-up' costs, where potential users will have to familiarize themselves with computer systems, although graphical user interfaces may help. Costs will continue to decrease (for example, the new IBM PS/1 comes with an onboard modem for under \$1,000). An informed choice will be essential, so cartographers should not shy away from what may be a very significant development. And as I personally found, if the resource is not there, it is always possible to create it yourself.

How to join the groups mentioned: Send an email note containing the message SUBSCRIBE <group name> <your name> to

the following addresses, for GIS-L send to LISTSERV@UBVM, for MAPS-L send to LISTSERV@UGA, for GEOGRAPH send to LISTSERV@FINHUTC, and for INGRAFX send to LISTSERV@PSUVM. For example, if your name is John Q Cartographer and you wish to join MAPS-L, send an email note to LISTSERV@UGA with the message SUBSCRIBE MAPS-L John Q Cartographer.

To join G/O call 1-800-GIS-WRLD.

NTIS CITATIONS

Atlas of Eastern Europe. Central Intelligence Agency, Washington, DC. August 1990, 102pp. CPAS-90-10002. Color illustrations reproduced in black and white. Paper copy available on Standing Order, deposit account required, U.S., Canada, and Mexico, minimum deposit \$100; all others \$200. This series offers a reduction in price as a standing order, PB91-928000. PB91-928001/WNR — Standing Order.

Eastern Europe is in transition. As the eight nations that have composed this region since World War II emerge from communist regimes, they will have problems such as demands for autonomy by ethnic minorities, cultural diversity, economic reform, and in the case of East Germany, reunification. The atlas describes in maps and charts a variety of geographical, political, historical and economic information to profile the region in the post-Cold War era. Maps are included in color with the report.

Atlas of Air Quality and Deposition in or Near Forests of the Western United States.

M. Boehm and T. Vandetta. NSI Technology Services Corp., Corvallis, OR. September 1990,

465pp. EPA/600/3-90/081. PB91-106229/WNR; price code: PC A20/MF A20.

An atlas of air quality and deposition data has been compiled to make air pollution data and information more accessible to biologists and ecologists working in western forests. Data from the 1985 National Acid Precipitation Assessment Program Emission inventory are used to characterize emissions of sulphur dioxide and nitrogen oxides across the West. Maps illustrating location, type, and magnitude of major point source emissions together with pie charts of the percent contribution by source category are presented alphabetically by state. Data from the Environmental Protection Agency databases AIRS and SAROAD are used to characterize ambient levels of sulphur dioxide and ozone for three averaging periods: annual etc. . . , May through October or growing season, and monthly. Data for 20 sulphur dioxide and 70 ozone sites in or near western forests are presented by state. Biographic information together with standard summary statistics are given for each site.

Selected Papers in the Applied Computer Sciences, 1990.

D. A. Wiltshire. Geological Survey, Denver, CO. 1990, 73pp. USGA-BULL-1908. Also available from Superintendent of Documents. Portions of this document are not fully legible. Color illustrations reproduced in black and white. PB91-141689/WNR; price code: PC A04/MF A01.

The compendium of papers reports on the technical advances in the applied computer sciences that were developed to support earth science research. The second volume, published in the U.S. Geological Survey Bulletin series, comprises short papers that

address the following aspects of the applied computer sciences: Contents: Applications of User-Supplied Transformations in Computer-Graphics Programs; Linking Digital Technology to Printing Technology for Producing Publication-Quality Color Graphics; Generating Color Separations of Geologic Maps on the Computer; Digital Spatial Data Technology and Applications; Radon Potential Defined by Exploratory Data Analysis and Geographic Information Systems; Automation of Data Systems — Minnesota's Approach for Water-Use Data.

Beta Splines Interpolation for DEM's. Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil). March 1990, 13pp. N91-11415/7/WNR; price code: PC A03/MF A01.

The interpolators used for the densification of Digital Elevation Models normally do not take into account additional information known to the operator, like rivers, lakes (flat areas), or mountain ridges. They interpolate based on the control points only. The Beta-splines curves, on the other hand, have properties that enable the operator to modify the bias and the tension for each cell by assigning values to the parameters beta 1 and beta 2. Thus, it is possible to force the resulting three dimensional surface to acquire a desirable shape. The disadvantage is the relatively large amount of extra calculations, but with the now available faster, and cheaper microcomputers, this disadvantage can be overcome. This work tests the use of Beta-splines interpolators for DEM's running on an IBM-PC-like environment.

AVAILABILITY OF INTERNATIONAL TOPOGRAPHIC MAPS

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One of the benefits of the political upheaval in Eastern Europe has been the lifting of restrictions on cartographic products, particularly topographic maps. Topographic maps available to the public are newly printed, sanitized versions of military topographic maps. Unfortunately, the Polish and Hungarian topographic maps lack latitude and longitude information, because the maps are based on internal grid systems unique to their countries.

Hungary was the first Eastern bloc country to release topographic maps since World War II. These included maps at scales from 1:10,000 to 1:200,000, at \$22 to \$29 a sheet. For many years Hungary had public access to geologic and other non-topographic maps through Cartographica, a quasi-governmental publishing and export agency, but the release of topographic maps was a real breakthrough.

In early spring, Poland and the German Democratic Republic also released their topographic maps to the public. Both countries released map series at scales from 1:25,000 to 1:200,000 at about \$15 a sheet. Ironically, after becoming available, the East German maps were temporarily unavailable after reunification, due to the consolidation of East and West German ministries.

In late summer Czechoslovakia became the fourth Eastern bloc country to release its topographic maps to the public. These maps also are available at scales from 1:25,000 to 1:200,000 at \$13 to \$16 a sheet.

The Soviet Union also has released its topographic maps for public sale. Although the USSR is completely mapped at the scale of 1:100,000 (26,000 sheets) and

1:50,000 (90,000 sheets), only 99 of the 5,500-sheet series at 1:200,000, and 55 of the 180-sheet 1:1,000,000 series are available. Additional sheets are due to be printed this year. Due to the severe paper shortage in the USSR, only limited numbers of sheets have been printed in non-military versions. Unfortunately, GUGK (Glavnoe Upravlenie Geodezii i Kartografii) has priced the maps at an astronomical \$100 to \$125 a sheet to try to acquire hard currency from the major oil and mining companies. The current prices preclude most customers buying more than a few sheets and puts buying complete sets well beyond any library's budget. Eventually GUGK will have to lower their prices if they are to have any sales volume at all.

The other Eastern bloc countries — Albania, Bulgaria, Romania, and Yugoslavia — have not yet released their topographic maps to the public. Ethnic unrest in these regions has made the governments slow to follow the regional trend. However, travel, tourist, and a few geologic maps are now available for Bulgaria, Romania, and Yugoslavia.

Countries in South America are continuing to publish new topographic maps on a regular basis. Bolivia is leading the way, with nearly 200 new topographic sheets in 1990. Uruguay offers 41 sheets at 1:50,000. Several other countries have printed new sheets, including Brazil and Venezuela, while the PAIGH Commission (Pan American Institute of Geography and History, a body within the Organization of American States) printed new sheets for Venezuela, Argentina, and Chile. But obtaining maps from South America continues to be quite difficult. Several of these countries require prepayment in their own currency, which is difficult to obtain, and take several months to fill an order.

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