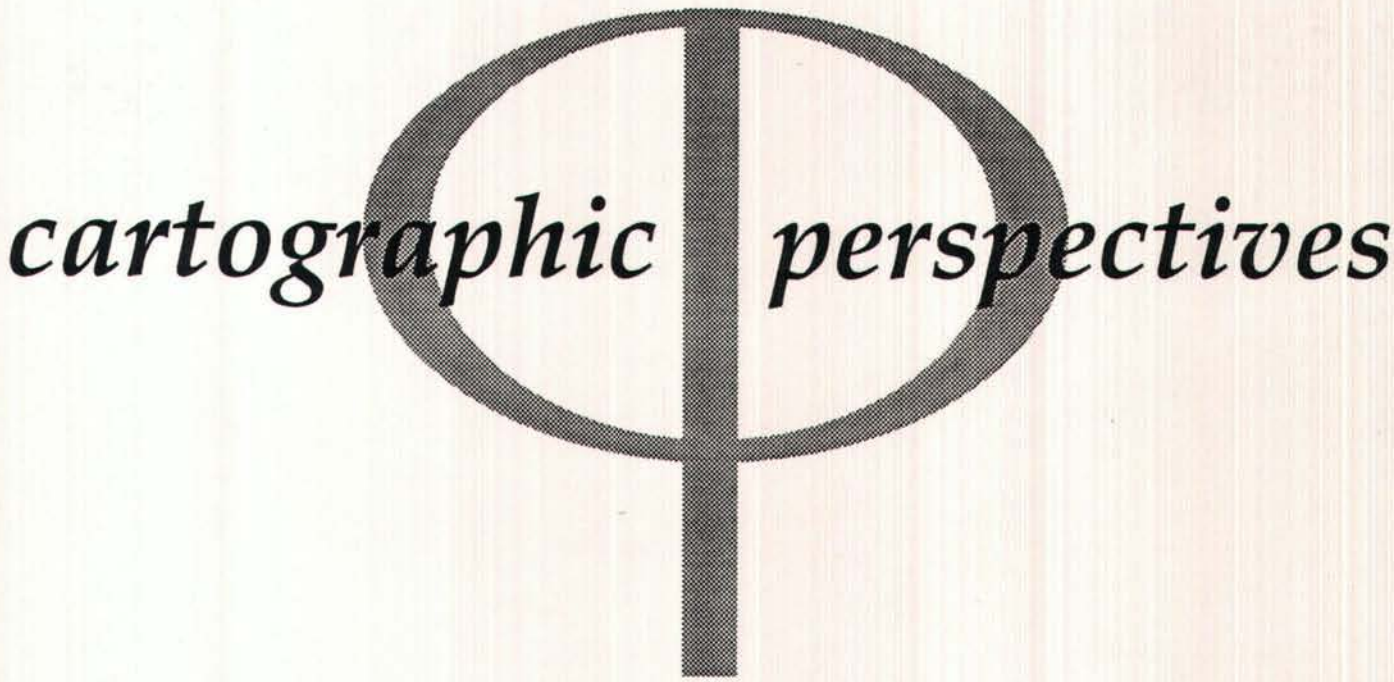

bulletin of the
North American Cartographic Information Society

Number 2, Summer 1989

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cartographic perspectives

Number 2, Summer 1989

in this issue

Editors' notes

You may have noticed that *CP's* numbering scheme has changed. "Volume 1 number 1 March 1989" has been superceded by "Number 2, Summer 1989." Ed Dahl, early cartography specialist with the National Archives of Canada, swayed us with ample (and amusing) evidence of the shortcomings of the volume/number scheme. As long as we were adjusting things, we thought that dating by season rather than by month would be better too (under the former scheme, this issue would have been dated "June," which would not have been quite true).

We do promise, however, that "Number 3, Fall 1989" will reach most of our readers in advance of the Annual Meeting (October 11–14, Ann Arbor, Michigan). We invite all who may wish to contribute a software review, events report, "fugitive cartographic literature" review, maps-in-the-news clipping, or cart lab bulletin board notice to contact us soon; to fulfill our promise, the deadline for submissions must be August 20!

We do hope you find the current issue useful, and as always, we welcome your comments.

David DiBiase & Karl Proehl

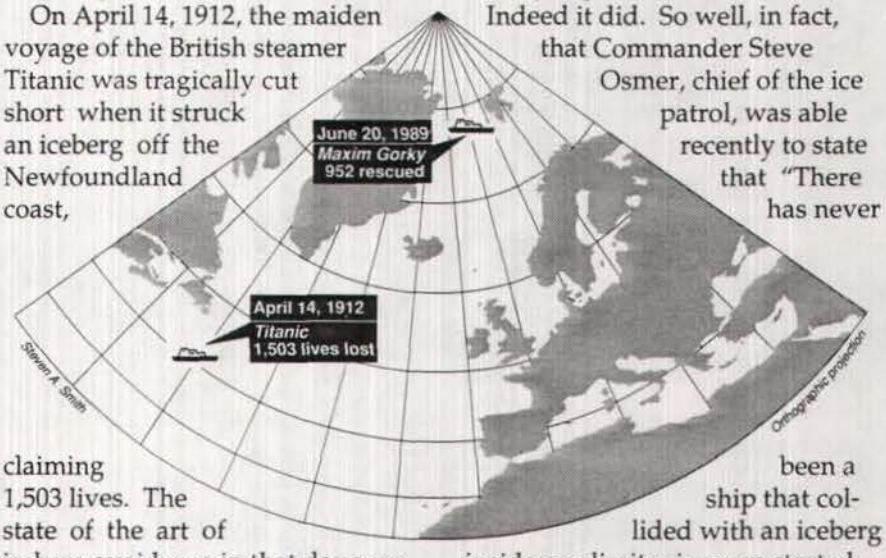
cartographic perspectives on the news

ICE ALERT!

Just after midnight on June 20 the Soviet cruise liner Maxim Gorky struck an iceberg in the Norwegian Sea about 180 miles west of the Spitsbergen Islands. The liner's hull suffered two large gashes—30 inches by 8 feet and 2 inches by 19 feet—forcing 575 West German passengers to take to the sea in lifeboats. At least 90 passengers alighted on sea ice when one lifeboat was damaged. Fortunately, the foggy, twilit arctic night was calm and the temperature just above freezing. The Norwegian Coast Guard vessel Senja arrived on the scene about four hours later. A helicopter was dispatched and all passengers were rescued without casualties. The 120 crew members who remained onboard somehow managed to keep the vessel afloat.

Icebergs continue to be perilous obstacles to high-latitude ocean navigation even now, 77 years after the Maxim Gorky's most famous predecessor.

On April 14, 1912, the maiden voyage of the British steamer Titanic was tragically cut short when it struck an iceberg off the Newfoundland coast, claiming 1,503 lives. The state of the art of iceberg avoidance in that day was to periodically lower a thermometer overboard, with the expectation that the ship would be warned of impending danger by a sudden drop of ocean temperature. A more reliable solution has been sought ever since.



An impressive variety of schemes has been proposed or attempted, ranging from nuclear explosives, depth charges and torpedoes (the Brute Force approach), to laser beams (the Star Wars approach), acid sprays (the Chemical Warfare approach), even giant lassos and gargantuan suction cups (the Gary Larson approach). Yet the only really effective way to deal with icebergs, says specialist Chris Woodworth-Linas of Memorial University, St. Johns, Newfoundland, "is just to leave them do what they want to do."

In 1914, the Coast Guard International Ice Patrol was charged with the responsibility of tracking and reporting icebergs that threaten shipping lanes in a 700 square mile area of the North Atlantic. "This used to be done with ships out there doing patrols every spring," explains ice patrol senior observer Mike Alfultis. "They would sail around and look for the southernmost iceberg and then basically park next to it and warn ships to stay away. Not exactly high tech, but it worked."

Indeed it did. So well, in fact, that Commander Steve Osmer, chief of the ice patrol, was able recently to state that "There has never been a ship that collided with an iceberg inside our limits since we started in 1914" (what went wrong in the Norwegian Sea has yet to be told as this goes to press).

Since 1984, however, the Ice Patrol has been able to meet its responsibilities far more efficiently through airborne surveillance. A remote sensing technique known by the acronym SLAR (Side-Looking Airborne Radar), which is able to penetrate the persistent fog that shrouds the area, has made airborne surveillance possible.

SLAR involves the pulsed transmission of long-wavelength "microwave" energy from an antenna mounted to the underside of an aircraft. Owing to differences in the reflectance characteristics of materials on the ground or the ocean surface, the energy is returned to the aircraft at different intensities. These signals are subsequently converted to images in which varying reflectance appears as tonal variation from light to dark.

As is the case with most remotely sensed information, interpretation is a problem. "It is sometimes quite difficult to spot icebergs when they are in the middle of sea ice," explained ice patrol scientist Donald Murphy. "Reading these films is still something of an art." The interpreted SLAR imagery is used to produce daily maps depicting the locations and drift patterns of known and suspected icebergs. Iceberg alerts are also broadcast to ships navigating the area.

(adapted from the Philadelphia Inquirer, 6/11/89 and 6/21/89)

"GIS" IN THE MASS MEDIA

The May 28 edition of Peter H. Lewis' *New York Times* column "The Executive Computer" is entitled "When Maps are Tied to Data Bases." Lewis discusses several commercial and governmental applications of mapping software, from Pizza Hut franchise location decisions to urban utilities management to analysing the effects of development strategies at the World Bank to vehicle navigation systems in GM cars.

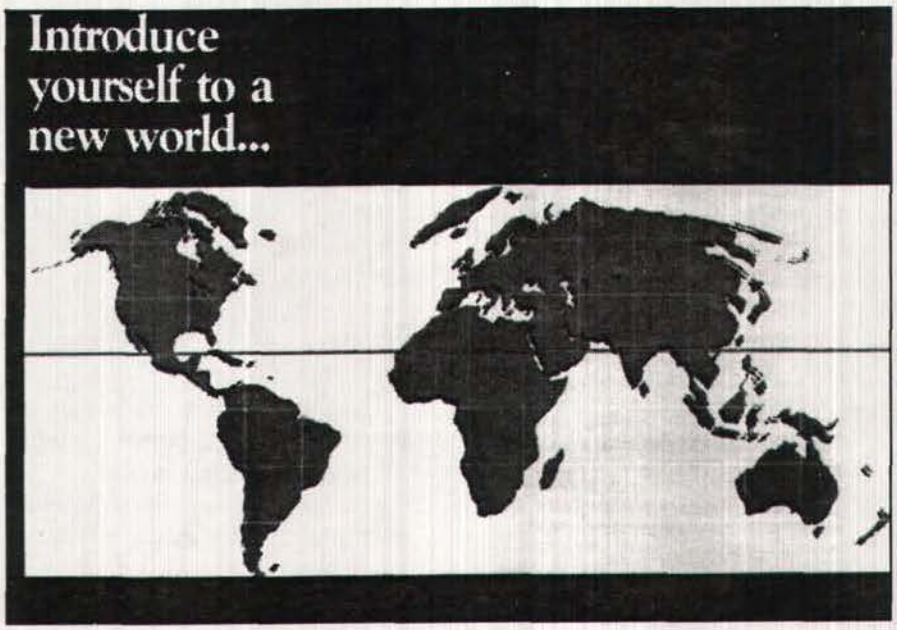
The article begins with a general description of GIS, which Lewis notes is "one of the fastest-growing applications of personal comput-

ers." "Geographic information systems merge conventional data bases, which consist of rows and columns of numbers and words, with spatial data bases of maps and diagrams." The article subsequently drifts from GIS to AM/FM to desktop mapping applications, ignoring the admittedly fuzzy boundaries between different classes of computer-assisted geographic information analysis.

Lewis interviewed several GIS/mapping software vendors and users for the piece. Stephen Poizner of Strategic Locations Planning (purveyor of the desktop mapping stalwart Atlas*Graphics) explains that "If you have information that includes geographic data, it makes sense to analyse it in map form; otherwise you lose the spatial sense." Lewis credits Steward Nazzaro of the Dallas consultants Peat Marwick Main & Co. with the statement that "fewer than 10 percent of the country's governmental bodies now use geographic information systems. But it is inevitable that virtually all of them will be using computerized maps by the year 2000." Les Barker of the World Bank stresses that "There's a night-and-day difference between what we were doing before, using pen and ink and mechanical production, and what we're doing now with computers. . . . In the past 18 to 22 months we've saved half a million dollars in printing and pre-press costs."

Lewis concludes by anticipating the effect on computer-assisted geographic information analysis of the 1990 Census. "When the United States Census figures begin rolling in after April 1, 1990, companies and government agencies with geographic information systems will have unprecedented access to information about their customers and citizens." While this statement is certainly cause for excitement among professionals who deal with maps and mapping, for citizens and consumers it may be cause for ambivalence. So long as only maps (not minds) are tied to data bases, the proliferation of computerized geographical analysis seems likely to be a welcome trend.

The *Time* piece includes an amusing account of an abandoned attempt to rename the Philippines: "Filipinos have long bristled at the colonialistic implications of calling their country the Philippines, in honor of Philip II of Spain. During the regime of Ferdinand Marcos, there was a campaign to rename the country Maharlika, a native word meaning noble and aristocratic. Plans for rechristening proceeded until an academic pointed out that the word probably derived from Sanskrit. Fine, the proponents said, Sanskrit is a non-imperialist language. Yes, replied the scholar, but Maharlika was most likely derived from the words *maha lingam*, meaning 'great phallus.' That was the end of the campaign."



Prospective new members of a prominent professional association concerned with surveying and mapping are currently receiving promotional literature which includes the map-like artifact shown above. Notice that this "new world"—apparently constructed from an interrupted projection of the old—includes twin Greenlands, Icelands, and Aleutian Island archipelagoes. How ironic that this illustration (which will likely be presented to generations of cartography students as a dubious example) represents an organization that continues to do such good work to promote better understanding of map projections.

THE NAMES THEY ARE A-CHANGING

Time (June 19, 1989) recently ran a feature on the ephemeral nature of geographic names. *Time* notes that Burma has renamed itself Myanma, and that Cambodia (née Kampuchea) has changed its name five times in the past 20 years. "No international laws govern the christening of countries: the label that sticks is determined by the tastes or even the sanity of its rulers."

NATIONAL INVENTORIES OF DIGITAL SPATIAL DATA AND CARTOGRAPHIC APPLICATIONS SOFTWARE

It may seem odd that this information is presented under the heading "news" — after all, these inventories have been available since October, 1986. It seems to CP, however, that many of our readers may not be familiar with the background of this major effort, which we suspect will be interesting. No doubt there are some for whom the existence of these valuable resources is indeed news. Since the inventories are continuously updated and expanded as new information is received, this news is by no means out of date (no matter how slow bulk rate mail may be).

As a result of the National Inventories project, two documents, *Sources for Digital Spatial Data* and *Sources for Software for Computer Mapping and Related Disciplines* have been made available. *Sources for Digital Spatial Data* (489 pages as of June, 1989) includes brief descriptions of 687 spatial data sets that are available from various Federal, State, and local government agencies, and from the private sector. The data sets are indexed by area of coverage (world, U.S. or region, and project areas by State), and cross-referenced by 16 data types (administrative, base mapping, biological, cadastral, etc.). The *Sources for Software* catalog (582 pages) provides 885 mapping software descriptions indexed by ten categories (coordinate conversion, data modeling/analysis, geodetic/cadastral, geographic information systems, image processing and analysis, map and chart plotting and construction, microcomputer software, photogrammetry, physical sciences related to mapping, and data format conversion). The documents are laser printed directly from a database as orders are received on 8.5" by 11" paper and are velo-bound. They can be purchased for $22 each from the Earth Science Information Center, 507 National Center, Reston, VA 22092. Orders must be prepaid by check, money order, Mastercard, Visa, or government order. Custom searches are also available; call (703) 860-6045 for information.

The National Inventory project was implemented as the result of a 1983 "monitored bureau objective" of the Office of Information and Data Services, National Mapping Division, United States Geological Survey. The objective called for "a clearinghouse function for collection and dissemination of information on federal and state holdings of spatial data," and was later expanded to include cartographic applications software and holdings of private industry.

The monitored bureau objective followed from a Survey of Digital Activities conducted by the Federal Interagency Coordinating Committee on Digital Cartography. Keith Elliott was hired to implement the objective. He began by analyzing some 2500 pages of responses to the initial survey, compiling a list of about 130 government contacts. The initial contacts were approached through direct telephone and mail campaigns.

Elliott's survey methodology involved modifying an existing NTIS software information form and designing an original database description form. Concerned that response rates were likely to drop off rapidly if complex responses were required, he decided to request brief and fairly general descriptions. Contributors to *Sources for Digital Spatial Data* were queried about database subject, area of coverage, method of spatial referencing, currency, source, scale of digitized sources, accuracy, database size, structure and medium, as well as availability and price. *Sources for Software* is compiled from responses to queries on application area, capabilities, hardware and operating system requirements, licensing terms, and price. Elliott notes that "the quality of responses varied from very detailed specifications to generic sales pitches." Though the responses have been edited, they remain somewhat uneven in format and content.

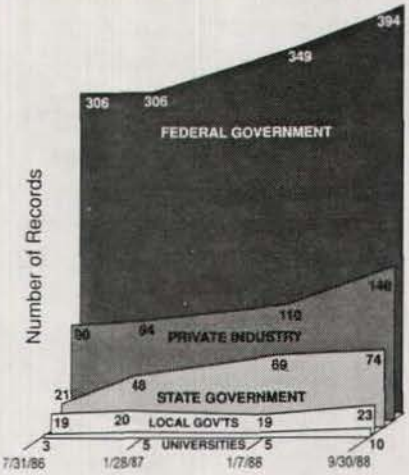


Figure 1: Trends in data references

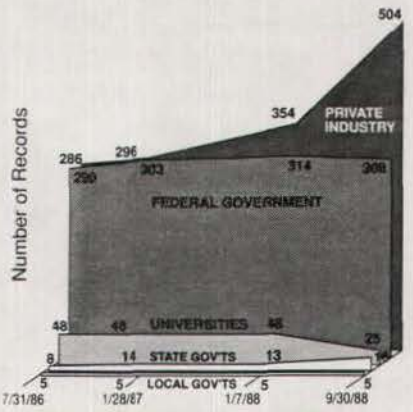


Figure 2: Trends in software references

The accompanying diagrams illustrate trends in the contributions of data and software references by producer sector in the two year period since the documents became available. Figure 1 demonstrates that the source of the majority (61 percent) of data references continues to be the Federal government. The number of records overall has increased by

48 percent. Elliott is convinced that a great many more data sets could be listed, but "some people don't have a mechanism for responding to people who may be interested."

The largest proportion of software references come from the private sector (59 percent). While the number of records associated with the Federal government has been static since 1986, the number associated with private industry has increased by 76 percent (Figure 2). Overall, the number of software references has increased 35 percent.

The entire Inventory currently consists of 1572 records that are imbedded in the Cartographic Catalog, a bibliographic database of some 82,000 records maintained in the GIPSY data management system.

According to Elliott, when the Inventories were first made available to NCIC State offices in 1986, the agency "never expected it to take off like it has." Although he has since been detailed as Acting Chief of ESIC and no longer is able to devote as much time to updating the Inventories, Elliott stresses that maintaining this service continues to be an important ESIC objective.

GIS INSTRUMENTAL IN OIL SPILL CLEANUP

The May issue of *GIS World* reports on the use of GIS technology in response to the discharge of some 240,000 barrels of crude oil in Prince William Sound from the Exxon tanker Valdez. According to *GIS World*, the Alaska Department of Environmental Conservation (ADEC) was able to integrate its standard environmental database with the GEOREF GIS and a recently completed database of the Prince William Sound shoreline created by E-Tech of Narragansett, Rhode Island. Drawing on ocean current, depth, and sensitive wildlife habitat data as well as aerial and ground surveys, ADEC has been able to produce daily maps of the spill's extent for public and private spill authorities, as well as for Exxon itself. The GIS was implemented on "two Compaq 386/20s, a portable and a desktop, with a 300Mb hard drive and VGA graphics. E-size plots are coming off a Calcomp 1043GT pen plotter" in a makeshift office in a Valdez courthouse.

The National Oceanic and Atmospheric Administration (NOAA) has also been active in using GIS to monitor the spill. Commenting that "NOAA, as an agency, however, apparently has some technical catching up to do," *GIS World* describes how hardcopy "sensitivity maps" of the Prince William Sound area "were being faxed in to Washington and then digitized for use in SPANS."

The military has been using special purpose desktop mapping software to track the disaster. From a command post at Elmendorf Air Force Base near Anchorage, the Air Force's Oil Spill Computer Aided Response software was engaged on a network of "120 Macintosh IIs" to compile and relay graphic information to the Pentagon.

Timely, effective responses to regional environmental crises like oil spills involve analyses of large, complex spatial data sets. The potential of GIS may be greatest in the context of such problems. The Alaskan oil spill may be the largest in U.S. history (estimated at 38,000 tons), but it is not even among the top ten internationally. The largest oil spills on record involved the Ixtoc I well in the southern Gulf of Mexico (1979) and the Nowruz well in the Persian Gulf (1983). Each spill amounted to approximately 600,000 tons. Since the supertanker Valdez ran aground on March 24, two more spills—in the Delaware River south of Philadelphia and south of Newport, Rhode Island in Narraganset Bay—have fouled U.S. waters. As expensive environmental insults continue to recur, the value of GIS analysis and desktop mapping is sure to grow.

LANDSAT PROGRAM STATUS

In its first issue, *CP* reported on the funding crisis that threatened to shut down the Landsat program. The following status report is culled from *Landsat World Update* (Volume 2, Number 5, May 16, and Number 6, June 12), a newsletter published by the Earth Observation Satellite Company (EOSAT), the company that operates Landsat archives and data processing equipment.

May 16

"Landsats 4 and 5 continue to operate nominally. Landsat 6 development continues towards a June, 1991 launch.

"The National Space Council, led by Vice President Dan Quayle, has reaffirmed a long-term commitment to the Landsat program by a unanimous decision. Early announcements indicate that Landsat 4 and 5 will be continued for the next two years, and support for the Landsat 6 mission will also be continued.

"The recommendations of the Council have been submitted to President Bush for his approval. Upon approval, Landsat 4/5 operations funding of $5 million will be made available for the completion of fiscal 1989, and $20 million for fiscal 1990.

"Landsat funding was also the subject of a Congressional markup held May 11 by the Natural Resources, Agricultural Research and Environmental Subcommittee (NRARE) of the House Committee on Science, Space and Technology. In NOAA budget authorization activity for fiscal 1990/91, the Subcommittee provided Landsat 4/5 operations funding, and Landsat 6 development and launch

funding.

"U.S. prospects and policy options for future U.S. civil remote sensing programs was addressed at a joint hearing convened May 9 by the International Scientific Cooperation (ISC) and the NRARE Subcommittees. The hearing is the first of two on the issue. According to NRARE Subcommittee chairman Rep. James Scheuer (D–NY), 'the near-termination of Landsats 4 and 5 last March vividly illustrated our lack of a coherent, stable, long-term policy for U.S. remote sensing satellites.' According to Scheuer, the hearings will explore options 'for putting Landsat back on track.' Rep. Ron Packard (R–CA), Ranking Minority Member of the ISC Subcommittee, said 'we need to look at the technological and scientific importance of Landsat in understanding the planet on which we live. We are spending billions of dollars on expeditions to our sister planets in the solar system, but we continue to neglect our own back yard of planet Earth.'

"Witnesses representing French, Soviet and Japanese remote sensing programs discussed their current status, as well as the commercial potential and possible future international cooperation for remote sensing systems. The pros and cons of international satellite consortia were addressed by a second panel, including Dr. John McElroy, Dean of Engineering, University of Texas at Arlington, and Jerry Caseman of the Harris Corporation. Both witnesses stated that prior to participating in any international consortium, the U.S. would "have to put its own house in order," to establish a strong position in the international remote sensing arena. The commercial potential for civil remote sensing was addressed by a third panel, whose studies about future land remote sensing efforts were recently released by the U.S. Department of Commerce."

June 12

"EOSAT is continuing with the transition of satellite command and control, and data processing facilities form NASA Goddard Space Flight Center to EOSAT Headquarters in Lanham, Maryland. The move is expected to be completed by October, when NASA will replace Landsat facilities with support systems for the Space Station project.

"On June 1 President George Bush announced from London that he had approved funding for the continued operations of Landsats 4 and 5, and for completion and launch of Landsat 6. According to a statement by press secretary Marvin Fitzwater, the President has also instructed the National Space Council and the Office of Management and Budget to review options for the continuation of Landsat-type data collections after Landsat 6. Funding for Landsat 6 is currently included in the Department of Commerce budget."

For further information on the Landsat program, contact EOSAT Public Affairs Office, 4300 Forbes Boulevard, Lanham, MD 20706, (301) 552-0547 or (800) 344-9933 ext 547.

NEW COOPERATIVE MASTER'S PROGRAM AT OHIO STATE

The cooperative master's programs are offered jointly by the departments of Computer and Information Science, Geography, and Geodetic Science and Surveying. They are designed for students who want to develop a broad base of understanding of mapping science, technology, and applications but also want to receive a disciplinary degree. Other departments are planning to join the cooperative master's programs, increasing the options available to students. All students in these programs are required to complete a common core of five courses and a seminar.

Beyond the mapping and disciplinary cores, one may pursue course work and research in such areas as automated cartography, facilities management, geographic information systems, operations research, and telecommunications. There is sufficient flexibility in the disciplinary programs to enable the student to select valuable electives in math, computer and information science, electrical engineering, geology, geophysics, mineralogy, statistics, and surveying.

For further information, contact the Graduate Studies Committee, Center for Mapping, The Ohio State University, 412 Cockins Hall, 1958 Neil Avenue, Columbus, OH 43210–1247; (614) 292–6642.

NEW GIS SOFTWARE SURVEY DUE

GIS World has completed its Second Annual GIS Software Survey. Expanded to more than twice the size of the original survey, it compares 62 GIS and similar systems in over 100 categories. The 16-page survey report was mailed to *GIS World* subscribers with the July issue, and will be shipped free as a premium to new subscribers until the supply is exhausted.

The survey results will also be available in the new *GIS World Sourcebook*, to be published in August. With over 50 pages of reference information on GIS technology, data sources, and definitions, the *Sourcebook* will be priced at $29.95 for subscribers, $76.95 for others. Prepublication orders are being accepted now, and descriptive information is available from the publisher. Contact GIS World, P.O. Box 8090, Fort Collins, CO 80526.

featured article

The Librarian's Dilemma: A Map Librarian's Access to Machine-Readable Information

Patrick McGlamery

The paper addresses how a map librarian gains entree to the fast track world of computer cartography. The history of machine-readable information in libraries has been rocky. As information resides more frequently on tape or disk, libraries will need to embrace the technology. By obtaining seed money from a Federal Library Services and Construction Act grant, the Map Library at the University of Connecticut, procured hardware, software and boundary files. With the aid of a research assistant, the librarian wrote a SAS program, PTOLEMY, which allows users to map their data. PTOLEMY is a menued environment running on the mainframe. Users may access the mapping system from remote sites.

Libraries have always been ready to embrace technological innovations. Incandescent lighting and xerographic copying were seen by librarians as provocative enhancements to the access of information. Computers made early entre into libraries as tools for storing and manipulating bibliographic records. As early as 1957, York Lucci and Stein Rokkan proposed a library center of machine-readable survey research data in a project sponsored by the School of Library Service at Columbia University. But machine-readable data files (MRDF), as a format, have not succeeded in library collections. To date relatively few libraries have developed an awareness of machine-readable data files beyond a collection of codebooks and referral directories, often times working within an informal relationship with campus computing facilities and the campus' Inter-University Consortium for Political Science Research (ICPSR) node.

It is a common misconception among computer specialists that a library is a book storehouse rather than a dynamic access point to information. Unfortunately, this misconception is often reinforced by the library's reluctance to collect the "book" tools of the computer trade, i.e. manuals, codebooks and documentation.

In a recent article, William Arm (1984) points out that "for many years librarians have been asking computing specialists for assistance. Unfortunately, assistance has not been forthcoming." At the same time the computing systems of our universities have become enormous collections of poorly indexed tools and resources. In the days when computing was restricted to a few specialists this was not important. When computer users were concentrated into terminal clusters, with many users sitting side by side, word of mouth was still an effective way of disseminating information. Now that computing has become widely distributed across campus, some better way is needed for scholars to learn of the riches at their fingertips.

The computing community is in need of the skills and experience the library profession can offer. The duplication of materials and effort in the computing community is a recognized problem. Computing specialists have failed to take the long term "research view" of the growing core of machine-readable information. Librarians have either failed to consider machine-readable information significant enough to acquire and control, or we have underestimated our ability and responsibility to handle it.

Our dilemma, the Librarian's Dilemma, is the almost total transference of information from paper to electronic format. Joseph Raben (1979) has observed that "After five hundred years as the sole basis of printing technology, metal type is joining the spinning wheel, the water wheel, the cotton gin, the steam engine and now the propeller-driven airplane as

Patrick McGlamery is Map Librarianof the Homer Babbidge Library, University of Connecticut, Storrs, CN 06268

exemplars of mechanisms that were vast improvements over those they replaced but that still had to yield to even superior ones." Paper, as a medium for storing and disseminating information, falls short of machine-readable information. Ironically, in 1989 much information exists in machine-readable form from author, through the editor, publisher and printer, until it is finally printed and distributed on paper.

THE ORIGINS OF PTOLEMY

At a backyard barbecue in Alexandria, Virginia in 1983, I got my first whiff that things in the Map Library profession were about to change radically. A friend, working at the Bureau of the Census, was discussing the 1980 decennial census and all the problems the Bureau was having getting its information out. He mentioned TIGER (Topologically Integrated Geographic Encoding and Referencing), the Bureau's redesigned Geographic Support System that consolidated the address coding, mapping and geographic inventory functions into a single database. When I got back to the University of Connecticut I began to gather bits and pieces of information about TIGER. There wasn't much. What there was indicated a thrust by two major mapping agencies to automate their mapping programs. It was disturbing to a paper Map Librarian.

A year later, attending my first National Cartographic Information Center (NCIC) State Affiliate meeting at the U.S. Geological Survey in Reston, Virginia, my counterpart from the Connecticut Department of Environmental Protection (DEP) was scurrying around the Survey like crazy acquiring Digital Elevation Models and Digital Line Graphs of the state. The DEP was working cooperatively with the Survey to develop a State Geographical Information System (GIS). When we went home at the end of the week the digital maps went with us.

I began to hear rumors of a planned coordination between UConn's Natural Renewable Resources Department and DEP. Then, in a time of little growth at the University, the Department of Geography managed to get the go-ahead for a graduate program in GIS. A half-million dollar High Tech Grant was awarded for a GIS Lab and an Image Analysis Lab. Electronic mapping was getting close to home. I quietly endured an anxiety attack . . .

When a Medical Anthropologist walked in and started talking about mapping epidemiological research in Hartford's Hispanic population the whole thing sort of came to roost right there in the Map Library. Those guys that ask questions five years ahead of anyone else . . . you've got to admire—and listen—to them.

Certainly, my greatest fear as a Map Librarian came when I realized how readily convertible to math maps are. How inherently Descartian they are. How nicely geographers have developed the ideas of XYZ, arcs, nodes, polygons, *et al*, and then raster scanners. Can they make it any easier? I was terrified that my paper Map Library would become an anachronism in a decade. I resolved to develop a plan.

DEVELOPING A PLAN OF ACTION FOR THE INFORMATION AGE

Contrary to popular belief, Map Libraries are not resource havens in most university research libraries. Reference desks, systems operations, cataloging departments, preservation/conservation laboratories, even Art Libraries always seem to be able to make a better case for resources. Always in need of equipment, *money*, space, *money*, personnel, *money;* map libraries are a lot of fun if you thrive on challenge. I think a successful Map Librarian has to be a cross between a scrounger, raconteur, hail-fellow-well-met, a good scout, a Radar O'Reilly kind of guy. Kind of a sneaky, manipulative, evil genius behind the beard who is working hard to slice out an empire before anyone notices.

In 1984 the Map Library got an Online Computer Library Center (OCLC) M300, a rebuilt IBM PC. OCLC is an international library network and shared database of some 13 million bibliographic records. In 1984, OCLC began to replace its dedicated dumb terminals with IBM PC's to which it added a board and replaced the standard IBM keyboard with an OCLC keyboard. I used the M300 to catalog maps. It had no graphics capabilities, but it was a computer and it made me begin to think.

With the M300 I got OCLC terminal software, which, when I logged onto OCLC gave me as stupid a terminal as you can get. In order to play on the PC I had to use DOS. It's amazing what you can do using EDLIN and batch commands. It wasn't long before I got a version of PC-Write, File Express and other shareware. I made an acquisitions list. I remember thinking I'd never have any need of DBase because as a librarian what would I need a sophisticated database manager for?

But then a germ of an idea began to form in my mind: *what if I didn't use the computer just as a bibliographic tool? What if I used the computer to do what it was meant for . . . computing!*

What did I need to make the TIGER roar in the Map Library, to tap into a Connecticut GIS and let Geography grad students convert paper maps to digital code? *Money!* One thing about computers, you can do almost anything you want if you have enough money.

I figured, correctly as it turns out, that the library administrators were not about to give me the $20,000 I might need to build and configure a cartographic workstation in the Map Library. I needed to find money from non-standard sources. I needed to write a *grant*.

To get a grant funded, of course, you are competing with others who think their ideas are better than yours. I needed to find that special something, a gimmick that made my grant better than theirs. This is about when that Medical Anthropology student sauntered into the map library and asked for some maps of Hartford to digitize. He described his idea to me and I put him in touch with the right people and thereby discovered my gimmick.

What's special about my Map Library is that it is at the University of Connecticut and also at the University is the Roper Center, *the* archive of public opinion data. The Roper Center is affiliated with the Institute of Social Inquiry. And the Institute is a Census Data Users State Affiliate. The Institute has the Census' summary tape files for Connecticut and the expertise to tailor the information.

I wrote all this up in a memo to my boss: RE: NCIC, ISI, Roper Center, IBM, digitizing data, TIGER. I gave it to him and let him simmer with the alphabet stew. I waited about a week and then, like Radar O'Reilly, I came in with a plan of action. He signed it. What he signed wasn't worth a cent, but it gave him the idea I was going to pursue a plan of action. And it sanctioned the pursuit of that action.

I began to make the case for getting at "primary information on tape." I began to talk to people about cataloging data files. Now that's radical. Make a bibliographic record for a data file. I pulled out all the old librarian arguments: freedom of information, rights of the citizen, information rich getting richer, information poor getting poorer, censorship through equipment costs. I began to develop into a librarian who sees the focus on cartographic information, regardless of its format; map, tape, image, whatever.

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One day, one of the library muckety-mucks was mucking through the halls of the administrative suite asking if anyone knew of a grant idea because she had this notice of *free Library Service and Construction Act (ISCA) money*. My boss, Colonel Potter, having signed the plan of action,

suggested me. It probably went something like this: "McGlamery's got an idea he trots out every now and then. Give it to him and see if it shuts him up." She did.

THE GRANT PROPOSAL

I wrote a grant, "Maps for the Future: Computer-assisted Cartography for the Community." I agonized over that title. It has every soft, fuzzy, hugable, cartographic word I could think of! I submitted it on April Fools Day, of course.

I wrote the LSCA grant as a research and implementation grant. My proposal was to create a facility to serve as a library cartographic work station. A *library* tool designed to access information in a cartographic format. It is not a geography department workstation nor a cartographic laboratory. The map librarian's job is *not* map making. It's providing access to machine readable information in a cartographic format.

The primary part of the grant involves generating maps of demographic data from distributed sites. I am interested in providing accessibility to as broad a user group as possible. I decided to design a system to be put on the university's mainframe computer using the mapping capabilities of SAS/Graph rather than a PC-based system in the Map Library. A couple of good reasons for a distributed network come to mind:

1. As a map librarian I have been an information node for social scientists trying to map their data. Typically they use SAS/Graph to make something that looks like a map, but usually doesn't act like a map.

2. There are users who have data, know nothing about SAS/Graph, or maps, or computers, but who want to map their information.

3. For many of these users, purchasing a mapping package and graphic hardware for the few maps they need to make is not feasible.

4. There is an extended group of SAS users in the state who meet on an irregular basis and who keep in touch with a newsletter and via electronic mail.

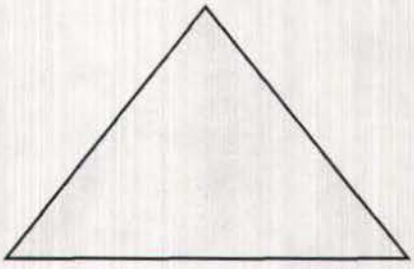


Figure 1: Model of a research library

Figure 2: Model of a computer program

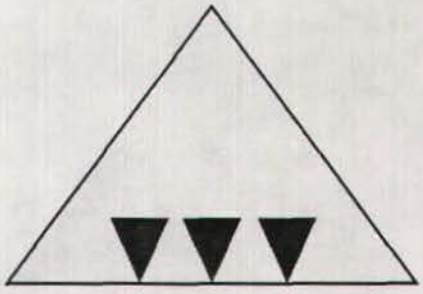


Figure 3: Model of computer applications in a research library

IMPLEMENTATION

About June 20th I pulled out the manuscript and brushed it off. For sure it hadn't stood a chance against ramps for the handicapped or record conversion for a special collection of 18th century German economic treatises. Two days later I got a call that it had been accepted with full funding ($17,600). Great idea. Good luck. Anxiety attack . . .

Computers are tricky. They seem really complex, but are really very simple. Libraries are also tricky. They seem very simple but are really

very complex.

Computer programs are designed with a single function in mind. As that function is attained, another is added, and so on, and so on. An effective program is a model of logical progression. I saw it as an inverted pyramid, functional point at the bottom and building toward complexity (Figure 1).

Libraries, on the other hand, are big, broad-based pyramids (Figure 2). Ponderous storehouses of information, described and accessed through card catalogs. The idea of a research collection is, ideally, that anyone can come in, at any time, and ask any question, at any level, and expect to get an answer. Maybe they will . . .

Now, how was I to apply that pivotal computer pyramid to the ponderous library pyramid? The answer lay in the opposite of what maps do. Maps tend to be format specific, not subject specific. Topographic quadrangles, for example, answer all kinds of questions, from hiking to civil engineering to historical geography. Computer programs, on the other hand, are subject specific. I guessed, then, that this library computer-assisted cartographic workstation was going to be a multifaceted, subject specific station. I imagined it as a lot of little inverted pyramids lined up inthe ponderous, squat pyramid, each facet pointing to a different type of map need: demographic, base map, geologic, topographic, image analysis and so on (Figure 3).

```
==========================================================
=                                                        =
=                  WELCOME TO PTOLEMY                    =
=                  ------- -- -------                    =
=                                                        =
=      An Interactive Mapping Package Developed          =
=                                                        =
=                 At The Map Library Of                  =
=                                                        =
=            The Homer Babbidge Library                  =
=                                                        =
=           The University Of Connecticut                =
=                                                        =
==========================================================

Please enter a  1  on the Command line to continue
```

Figure 4: PTOLEMY title screen

With the grant I hired a Research Assistant from the Geography Department. I purchased computer equipment: a high-resolution graphics monitor, an EGA graphics card, a CD-ROM reader, 20Mb Bernoulli disk drive, digitizing tablet and a color inkjet printer. I acquired software: Tektronix emulation software, and Windows and SAS Manuals. I also procured data files: a tailored version of the GBF DIME Files of the tracts of Connecticut from Geographic Data Technology, Chadwick-Healey's SUPERMAP, and the National Atlas on CD-ROM from GEOVision. With these I have put together a SAS/Graph–SAS/AF program we call PTOLEMY.

```
==========================================================
=  During your PTOLEMY session you will be creating      =
=  a SAS/Graph program which can be viewed and           =
=  printed. You will be asked to supply information      =
=  in a prescribed sequence. In order to "back-up"       =
=  through the program hit the PF3 key.  The se-         =
=  quence is:                                            =
=        1. Name your terminal type. You may only        =
=  view from a graphics terminal or a PC with a          =
=  graphics card running Y-Term.                         =
=        2. Name your data set. PTOLEMY supplies a       =
=  1980 Census data set.  Your data set must be in       =
=  SAS format.  See the HELP selection on the menu       =
=  if you have any questions.                            =
=        3. Choose your pattern.  Y-Term only views      =
=  Black-on-White, but you can name a color printer.     =
=                                                        =
=    ANY QUESTIONS CALL: P. McGlamery; 486-4589          =
==========================================================
    Please enter a 1 on the Command line to begin
```

Figure 5: PTOLEMY explanation screen

PTOLEMY is a menued mapping facility. The user enters cued information at the appropriate points in the session and PTOLEMY builds a SAS/Graph program that utilizes DIME boundary files, either user supplied or "canned" data sets, and appropriate output devices. I've tried to make it as much like a PC program as possible.

What PTOLEMY does is sequentially build a SAS/Graph program. The

first steps are introductory: a title screen (Figure 4) and explanation of what will be asked of the user (Figure 5). The program begins by instructing the user to select an output device, then asks whether the data set is user-supplied or PTOLEMY-supplied (The PTOLEMY data set menu is shown in Figure 6). After the data has been determined the base map is selected. The grant provided funding for the purchase of tailored DIME boundary files. We groomed them a bit by replacing the state code with a town code that was derived from the alphabetical listing of the towns and mounted them on the mainframe. The user can select a variety of configurations of town and tract level maps of Connecticut. Two lines of title are supplied. Finally the user is asked to selected hatched or solid fill and color choice. The output (Figure 7) appears on the screen or is picked up in the Computer Centers Output Room, depending on the user's choice.

```
Please Enter The Ptolemy Name Which Corresponds To
          The Desired Data Set

                                          PTOLEMY
          Data Set Description             Name
          --------------------            -------

 1)  Total Population                   - POP
 2)  Percent Of Population In Professional
     Occupations                        - PROCC
 3)  Percent Of Population With High School
     Degree                             - HIGH
 4)  Mean Family Income                 - INCOME
 5)  Mean Home Value - Owner Occupied   - HOME
 6)  Mean Contract Rent                 - RENT
 7)  Percent Population Below Age 18    - CHILD
 8)  Persons Per Household              - POPHOU
 9)  Fertility Rate                     - FERT
10)  Percent Single Family Housing      - SHOUS
11)  Percent Of Population Non-White    - NWHITE
12)  Percent Single-Parent Households   - SPRNT

          PTOLEMY NAME: &varnm

Press the PF3 key to continue
```

Figure 6: PTOLEMY data set menu

The program attempts to effect clear cartographic communication by following fundamental cartographic principles. By limiting choices and sequencing decisions, the user is not overwhelmed with choices. The cartographer will systematically work through notions of map purpose and map type. The user, however, will often approach computer cartography like a kid in a candy store and end up with something that looks like a map, but doesn't act like a map because it is illegible or misleading. PTOLEMY provides the user with a simplified decision tree: it will be a choropleth map, the hatching will be thus and so, the color will be your choice of red, blue, green, and so on.

What PTOLEMY attempts to do is provide a staightforward tool for illustrating statistical information cartographically

The choice of which data classification techniques should be provided for users was a major difficulty. Since many statisticians seem to prefer quartiles, I decided to make quartile classification the default for PTOLEMY. I will, however, work with users to produce the classification that represents their data most appropriately. What PTOLEMY attempts to do is provide a straightforward tool for illustrating statistical information cartographically.

PTOLEMY, the hardware purchased to support it, and most importantly the lessons learned while developing it, have brought the Map Library significantly closer to dealing with the problems of providing the user with machine-readable information. As we enter the next decade with TIGER, Mark II, enhanced demographic information, high-volume storage media, educated users and increased demands, the librarian will inevitably have to deal with the 'new' information formats. I'm looking forward to the rest of the story.

REFERENCES

Arms, William Y. (1984) "Scholarly information," *College and Research Libraries*, May, pp. 165-169.

Raben, Joseph (1979) "The electronic revolution and the world just around the corner," *Scholarly Publishing*, April, pp. 195-209.

Editor's note: Information about the TIGER data format and proposed products was distributed by representatives of the Bureau of the Census at the Denver NACIS meeting. The following persons were responsible for a report entitled "The TIGER File: Proposed Products": Robert A. LaMacchia, Geography Division, (301) 763-4708; Silla G. Tomasi, Geography Division, (301) 763-4700; and Sheldon K. Piepenburg, Data User Services Division, (301) 763-1808. The best description of TIGER's data structure issued thus far is probably a paper distributed by Frederick R. Broom, Geography Division, entitled: "TIGER Preliminary Design and Structure Overview: The Core of the Geographic Support System for 1990." Information on obtaining a sample prototype TIGER file for Boone County, Missouri is included in the Cartographic Techniques section of this issue. SAS is a statistical package produced and marketed by the SAS Institute, Inc., Box 8000, Cary, NY 27511-8000.

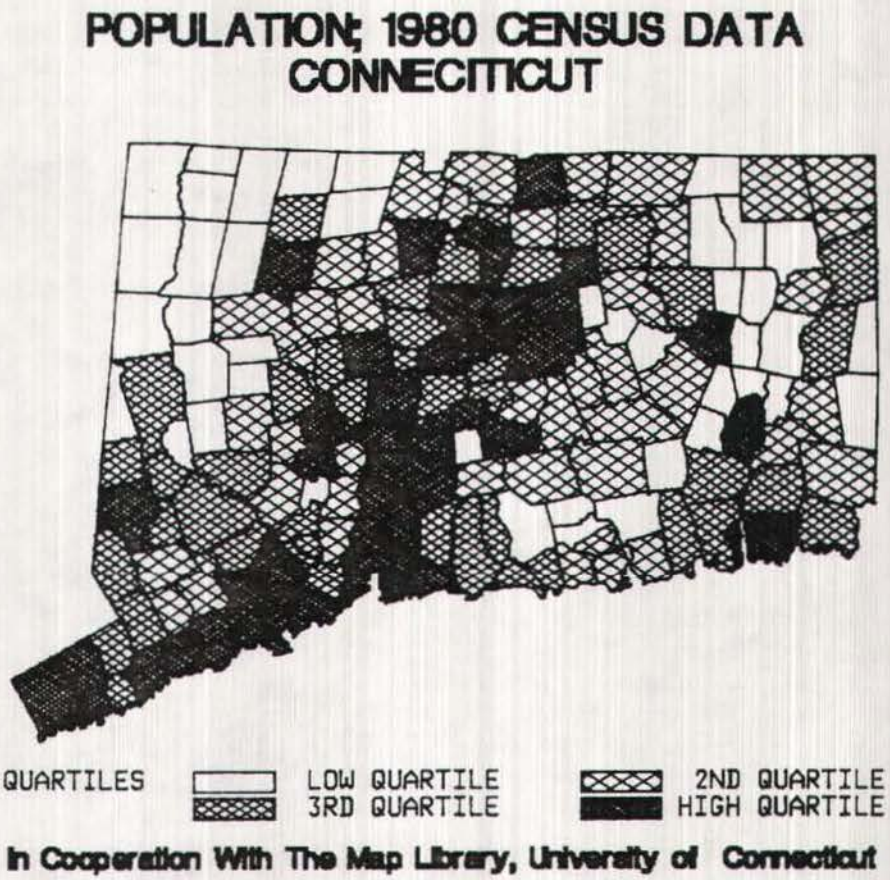


Figure 7: Sample PTOLEMY output

Este artículo trata sobre cómo un bibliotecario de mapas consiguió entrar al versátil mundo de la cartografía por computador. Aunque la evolución de información computarizada en bibliotecas ha sido intermitente, a medida que mas información es almacenada en cinta odisco las bibliotecas tendrán que asimilar la tecnología e incorporarla en sus operaciones. Atravez de una subvención del Acta Federal de Servicios y Construcción de Bibliotecas, la biblioteca de mapas de la Universidad de Connecticut obtuvo equipos de computador, paquetes y programas, y archivos de frontera. Con la ayuda de un asistente de investigación, el bibliotecario escribió un programa en SAS, llamado PTOLEMY, que permite a usuarios trazar mapas con sus datos. PTOLEMY funciona a base de menús en el "mainframe," y los usuarios pueden entrar al programa desde puntos remotos.

El dilema del bibliotecario de mapas: su acceso a la información computarizado

Extracto

cartographic techniques

THE DESKTOP MAPPING MARKET (continued)

The April 17, 1989 issue of *PC Week* features a pair of articles by Jon Pepper entitled "Desktop Mapping Gains Corporate Recognition" and "Users Praise Mapping Software's Potential." Also featured is a "vendor profile" of 16 purveyors of mapping software for IBM-PC and compatible microcomputers, as well as a chart that outlines hardware requirements, capabilities, color and text features, output options, and prices of the profiled vendor's products. According to *PC Week*,"The products listed serve a wide range of purposes, including general map making, driving directions and calculations, and weather tracking and forecasting. All information was supplied by the vendors."

Pepper points out that "A number of factors are converging to produce demand for PC mapping software. First, the hardware platforms have advanced so that '286 and '386 computers are fairly commonplace in corporate settings . . . Second, the corporate market is only now beginning to appreciate what mapping software can do, which is attracting more vendors to the marketplace." According to Ken Shain of Geovision Software Corporation, the appeal of mapping systems to the corporate market lies in their use as "a management-information tool," rather than as tools to produce finished goods for sale. Therefore, the market was "stifled until the cost dropped down dramatically to the PC level."

Four principal concerns emerge from Pepper's discussions with desktop mapping system users: ease of use, price, flexibility, and compatibility.

"We wanted the average user to be able to produce something immediately," said George Zalaquett of NSI Technology Services Corp., Research Triangle Park, NC. NSI uses the Geovision system to map the locations of environmental monitoring sites.

Doug Taylor of Yellow Freight System Inc. of Overland Park, KN uses Atlas*Graphics to locate service terminals. Taylor explained to *PC Week* that "We wanted to be able to draw maps as well as generate overlays that could be zoomed to fit an existing map . . . Price was important, but we wanted the flexibility even more than the price . . .". Pepper reports that "Yellow Freight spent about $20,000 for its hardware/software setup, plus about $3000 for additional data files."

Concern for PC-to-mainframe file compatibility is voiced by Tom Link, an environmental protection specialist with the EPA. Link downloads EPA air pollution data in ASCII form, edits it with a word processor, and maps spatial variations in air quality on a PC (his choice of mapping software is not mentioned in the *PC Week* article—perhaps EPA is reluctant to make endorsements).

SOFTWARE REVIEW

Software reviews will normally be solicited by the editors, but unsolicited reviews are invited for consideration. If you are using a piece of software useful in working with map information, and are interested in contributing a review, please communicate this interest to the editors.

PC-Globe+ and Electromap

reviewed by Sona Karentz Andrews and Chris Baruth, University of Wisconsin—Milwaukee

PC-GLOBE+
Comwell Systems, Inc., 2100 S. Rural Road, Suite 2, Tempe, Arizona 85282. PC-GLOBE+ is an electronic software package containing maps and information on 177 countries. The list price is $69.95. Registered owners are qualified to purchase annual upgrades at minimal cost. The program supports EGA, CGA, Hercules Monochrome, or VGA displays for the IBM PC/XT/AT, PS/2 or compatible with a memory of 384Kb RAM, MS.DOS 2.0 or later (MacIntosh and Apple II versions will be available later this year). The output support is through an IBM Proprinter, the HP Laserjet Series II, the IBM Color Printer and compatibles. PC-GLOBE+ has four 5.25" disks (it is also available in 3.5" format) and a 28 page user manual. The software is operated with pull-down menus controlled by a mouse or arrow keys. There are seven main menu options: Help, World, Region, Country, Database, Utilities, and Quit. World, regional, and country boundary maps can be accesses through all menus, whereas country elevation and physical features maps are only accessible through the country sub-menus.

The sub-menus for the Database option include statistics on Population; Age; Language, Ethnic Groups, and Religion; Health Statistics; City Information (populations, phone codes, time zones, latitude and longitude coordinates, and country's Western Union telex access codes and ham radio prefixes); GNP for 1987, 1988 and 1989; Resources, Agriculture and Industry; Imports and Exports; Government; and Culture and Tourism. This information can be displayed in bar charts and tables for an individual country or up to ten countries of the user's choosing to compare statistics. Since all the data in the data base files is aggregated by country, it is not possible to map the information at the country scale. Regional and global scale maps of the data are, however; easily displayed.

The utilities options include changing map parameters (shifting world center, change color, delete country boundaries), calculation of

distances and bearings between two cities in the program or two latitude and longitude points of the user's choosing, currency conversions, time zone information, print screen and view text files, and a save map display.

PC-GLOBE+ is easy to install onto a hard disk and uses 1.5 Mb of disk space. The menus are self-explanatory and there is little need to follow the directions in the user manual in order to understand how to operate the program. Virtually all the map displays use Miller's Cylindrical projection. This does not present a major problem at the global scale, but at the higher latitudes distortions of scale and shape are significant.

The maps in PC-GLOBE+ look very simple and are highly generalized. This is especially the case with the country maps, since they show a limited number of features using iconic symbols to represent the general locations of mountains, rivers, deserts, and forests; or the country maps of cities which always include eight cities—regardless of the size of the country or city populations.

One of the nicest features of the program is the large database. You can choose to map the information for select countries or for all countries. The data base format is flexible and allows the user to add data. The graphics and text from the program can be exported to other programs such as WordPerfect, PageMaker, PC-Paintbrush, Lotus 123, Ventura, and others (we did not try any of these options and are unable comment on how well the program performs in this regard). The shift world center option and calculation of distances and bearings utilities options add some flexibility to the program.

ELECTROMAP

ELECTROMAP, Inc., P.O. Box 1153, Fayetteville, Arkansas 72702-1153. ELECTROMAP is another electronic atlas software package containing 238 country, regional, topographic, and statistical maps. The list price is $129 ($159 after September 1). The program supports EGA or VGA displays for the IBM PC or PS/2 or compatibles with a memory of 640Kb RAM, MS.DOS 3.1 or later. The output can be printed with screen dump or screen capture software. ELECTROMAP uses five 5.25" disks (it is also available in CD-ROM version) and a 20 page user manual. The software is operated with a top menu bar and clicking areas on index maps with a mouse or arrow keys. The World index map is used to access one of fourteen regional index maps, which in turn allow you to access country maps. Map access is also possible using an alphabetical drop-down index of all countries, cities, and physical features listed in the program.

Fourteen maps are available on a pseudo-cylindrical equal-area projection at the World scale. These include; Topography, January Temperature, July Temperature, Precipitation, Agricultural Labor, Electricity, Income Per Capita, Income Growth, Infant Mortality, Inflation Rate, Life Expectancy, Literacy Rate, Population Density, and Population Growth. A text option allows you to display lists of statistics alphabetically by country or by numerical rank in page format.

The regional maps are limited to displaying country boundaries with topographic information. The country maps display either cities and rivers or topography. A text option allows you to display a drop-down menu for text information on the Geography, People, Government, Economy, and Communications of the selected country. The information is overlayed in page form. A flip option allows you to change from the printed text back to the map.

The program is easy to install but takes considerable time to do so and requires 6Mb of space on the hard disk. The menus are self-explanatory and the user manual only needs to be consulted to determine the limitations of the software. The maps displayed in ELECTROMAP are lovely. They contain substantial detail (therefore the large amount of disk space) and use subtle colors and hypsometric shading for elevation. One cannot help but to be very impressed when the first map appears on the screen. The program is, however, very limited in the number of maps it contains and the data base it supports. The user will surely be disappointed by these limits.

There are a number of differences between PC-GLOBE+ and ELECTROMAP. PC-GLOBE+ contains many more statistical data that can be graphed and/or mapped. PC-GLOBE+ allows you to generate a large number of world maps whereas ELECTRO-MAP has only fourteen world map options. The maps of less than the entire world as displayed on PC-GLOBE+ are mostly enlarged portions of the world map on the Miller's Cylindrical projection, whereas regional and country displays on ELECTROMAP consist of a series of independently projected maps, providing for a more satisfactory effect. One should keep in mind that although PC-GLOBE+ offers the user more flexibility, both programs are electronic atlases and neither one is intended to be mapping software.

The ELECTROMAP maps are by far more detailed and more attractive than those of PC-GLOBE+, however, at this scale the map displays can, in no way, be compared favorably to even a mediocre printed atlas—the resolution of the medium will not supply nor permit it. Both programs contain, at best, a level and

amount of information comparable to the most elementary type of school atlases, leading us to the assessment that their best use is probably at the secondary school level.

How different are these electronic atlases than their printed counterparts? Given their current costs and limited number of maps and specific hardware requirements, they are not competitive with printed atlases. And turning pages is not much different than clicking through menus. Electronic atlas creators have not yet taken full advantage of the medium they are working in, but rather have attempted to make the electronic atlas a software clone of the printed atlas. In this respect, PC-GLOBE+, with its broad data base and choices of what to display where has the potential to move in that direction, however, both programs have a long way to go.

A CALL FOR MAPPING SOFTWARE REVIEW EDITORS

CP is planning an annual compilation of mapping software review references for publication in the Winter issue. We are seeking individuals willing to compile references from a wide range of sources and to submit a list in digital form by December 1, 1989.

Several individuals might share the responsibility. One could concentrate on software reviews for IBM-PCs and compatibles, another on software for the Apple Macintosh, another on software for workstations, minicomputers, or mainframes. For more information please contact David DiBiase at (814) 863-4562; Bitnet: DWD1 at PSUVM.

PROTOTYPE TIGER FILES AVAILABLE

U.S. CENSUS BUREAU

The TIGER/LINE file for Boone County, Missouri is available from the U.S. Census Bureau on a single reel of tape (at either low or high density) for $175. The prototype product offers more than 4.6 Mb of information on roads, railroads, rivers, and other features, along with names and classification codes; State, county, census tract, block, and other area codes; feature shapes; address ranges and ZIP codes. Contact: Customer Services, Bureau of the Census, Washington, DC 20233; (301) 763–4100.

AAG MICROCOMPUTER SPECIALTY GROUP

The AAG/MSG is offering a demonstration program by James Taylor that displays the Boone County prototype TIGER file. The program is distributed on two high density diskettes at a cost of $5, including "the Boone County data which the Census sells for $60." Requires EGA graphics. Request diskette G16 from Robert Sechrist, Department of Geography, Indiana University of Pennsylvania, Indiana, PA 15705. Make checks payable to the AAG Microcomputer Specialty Group.

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.

THE BEST OF BOTH WORLDS: Linking the WORLD projections package with Macintosh drawing programs

Iden Rosenthal
Maximum Use Software

Desktop publishing (DTP) technologies have profoundly altered the balance of power between the technical pen and the microcomputer in the graphic arts, as well as in thematic mapmaking. The DTP market appeared in response to the introduction—in 1985—of Apple Computer's Laserwriter, Adobe System's PostScript page description language, and Aldus Corporation's PageMaker, the first personal page layout program. The second generation of PostScript output devices (such as the Linotronic Imagesetter) coupled with advanced drawing programs like Adobe's Illustrator and Aldus' FreeHand make it possible to generate real typography, fine dot screens, and color separations direct to film. The prospect of creating high-quality thematic maps without sticking-up lettering, etching and peeling, and compositing negatives is enticing to many thematic map producers.

PostScript's unprecedented power to describe pages that has made it a *de facto* industry standard. PostScript became accessible to a large, previously untapped market through the intuitive graphic interface of Apple's Macintosh microcomputer. Market forces have led IBM and the clone-makers to find a way for their machines to work more like the Mac, at least for graphics purposes. Although the Mac was designed with graphics central to its method of user interaction, and thus has an inherent advantage, there are twice as many MS-DOS systems being used for DTP. For what it's worth, my opinion on the issue of Macintosh vs. MS-DOS is this: if you've got them, it's best to mix both machines in the same workplace, passing files back and forth via cable or networking. With the Macintosh you run into fewer frustrating configuration and compatibility hang-ups and (at least to date) the drawing programs are faster, easier to learn and use, more powerful, and better tailored to production concerns. On the other hand, many people are already set up to table digitize base maps on a PC running

AutoCAD or some other CAD program. Furthermore, many programs that are important for cartographers have yet to be ported from MS-DOS to the Apple operating system. Perhaps the best example is the WORLD map projections package.

WORLD is widely regarded as the best at what it does, and there is no equivalent in the Macintosh environment. Fortunately, the option of saving output to disk as a PostScript file has recently been added. Unfortunately, the PostScript files generated by WORLD are incompatible with Illustrator and FreeHand. PostScript may be something of a standard, but it is a very broad one. The litany of PostScript subformats (Illustrator PostScript vs. FreeHand PostScript vs. Encapsulated PostScript) goes on at length. What follows is an outline of a procedure that converts the PostScript that WORLD generates into a form that Illustrator and FreeHand can manipulate (FreeHand can import Illustrator files, though Illustrator does not return the favor).

What you need to understand for this operation is that an Illustrator file is comprised of three sections: a prolog, a body, and a trailer. The prolog and trailer sections are virtually identical for every file so you can just copy them from a dummy file and combine them with whatever x,y coordinates you like in the body section. For simple line strings the format is:

```
x1 y1   m
x2 y2   l
x3 y3   l
...
xn yn   l
S
```

A polygon has the same form except that x1 y1 = xn yn.

PostScript is written in standard ASCII text so any word processor can be used to edit it. In fact, I use a WordPerfect macro to accomplish the conversion. If one wanted to make routine use of this procedure, however, I'd recommend writing a Turbo Pascal utility for the speed of it. The conversion consists of the following search and replace sequences:

1) Replace everything (in the WLDOUT file WORLD creates) up to and including the first line ending with "moveto" with the prolog from any other functional Illustrator file. The prolog starts at the beginning of the file and ends with the line "%%EndSetup:".

2) Change all occurrences of "moveto" in the file to "m". IMPORTANT: Make sure after this that no two consecutive lines end with an "m." If they do, get rid of all but one of them. This happens when WORLD is asked to generalize or to break a polygon off on the edge of the page. If your text editor can't handle this double-'m' search procedure you may have to resort to some minimal programming.

3) Change all occurrences of "lineto" in the file to "l"

4) Change all occurrences of "stroke" to "S"

5) Replace the last two lines in the WLDOUT file with the trailer from a functional Illustrator 1.1 file. The trailer starts with the line "%%Trailer:" and runs to the end of the file.

Congratulations, you are done! You can now open the file you have created using either Illustrator 88 or FreeHand and start adding data and design.

One thing to be aware of is that WORLD sometimes creates PostScript with lines like "47.324-235.763 lineto", i.e., no space between the x and y values. This will choke Illustrator. There has to be a space between the 47.324 and the -235.763. Another problem may arise if the x,y coordinates in your converted WLDOUT file aren't close to the x,y coordinates from the Illustrator file you harvested your prolog from (as found in the line of the prolog that begins "%%BoundingBox:"). If the coordinate systems don't happen to nearly match, you won't see anything on the page when you open up the file after conversion. The map is still there, you just can't see it. Try this sequence of commands: Fit to View, Select All, Cut, Paste. The map should then be centered on your page.

Adobe Illustrator 88 desktop showing a converted WORLD Postscript file with paths selected

I continue to be intrigued by the creative problem-solving process that is required to push the limits of desktop mapping. The same practical issues are being tackled simultaneously in many different kinds of mapmaking environments. By offering this information to the cartographic community, I hope to turn a few more heads in the direction of desktop mapping and encourage others to share their thoughts and problem-solving efforts in this area. My company, Maximum Use Software, consults on desktop mapping and publishes a utility that creates graphs directly in Adobe Illustrator file format. I am always happy to talk Macintosh cartography and can be reached at (215) 878-9364.

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 librianship.

Blaut, J.M. (1987). Notes toward a theory of mapping behavior. *Children's Environmental Quarterly,* 4:4 (Winter), pp. 27–34.
reviewed by Jeffrey C. Patton, University of North Carolina at Greensboro

Blaut begins by stating that the process of mapping is "**a normal activity in human beings of all ages and all cultures, akin to language behavior and perhaps equally primitive and basic**". Blaut and others have long held that mapping behavior is analogous to linguistic behavior in both development and practice. This paper explores the evidence for and the implications of this position.

As a starting point for theorizing about mapping behavior Blaut differentiates between macroenvironmental behavior (place behavior) and microenvironmental behavior (behavior directed at individuals or objects). He makes the argument that the human sensory and motor modalities function differently in each case. Exteroceptor are more critical in place behavior while proprioceptors are more important in microenvironmental situations. For example in understanding and remembering objects the hands and manipulation are used while comprehension of a larger environment may require the use of feet and walking. In speaking of mapping behavior Blaut deals specifically with macroenvironmental behavior. He points out that the comprehension and organization of macroenvironments relies on the development of cognitive maps and that *learning* of "**place**" by either adults or children requires a communication system be utilized. As ordinary language is insufficient to meet the needs of communicating macroenvironmental information, mapping evolved in all cultures.

For the reasons given above Blaut hypothesizes the following:

1. Mapping is a limited and specialized linguistic form.

2. Mapping emerged from the same root process as natural language.

3. Mapping and maps are older than written language.

4. Mapping abilities emerges naturally in young children independent of training.

5. Mapping is a cultural universal.

To support these hypotheses Blaut presents evidence that mapping behavior is homologous to ordinary written language, having both syntax (a set of ordering rules) and is semiotic. While he freely admits that maps may be limited as a language form in terms of what they can easily communicate, mapping is clearly a language.

Evidence of early mapping behavior in children is well documented with several examples presented detailing how toy play may mimic the macroenvironmental world and "**accustom**" children to a map-like (rotated and reduced) perspective of the world. The successful interpretation and use of black and white vertical aerial photographs by five year old children is given as evidence of the development of sophisticated cognitive maps.

Archeological and anthropological finds are reported which indicate that mapping is indeed very old in human culture. The oldest known map from Catal Huyuk is over 8000 years old while the oldest written language appears to be only 6000 years old (those languages utilizing an alphabet are significantly younger). Blaut suggests that this is the case because mapping behavior "**buds off**" from basic linguistic behavior at a much lower level than writing and that written language may be a derivative of mapping.

In concluding Blaut makes several suggestions for map learning and reading:

1. Map skills can be taught at school entering age or before.

2. Natural mapping in young children employs a downward eye-in-the-sky perspective. This can be developed by placing large maps on the floor or even incorporating maps into the flooring.

3. Contrary to some structuralist views young children can gain the most from and enjoy complicated maps the most. He explains that this may be due to the fact that children are more sophisticated map readers than previously thought or simply that more complicated maps are more exciting even if they are not fully understood.

4. As mapping has common roots with written language this link should be utilized to promote not only better mapping skills but also reading and writing skills.

Blaut's rather informal paper makes a compelling case that mapping behavior is a fundamental activity of all human beings and of all cultures. It has important ramifications for anyone interested in natural language, map design for children, or geographic education.

Ottosson, Torgny (1988). What does it take to read a map? *Scientific Journal of Orienteering*, 4, 97–106.
reviewed by Jeremy Crampton, Penn State University

Can children understand maps "early and easily," or do they find maps difficult, not at all "transparent"? This is the main question addressed by Ottosson in his review of a brief selection of literature on the topic. And it is certainly an important question in this time of geographic ignorance. If children readily understand maps, geographic education need not devote much effort to them, and could possibly even ignore them. On the other hand, if map understanding is an effortful process, explicit formal training may be necessary.

Ottosson largely accepts the former position. Since "most spatial relationships on many maps are the same as the relationships between the corresponding real-world features" (p. 101), it is possible for children to have a basic understanding of maps. A large number of his references are from the Sheffield Research Program (UK), one conclusion of which is that young children can easily use maps.

However, this kind of position has been repeatedly criticized. Piagetian as well as cartographic theory would argue that map understanding does *not* come "early and easily." There are also empirical problems with such arguments. Ottosson appears to be aware of these criticisms, but rather too easily dismisses them (in a single sentence) before going on to make the assertion quoted above. The trouble with this position is that it merely pushes the problem backwards; instead of striving to understand how children comprehend maps, the task instead is to understand spatial comprehension of the environment (skills which are then somehow applied to map comprehension). Environmental comprehension is a worthy goal, but the overall impression gained from this type of argument is that maps are just reflections of reality that do not involve human creativity or categorization.

Other parts of the article are concerned with showing that map projection (i.e., perspective), symbolization, and scale are not problematic for young children. Ottosson presents some results from an experiment he did involving five year old children who were asked to describe "a rather complex road map." Although there were errors (which seem to reflect the child's reification of symbols, consistent with Piagetian theory), Ottosson nevertheless claims that symbolization is not a crucial problem.

Although there is no doubt that children can learn spatial relations (such as proximity) early on, it is misleading to claim that this means map understanding follows naturally because "in essence . . . map understanding is spatial understanding" (p. 102). It ignores the fact that maps are creative realizations, not degraded pictures of reality. Ottosson's teaching examples depend on showing literal similarities between the environment (a road bend) and the map. This is not necessarily "incorrect," but as he admits himself, it takes attention away from the map's role, it's form and also the active participation of the child.

Miller, David; and Modell, John (1988). Teaching United States history with the Great American History Machine. *Historical Methods*, summer 1988; pp. 121-134.
reviewed by Karl Proehl

The Great American History Machine (GAHM) is a computer-based tool used at Carnegie-Mellon University for interactively accessing and exploring county-level census and election data through a map interface. GAHM was designed as a teaching application to be used for generating and exploring hypotheses rather than for formally testing them.

On the basis of field testing GAHM, the authors belive that this software opens up new possibilities for enabling students to approach historical problems empirically and analytically. A sensible way to use computers in introductory history courses is to facilitate the search for patterns in large bodies of data. GAHM is designed to make data accessible through a medium that invites the search for patterns—the choropleth map.

Six exercises were mentioned along with a series of maps. The authors found that students in this course were much more engaged with the material than is normally the case in introductory history courses.

An excerpt from **Mary Kingsley, *Travels in West Africa***, London: 1897.
Submitted by Pat Gilmartin, University of South Carolina.

Mary Kingsley was an English explorer who explored the Ogowé and Rembé rivers of West Africa in the late 1900's. During her forays there, she collected specimens of fish for the British Museum and continued her father's studies of the religions and laws of primitive societies. She travelled alone, mostly by canoe, hiring native guides along the way. One afternoon, she and her party stopped at a village of the Fan cannibal tribe to ask about villages further upstream. The following is Kingsley's description of the map which the Fans created for them.

". . . when we reached a large village on the north bank, we seemed to have a lot of daylight still at hand, and thought it better to stay at [a village] higher up, so as to make a shorter day's work for to-morrow, when we wanted to reach Kondo Kondo; so we went up against the bank just to ask about the situation and character of the up-river villages . . . One chief . . . took a piece of plantain leaf and tore it up into five different-sized bits. These he laid along the edge of our canoe at different intervals of space, while he told M'bo things, mainly scandalous, about the characters of the villages these bits of leaf represented . . . The interval between the bits was proportional to the interval between the villages, and the size of the bits was proportional to the size of the village . . .

"Now there is no doubt that that chief's plantain-leaf chart was an ingenious idea and a credit to him. There is also no doubt that the Fan mile is a bit Irish, a matter of nine or so of those of ordinary mortals, but I am bound to say I don't think, even allowing for this, that he put those pieces far enough apart . . ."

Schiff, Barry (1989). Aeronautical charts; portraits of the earth. *AOPAPilot*, March, pp. 78–80, 82. *reviewed by Claudette Dellon, Aeronautical Charting Division, NOS/NOAA*

Schiff, a pilot, has written a humorous and touching article on his long-standing love affair with aeronautical charts. He views them as pieces of art, portraits of the earth, with which a pilot can "window-shop the world."

A chart is a map modified for use in aerial or maritime navigation and is meant to work on rather than to look at (though some, like Schiff, like to look as well as to work). To maximize the value of a chart, pilots must learn as much as they can about chart symbology. Schiff feels this can best be accomplished by reviewing the National Oceanic and Atmospheric Administration (NOAA) 112-page booklet, *Aeronautical Chart Users Guide*. To help remember the differences among large- and small-scale charts, he points out that one inch on a VFR terminal area chart (scale 1:250,000), a sectional chart (scale 1:500,000), and a world aeronautical chart, or WAC (scale 1:1,000,000) equals 4, 8, and 16 statute miles respectively.

Covered also is a history of "navigational maps," dating back to 1807 when President Thomas Jefferson established the Survey of the Coast to map our nation's coasts. The Air Commerce Act of 1926 assigned the task of creating charts for air navigation. The first aeronautical chart was published in 1927, the year of Lindbergh's historic flight. By 1930, sectional aeronautical charts were developed to provide coverage for the entire country. Sectionals, at 1:500,000 scale, provide detail needed for visual navigation of slow- to medium-speed aircraft. Those who fly faster and higher don't need as much detail, and this led to the development of regional aeronautical charts (RACs), followed by WACs, and finally, in the 1960's, operational navigation charts (ONCs) published by the Defense Mapping Agency (DMA). RACs, WACs and ONCs are produced at 1:1,000,000 scale.

In 1970 the name of the Survey was changed to NOAA, of which the National Ocean Service (NOS) is charged with publishing and distributing aeronautical charts. Chart products are described in NOS's free catalog, *Aeronautical Charts and Related Products*, available from NOAA Distribution Branch, N/CG33, NOS, Riverdale, MD 20737.

In addition to producing ONCs, DMA produces visual jet navigation charts (JNCs) at 1:2,000,000 scale. Only 122 JNCs are required to cover the entire world, with three covering the continental U.S. The kings of visual charts are the global navigation charts (scale 1:5,000,000') developed for very long range aircraft navigating at very high altitudes. For a free catalog of these and other charts, contact the DMA Combat Support Center, ATTN: PMA, Washington, DC 20315-0020.

Schiff is also fascinated by charts produced by foreign governments. He considers some to be real works of art. The excitement this collector and art lover feels for aeronautical charts is contagious.

cartographic artifacts

ALBUM OF MAP PROJECTIONS

USGS Professional Paper 1453 entitled "An Album of Map Projections" by John Synder and Philip Voxland has been prepared to acquaint those in the cartographic profession with the wide range of map projections that have been developed during the past few centuries. Ninety basic projections are presented with consistent and concise textural descriptions and are accompanied by standarized, visual portrayals.

USGS MAP DISTRIBUTION

The USGS/GPO cooperative map project has been operating for over four years since its inauguration in October 1984. USGS consolidated its eastern and western map distribution facilities into Building 810 in the Denver Center in 1986 in order to realize an annual cost savings of over $1 million. During the consolidation, 3700 tons of maps and books were delivered to Denver in 185 truckloads.

Building 810 offers some seven-

teen acres of floor space. About 10,500 linear feet of shelving — with 2500 linear feet reaching 16 feet high—holds approximately 100 million sheets representing 70,000 different map titles.

USGS maps are currently produced at the Reston printing facility. Both flat and folded maps are printed in a variety of quantities. Printed materials are stacked three feet high, then strapped to pallets. The pallets wait in a loading area until 40,000 pounds are accumulated—one truck load. At least twice a month, a truck departs Reston for Denver.
Adapted form Administrative Notes, April 1989.

MAGERT OPEN FILE REPORTS

Titles in this series are generally of an ephemeral nature or are too specialized to warrant general distribution as formal publications. They are available as on-demand photocopies, as a service to the map library community. All orders must be prepaid with a check or money order made payable to Jim Coombs, MAGERT Open File Reports Production Manager. There is a minimum charge of $3.00 per order. Prices include postage and handling. Orders should be sent to: Map Library, duane G. Meyer Library, Southwest Missouri State University, Box 175, Springfield, MO 65804-0095.

86-1 Vick, Nancy J. **Guide to U.S. map resources: a personal name index.** 1986. 16 leaves. $1.60.

86-2 Sunnen, Linda, and Daniel O. Holmes. **Map room acquisition procedures: University of California, Berkeley: a systems analysis.** 1984. 36 leaves. (an introductory examination of then current problems with some suggested solutions) $3.60.

86-3 COUNTY COORDINATES (4 corner latitude/longitude; degrees and minutes):
-CA Robertson, R. Bruce. **California County coordinates**. 1984. 4 leaves. $0.40.
-HI Baldwin, James A. **Hawaii County coordinates: including major islands and National Parks.** 1987. 4 leaves. $0.40.
-IL Wenner, Alex, and Marian Hunter. **Illinois County coordinates**. [1985] 5 leaves. $0.50.
-MO Wilson, Allen P. **Missouri County coordinates**. 1988. 6 leaves. $0.60.
-UT Robertson, R. Bruce. **Utah County coordinates**. 1984. 3 leaves. $0.30.
-WY Walsh, Jim. **Wyoming County coordinates: including National Parks and Monuments, and Wind River Indian Reservation**. 1986. 3 leaves. $0.30.

86-4 Vick, Nancy J. **Latin America Cutter list: first and second order administrative divisions**. August 1988. 30 leaves. (An expansion of the Library of Congress "G" classification schedule; excludes Mexico) $3.00.

86-5 Cobb, David A. **United States State coordinates**. 1986. 4 leaves. (4-corner latitude/longitude for each state; degrees and minutes) $0.40.

86-6 U.S. National Parks and Forests Cutter list. 1986. 11 leaves. (Library of Congress expansion of "G" classification schedule) $1.10.

86-7 Sample map workforms for M.A.R.C. input. 1986. 8 sheets (some printed on both sides) (Locally devised OCLC, RLIN, and UTLAS input workforms) $1.50.

88-1 Kandoian, Nancy. **An English translation of words abbreviated in Ritter's Lexikon**. 1988. 4 leaves. $0.40.

88-2 Vick, Nancy. **MAGERT alphabetical membership list.** February 1988. 20 leaves. $2.00 (This ORF will be updated biannually).

88-3 Lorrain, Janice, and Jim Coombs (with a "tip o' the hat" to Charles A. Seavey). **A map to the LC "G" schedule**. 1988. 18 leaves. $1.80. (a new, expanded, and improved set of base maps showing place names and "G" schedule 4-digit area numbers).

MAP LIBRARIANSHIP

"Take a map and travel with it" —that was Clara Egli LeGear's response to Librarian of Congress James H. Billington when he asked her what advice she would give young people interested in maps and geography.

Billington, John Wolter (chief, Geography and Map Division) and other staff members paid tribute to Mrs. LeGear for her 74 years of service to the Library at the division's Christmas party in December.

Mrs. LeGear, now 92, has spent a lifetime involved in almost all aspects of map librarianship — cataloging, reference, acquisitions, bibliography, and administration—in the Library's Geography and Map Division. Soon to be published by the Library of Congress is Mrs. LeGear's "Comprehensive Author List," Volume 9 in the *List of Geographical Atlases* in the Library of Congress.

Clara LeGear joined the Library of Congress as a typist and clerical assistant in December 1914. Eleven months later she transferred to the Division of Maps.

During her first 35 years, Mrs. LeGear served in a variety of positions, including cataloger, reference librarian, assistant chief (1931-1945), and librarian in charge of cartographic acquisitions.

After the Second World War Mrs. LeGear relinquished her administrative duties in order to devote full time to writing and bibliographic activities. Her first major publication was a manual on the care and preservation of cartographic materials, *Maps: Their Care, Repair and Preservation in Libraries* (1949), which quickly became a standard reference work in the field of map librarianship.

With the official designation of bibliographer, she resumed work on a bibliography of atlases in the Library of Congress that had been started by her former chief, Philip Lee Phillips, completing Volume 5 of *A List of Geographical Atlases* in the Library of Congress in 1958. Earlier she produced a two-volume work, *United States Atlases, 1950-1953*. She also continued work on the division's card file of bibliographic citations to cartographic literature, which was eventually published by G.K. Hall as *The Bibliography of Cartography* (5 volumes, 1973).

Retirement from the Library after 47 years of service in 1961 did not put an end to her productivity. Appointed Library of Congress honorary consultant in historical cartography, she went on to complete volumes 6,7, and 8 of *A List of Geographical Atlases* and continued compiling the Bibliography of Cartography until a full-time bibliographer was appointed in 1969. As a result of her extremely long and productive career, Mrs. LeGear has received extensive national and international recognition and numerous awards from professional and cartographic organizations. When she received the Honors Award of the Special Libraries Association's Geography and Map Division in 1957, the citation recognized her "as patron saint to anyone interested in historical cartography; as a source of advice and counsel to all; as author of many of the bibles of the profession...; and especially...for the very gracious modesty with which all of these things have [been] accomplished."

Two years after her retirement from the Library of Congress, in 1963, Mrs. LeGear received the Library's highest honor, the Distinguished Service Award.

Mrs. LeGear was accompanied at the Geography and Map Division Christmas party by her husband of 50 years, Russell LeGear, who retired from the Library himself after 34 years as a descriptive cataloger.

LC Information Bulletin, April 1989

UNIVERSITY OF MARYLAND OFFERS DUAL MASTERS CURRICULUM

The Geography/Library Sciences (GELS) curriculum of the University of Maryland is a full offering in computer-based spatial analysis and information management—one of the few programs in the United States.

Students earn a Master of Library Science and Master of Arts in Geography on completion of a minimum of fifty-six graduate hours. Applicants must be accepted by both departments. Those who already hold a related graduate degree may be eligible for advanced standing in the program.

Contact Dr. Anne S. MacLeod, College of Library and Information Services, Hornbake Library Bldg.—Room 4111E, University of Maryland, College Park, MD 20742, (301) 454-3590; or Dr. Kenneth E. Corey, Department of Geography, 1113 Lefrak Hall, University of Maryland, College Park, MD 20742, (301) 454-2241.

cartographic events

EVENTS CALENDAR

July 31–August 4: **SIGGRAPH '89** (Special Interest Group on Computer Graphics), Association for Computing Machinery Annual Conference, Boston, MA. Contact: SIGGRAPH Conference Office, 111 East Walker Drive, Chicago, IL 60601.

August 6–10: **URISA 27th Annual Conference**, Boston Marriot Copley Place, Boston, MA. Contact: Tom Palmerlee, Executive Director, URISA, 319 C Street SE, Washington, DC 20003; (202) 543–7141.

August 17–24: **ICA International Cartographic Conference 1989**, Budapest, Hungary. Contact: Ernó Csáti, Institute of Geodesy, Cartography, and Remote Sensing, H–1373, Budapest, POB 546, Hungary.

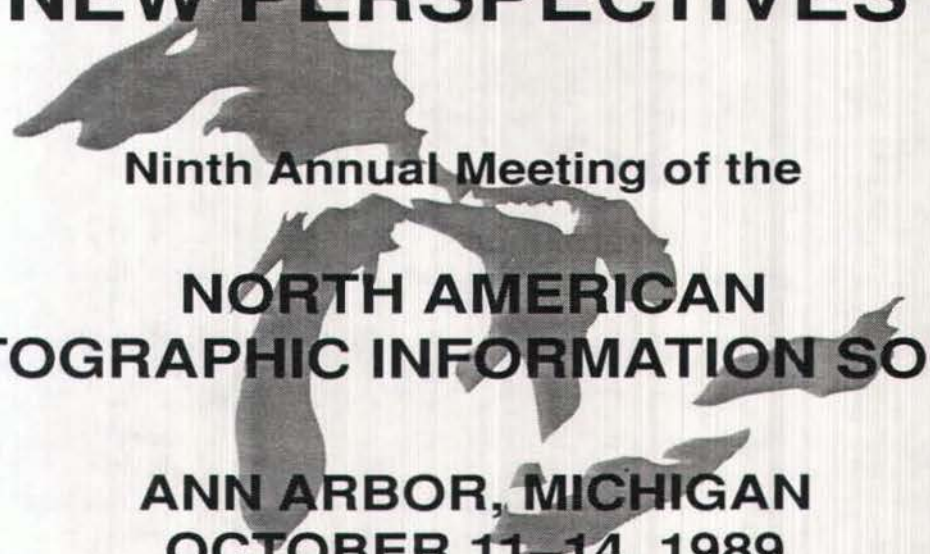
September 15–16: **GIS: Database and Mapping Applications**, sponsored by Lincoln Institute of Land Policy (LILP), San Francisco, CA. Contact: LILP, (800) LAN-DUSE.

September 17–22: **ACSM/ASPRS Fall Convention**, Cleveland, OH. Contact: John E. Daily, Suite 100, The Honeywell Building, 925 Keynote Circle, Cleveland, OH 44131.

September 18–19: **ERIM Fall Conference**, "Options for the Federal Agenda for Earth Observations in the Global Change Era," Washington, DC. Contact: Dr. Robert H. Rogers, ERIM, Box 8618, Ann Arbor, MI 48107–8618; (313) 994–1200 ext. 323; FAX (313) 994–1575; Telex 4940991 ERI-MARB.

September 20–23: **International Map Dealers Association Annual Conference and Trade Show**, Kansas City, MO. Contact: Nancy Edwards, Office Manager, International Map Dealers Association, P.O. Box 1789, Kankakee, IL 60901.

NUEVAS PERSPECTIVAS
NOUVELLE PERSPECTIVES
NEW PERSPECTIVES



Ninth Annual Meeting of the

NORTH AMERICAN CARTOGRAPHIC INFORMATION SOCIETY

ANN ARBOR, MICHIGAN
OCTOBER 11–14, 1989

The Ninth Annual NACIS meeting will feature papers on various aspects of cartographic information and, in particular, those papers which relate to the theme of this year's meeting: *New Perspectives*. Topics include:

* Atlases--Concepts to Production
* Canadian Cartography
* Cartographic Design
* Cartographic Educatation
* Cartographic Software
* Cognitive Cartography
* Computer Mapping
* GIS
* Geological Mapping
* Government Mapping Programs
* Historical Cartography
* Latin American Cartography
* Map Librarianship
* Mapping Water Resources
* Marketing Cartographic Information
* Navigation
* Remote Sensing
* Statistical Mapping
* Techniques in Map Production
* The Cart Lab: Issues and Problems

The NACIS IX conference site will be the Ann Arbor Inn in the heart of the city's business district. It provides easy access to over 40 restaurants, shops and the University of Michigan. Various cultural activities such as museums, galleries, gardens and libraries are also close by. Known as the "City of Trees", Ann Arbor displays a wide array of colorful leaves in October. Temperatures are mild and range between 40 and 60 degrees. Registration and accommodations information will be made available soon.

Conference information:
Diana Rivera
University Libraries
Michigan State University
East Lansing, MI 48824-1048
(517) 353-4737

Poster Session information:
Craig Remington
Department of Geography
University of Alabama
University, AL 35486
(205) 348-1536

Exhibit information:
Charles E. Harrington
NOAA/NOS
6001 Executive Boulevard
Rockville, MD 20872
(301) 443-8360

October 11–14: **North American Cartographic Information Society** Ninth Annual Meeting, Ann Arbor, MI. Contact: Diana Rivera, University Libraries, Michigan State University, East Lansing, MI 48824–1048; (517) 353–4737 ext. 4593.

November 12–15: **NCGA Mapping & GIS '89**, Los Angeles, CA. Contact: NCGA; (703) 698–9600.

November 26–30: **GIS/LIS '89**, sponsored by AAG, ACSM, ASPRS, URISA; Orlando, FL. Contact: ACSM; (703) 241–2446.

March 13–16, 1990: **GIS '90**, Vancouver, B.C. Contact: Hugh Legg; (604) 664–5922.

Spring 1990: **Canadian Cartographic Association** Annual Meeting, Victoria, B.C. Contact: Dr. C. Peter Keller, Dept. of Geography, University of Victoria, Victoria B.C.

June 22, 1990: **ALA Preconference Workshop on Satellite Imagery and Aerial Photography**. The Map and Geography Round Table and RTSD/CCS Committee on Cataloging: Description and Access will cosponsor a workshop, "Remote Sensing Imagery: Identification, Control and Access," on Friday, June 22, 1990 in Chicago, prior to the ALA Annual Conference. The workshop will include discussions on identifying the special characteristics of remote sensing images (including satellite images and aerial photographs) as well as creating and coding catalog records for them. A practicum will follow. Instructors will be Dr. Helen Jane Armstrong (Univ. of Florida), Mary Larsgaard (U.C., Santa Barbara), Betsy Mangan (L.C.), and Nancy Vick (Univ. of Illinois). For more information, contact Ellen Caplan (OCLC) at (614) 764–6000 or Nancy Vick at (217) 333–0827. Complete registration information will be available this fall.

July 1990: **4th International Symposium on Spatial Data Handling**, Zurich, Switzerland. Contact: Dr. Duane Marble, Dept. of Geography, 103 Bricker Hall, The Ohio State University, Columbus, OH 43210.

CALL FOR PAPERS

The editors of *The American Cartographer* are soliciting papers for a special issue on analytical cartography to be published in January, 1991. Potential topics include:

§ The conceptual structure of analytical cartography

§ Theory of spatial operators in regular/irregular cellular systems

§ Spatial filtering in cartography

§ Spatial data structures

§ Relational data structures in a cartographic setting

§ Object oriented data structures

§ Mathematical definition of cartographic objects

§ Spatial database systems

§ Numerical terrain analysis/representation

§ Cartographic query languages

§ The use of artificial intelligence in cartography

§ Concepts of vehicle navigation systems

§ Use of fractals in cartography

§ Concepts of numerical map generalization

§ New work in map projections

Please contact the guest editor if you are interested in a topic that is not listed here. All manuscripts submitted will be peer reviewed with the normal process. For the style requirements, please refer to the July, 1989 issue of *The American Cartographer*. Please send a one page prospectus to the guest editor if you are interested in writing an article.

GUEST EDITOR
Prof. Harold Moellering
Dept. of Geography 103 BK
Ohio State University
Columbus, OH 43210
Tel: (614) 292–2608
Bitnet: Ts0215@OHSTVMA

SCHEDULE
Prospectus due: October 1, 1989
Submission of manuscript: February 1, 1990
Notification of review: May 1, 1990
Revision of manuscript: September 1, 1990
Planned publication: January, 1991

CONTINUING EDUCATION

September 6–8, 1989: **Digital Geographic Information Systems** George Washington University, Washington, DC. Instructors: John E. Estes and Jeffrey L. Star, Department of Geography, University of California—Santa Barbara. The course concentrates on the requirements and techniques for managing data within geographic information systems. It introduces concepts of geographic analysis and emphasizes the need to assess simultaneously point, polygon, and raster (image) data. The processing of various data types and use of data from diverse sources is facilitated through the application of common methods of geographical referencing and data interchange formats. In a laboratory session, participants receive hands-on experience with a microcomputer-based geographical information system.

For further information, contact Darold Aldridge at (202) 994–8518.

NACIS news

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Patricia Gilmartin, Department of Geography, University of South Carolina, Columbia, SC 29208; (803) 777-2989

***William Schenck**, Cartographic Information Center, Delaware Geological Survey, University of Delaware, Newark, DE 19716; (302) 415-8262

***Leonard Abrams**, Panoramic Studios, 2243 W. Allegheny Avenue, Philadelphia, PA 19132; (215) 233-4235

***Patrick McHaffie**, Kentucky Geological Survey, University of Kentucky, 311 Breckinridge Hall, Lexington, KY 40506-0056; (606) 257-5863

Ellen White, Department of Geography, Michigan State University, East Lansing, MI 48824, (517) 366-4658

Those positions marked by an asterisk are open for nomination for 1989-90.
Three Directors-at-Large, The Vice President and Secretary must be elected by our next annual meeting. Please forward nominations to: Ron Bolton, Room 100, 6010 Executive Blvd., Rockville, MD 20852. Nominations when forwarded should include a letter of acceptance and a short vita for use on the annual ballot.

CONGRESS OF CARTOGRAPHIC INFORMATION SPECIALISTS ORGANIZATIONS
Final Text, as Adopted, The Newberry Library, Chicago, November 10, 1988

Resolution #1
WHEREAS, WE, THE DELEGATES to the Congress of Cartographic Information Specialists Organizations, assembled in Chicago on November 9th and 10th, 1988, discussed common concerns and expressed our hopes for cooperation among ourselves and our respective organizations, and

WHEREAS, WE found those discussions and our social interchange to be of mutual benefit, and

WHEREAS, WE learned that there is great potential for improving our ability to serve better our members and our patrons, and

WHEREAS, WE find that a continuing interchange among us and our organizations will promote cooperation in many areas of mutual interest, will provide opportunities for personal growth and continuing education, and will strengthen our collective voice,

WE RESOLVE, THEREFORE, to return these sentiments to our respective organizations with a request that they individually appoint one member, by February 15, 1989, to a Planning & Coordinating Committee to plan and conduct the first International Conference of Cartographic

Information Specialists to be held in 1990 or as soon as practicable;

BE IT RESOLVED, FURTHERMORE, that the Planning & Coordinating Committee should proceed with reference to the following guidelines, which have been discussed and are considered worthy of further consideration:

1. The Conference should include lectures, workshops, exhibits, and time for each sponsoring organization to have at least one meeting of its own members for the conduct of business.

2. That successive Conferences, if any, should be held at intervals of no greater than five years.

3. The focus of the Conference should be on map curatorship and librarianship, as compared to cartographic production.

4. The Conference should not be designed to take the place of the annual meeting or other meetings of the sponsoring organizations, but if a sponsoring organization finds if advantageous to forego one of its meetings in exchange for the Conference, or hold one of its meetings in conjunction with the Conference, it is encouraged to do so.

5. The Conference should not diminish the quality of regular programming by the parent organization, but rather the Conference should supplement the continuing education and strengthen the information exchange between organizations and their members.

6. The Planning & Coordinating Committee shall elect its own Chair from among those appointed to the Committee.

Resolution #2

WHEREAS, there is a need to improve the quality of communications between the members of cartographic information specialist organizations, and

WHEREAS, there is a desire to eliminate unnecessary duplication of effort in accomplishing the above objective,

NOW, THEREFORE, WE, the delegates to the Congress of Cartographic Information Specialists Organizations, request that each member organization designate a member, by February 15,1989, to act as the Information Coordinator for that organization.

The Information Coordinators, in cooperation with each other, should attempt to accomplish the following objectives:

Develop a mechanism for pooling and disseminating information on the following:

Calendar dates for meetings, exhibits and other events

Job announcements, retirements, vacancies, and any other employment related information

Awards, prizes, grants, and other opportunities for professional advancement

Lists of publications as sources of information and as disseminators of information

and,

Matters of common interest to all.

Resolution #3

The Congress regrets the expenditure of time, effort, and money represented by the production of three overlapping or competing directories of map libraries (by SLA GMD, ALA MAGERT, and ACMLA). While we can appreciate the organizational and economic motivations that led to this duplication, it seems to us a less than ideal situation given the size of the map library community, the restricted budgets of libraries, and the palpable lack of harmony it presents to observers of the map library scene.

The Congress discussed several possible solutions, including

1. Unilateral suspension of one or more publications,

2. Further specialization of information to make the directories more distinctive (for instance, one specializing in descriptions of collections, including, perhaps, ARL profiles by class number; another in personal addresses and phone numbers),

3. A totally cooperative effort, involving several groups, using a uniform questionnaire, and published by a nuetral publisher, such as Bowker,

4. A two-volume directory, one for the U.S., and the other for Canada, to be sold separately or as a set, and

5. Staggered publication dates to maximize the currency of information promoted while minimizing overlap (two directories, for instance, might each have five-year revision cycles, with a new directory appearing every two and one-half years).

NEW APPOINTMENTS

NACIS Preident Juan José Valdés announces the following appointments: **Diana Rivera** and **Karl Proehl** will represent NACIS in the planning of the first **International Conference of Cartographic Information Specialists** to be held in 1990 or as soon as practicable. Diana will serve on the Planning &

Coordinating Committee and Karl will represent NACIS as an Information Coordinator.

EXCHANGE PUBLICATIONS

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

Canadian Cartographic Association Newsletter. A quarterly publication offering news and announcements to members of the CCA. Contact: Canadian Cartographic Association, c/o Department of Geography, Memorial University of Newfoundland, St. John's, Newfoundland, A1B 3X9; (709) 737–8988; Bitnet: CHWood@MUN

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. Contact: Siegfried Feller, publisher/editor, 8 Amherst Road, Pelham, MA 01002; (413) 253–3115.

GIS World. Published six times annually, this newsmagazine of Geographic Information Systems technology offers news, features, and coverage of events pertinent to GIS. Contact: Debbie Parker, Subscription Manager, GIS World, Inc., P.O. Box 8090, Fort Collins, CO 80526; (303) 484–1973.

LETTER TO THE EDITORS

April 26, 1989

Dear David,

Many thanks for your very snappy looking first edition of *Cartographic Perspectives*. In return, I enclose our most recent CCA Newsletter, and look forward to your future issues. It looks like I will be incoming CCA manager as well as the newsletter western correspondent.

Given the multiplying number of meetings in cartography and GIS, and the difficulties of attending all such meetings, we could at some point perhaps consider the possibility of a joint annual meeting at some border crossing of well placed city, e.g. Seattle, Buffalo, Toronto etc.. We have gained much from recent joint meetings with like minded organizations, which helps foster continued co-operation, although their set-up can be complex.

Anyway the exchange of newsletters is extremely useful.

Yours sincerely,
Roger D. Wheate
University of Calgary

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 representration of the divers interests of the membership. The primary mechanism for soliciting featured papers will be a paper competition held in conjuction 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 or meeting participants before submitting as 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, MindWrite, 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.

Graphics generated with Adobe Illustrator or Aldus FreeHand for the Macintosh are most preferred, but generic PICT or TIFF format graphics files are usually compatible as well. Certain graphics formats for the PC may also be submitted (for example, HPGL (.PLT), CGM, EPS, and TIF).

For those lacking access to microcomputers, typed submissions will be tolerated. Manually produced graphics should be no larger than 11 by 17 inches, designed for scanning at 300 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.

COLOPHON

This document was desktop-published at the Deasy GeoGraphics Laboratory, Department of Geography, Penn State University, using an Apple Macintosh IIx. Word processing was accomplished with WriteNow 2.0; page layout with PageMaker 3.01. Graphics not rendered with Aldus FreeHand 2.0 were scanned from paper originals using an HP 9190 ScanJet desktop scanner. 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. The type face is Palatino, designed by Herman Zapf.

NACIS membership form

North American Cartographic Information Society
Sociedad de Informacion Cartografica Norte Americana

Name/Nombre: _____

Address/Direccíon: _____

_____

_____

Organization / Afiliacíon profesional: _____

_____

Your position/Posicíon: _____

Cartographic interests/Intereses cartografíco: _____

_____

Professional memberships/Socio de organizacíon: _____

_____

_____

Membership Fees for the Calendar Year/
Valor de nomina de socios para el año:
Individual/Regular: $15.00 U.S./E.U.
Students/Estudiantes: $ 5.00 U.S./E.U.
Institutional/Miembros institucionales:
$35.00 U.S./E.U.

Make all checks payable to/
Hagan sus cheques a:
NACIS
6010 Executive Boulevard, Suite 100
Rockville, MD 20852
U.S.A.

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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LOG OF THE EXPEDITION

Part 1 - Heading For Heard

1997 - Reunion Island

Peter ON6TT and Arie PA3DUU were the first to arrive, one day after Christmas. It was a good decision to come early: one of our containers (the one carrying the precious tractor and wagon!) was missing. Well, not exactly missing. Apparently the ship was delayed, and for several days it was not at all clear that it would arrive before the Marion Dufresne left. Silently I reviewed what was in the container, and whether we could do without it. Nope. We had to have it. It was no small relief when the guys walked into the corporation yard of the shipping agent and found both containers there. Of course, I had the keys, so they simply used boltcutters and broke the padlocks. Inside they found a kit for a small city. Just add water and gasoline and you're operational!

The team was hosted by local hams, particularly Philippe FR5DN and Patrick FR5FC, who put us up in the village of St. Giles les Bains. The village is about an hour from the airport but quite near the Marion Dufresne. It is a quaint semi-tropical resort, with pool, outdoor bar, and bungalows. It was very hot and humid, not particularly good for acclimating the team going to Heard Island.

Soon the other team members started appearing: Ralph KØIR and Glenn WAØPUJ (sporting his new callsign WØGJ) from Minnesota. James 9V1YC, from Singapore. They moved into the bungalows, and almost instantly put Reunion on the air as TOØR. During that first evening, they dragged a table, chairs, transceiver, generator, gasoline, computer, and a Gladiator 160 m vertical antenna a quarter mile down the beach, and set up a station under a picturesque wooden kiosk. The antenna was installed in the ocean, and it tuned well. Not surprising, they were rewarded with a huge pileup. The greatest threat came not from band cops or the lightning strikes, but from the several drunks who patrolled the beach. At 3 AM, the beleaguered and exhausted team packed it all up and retreated to the safety of the bungalows.

With the team on the move, Martha and I spent a blissful week in England. We made the obligatory tours through Westminster and the Tower. On Christmas morning we made a pilgrimage to the church where the body of explorer Sir Richard Francis Burton lies, together with that of his wife Isabel. Denied entrance into Westminster, they repose in a plaster tomb in the church garden, designed to look like an Arab tent on the outside (for him) and a Catholic chapel on the inside (for her). The fact that Isabel had committed the literary crime of the century by burning Burton's diaries when he died was on our minds as we gazed in through a

clear window at their wooden coffins. Although a century of time and an ocean of culture separated us from them, we shared a bond of love for faraway places. And Heard Island is *very* far away.

I began to head for Heard from Heathrow, on Dec. 31. The young lady at the British Air counter explained that my excess weight charge would be about $2400! No, no, I said. Yes, yes, she said. No, no, no, no, I said. She recomputed it: $400. As I stood for 30 minutes trying to pay this ridiculously exorbitant fee, my plane took off for Paris without me. I sat down to wait for another.

Some four hours later I finally arrived in Paris, and took the bus to Orly airport. There were my teammates! Al K3VN (WA3YVN), Bob N6EK, Wes W3WL (W8FMG), Bob K4UEE, Mike N6MZ, Michel EA8AFJ, and Ghis ON5NT. But where was Carlos NP4IW? Not here, we all said, but no one knew where he was. He had flown into Paris with Bob N6EK, but had not appeared at Orly when we expected him. As we flew away toward Reunion, we were mystified, and worried.

The flight to Reunion was not easy. It was hot, noisy, smoky. I think there were about 250 babies onboard, all of whom wanted us to know they were not happy. There must have been an equal number of smokers, seated in concentric circles around me. I maintained good British decorum by wearing my coat and tie, and scarf, even though we were flying across the equator into the tropics.

Peter and the others were at Reunion waiting. They had news:

"Telegram from Carlos. He got as far as Paris, turned around, and flew immediately back to California."

"What's the problem?" we asked. "Is he OK?"

"That's all we know now." they said. "Apparently it's complicated." We knew we would have to check on him, but right now there was much to do.

Ralph and Glenn inspect some of the supplies for the expedition.

The first thing I wanted to do was see the gear. Although hot and tired from the flight, I insisted that we go immediately to the Jules Roy corporation yard. While some of the team continued on to the bungalows at St. Giles, several of us opened the containers and gazed on the sublime beauty of 2500 cubic feet of expedition gear. While Ralph and others fawned over the generators, I leaped at the tractor. Much to the amusement of almost everyone, we pulled off the flimsy crating, attached the steering wheel, and installed the battery. Then, in a moment of glory I sat on the seat, turned the key, and roared with delight as it's engine came to life instantly. Triumphantly I careened around the yard, waving and grinning. But when I invited the others to try it, they demurred and backed away. Hmmm, I mused. They're not yet convinced about the tractor, but they will be, I thought. On Heard Island, where everything will be heavier, they'll be convinced.

Then Peter told us the news:

"Guys. We have a problem. The French Maritime Services, a kind of union all over France, is going to go on strike. It will delay our departure. Unless something changes, it could cost us two days on Heard Island."

To us this loomed like a major disaster. Projecting additional lost time due to high seas, delays in landing due to bad weather, and the possibility of having to leave early if an emergency or storm arose, we were looking at perhaps 10 days of operation. Killing two more days for a strike was atrocious. We reacted angrily, but it did us no good. We would meet with the boat officials on New Year's day. Until then, we could only fret.

Back at the bungalows, we talked over the situation and strategy. We were in total agreement: Heard was priority. If that meant compromising our visits to Crozet and Kerguelen, so be it. Heard had the priority. That was it. Agreed. Period.

Some of our precious cargo is loaded on the ship.

January 1-4 - Preparing to leave

New Year's Day. Ralph, Peter, Willy, and I boarded the Marion Dufresne. We were introduced to the captain, Patrick Regnier, and the operations officer Claude Chaufriasse. The captain was in his late 50's, trim and handsome, with a booming voice that sounded like an organ pipe. Claude was your idea of a perfect uncle: cuddly, smiling, gentle, strong. Claude explained, in French:

"The strike is scheduled from 1500 on January 3 to 1500 on January 5. It's confirmed by TAAF. The strike is mainly concentrated in France, but the crew of the Marion Dufresne decided to go along with the strike as a sign of solidarity. There is no chance of avoiding this. We cannot leave before the 5th."

We sucked in a nervous breath. Peter spoke for the four of us:

"We understand. We want to emphasize how important it is to get our team on Heard Island by Jan. 11. It is absolutely essential in order to keep a schedule with our radio satellite. Missing that date will compromise all our subsequent operations. This will be very damaging worldwide, and would damage the image of TAAF and the French research program."

Peter's explanation was only a slight exaggeration. We were concerned also about Crozet. A brief stop there was planned on the way down, but if the weather was bad, it could further delay our arrival at Heard. Claude responded:

"I propose that we leave at 1600 on Jan. 5 and go directly to Heard, bypassing Crozet. That would put us at Heard on Jan. 11 or 12, on schedule."

We gasped, and smiled. Just what we hoped for. All it took was approval by TAAF. By mid-afternoon, approval was relayed from Paris, and we had a plan. The word was flashed to John ON4UN, who put it out to the Heard internet reflector and the world.

Now we relaxed. Four more team members arrived. Two more to come, and we would be 20. At 3 o'clock we assembled at the bungalows for the first group meeting. For some it was the first time they had met. For others it was seeing close friends. We sat around in a huge circle and I gave each one a copy of the Participant's Handbook. To me, the Handbook seemed like a terse summary of resources everyone would need. To the recipients, it must have seemed like the Manhattan telephone directory. It was about 150 pages long. I told them they should read and master it all, quickly, please. In retrospect they must have thought me mad.

That afternoon, Arie PA3DUU snapped a photograph of Glenn with his digital camera. At the home of Patrick FR5FC, he logged onto the internet and uploaded it to Andre ON1AIG in Belgium. Andre forwarded it to Don N1DG in Duxbury, Massachusetts, who posted it on the VKØIR web news pages. That evening, Glenn telephoned his wife, only to learn that she had seen his picture on the web before he knew it was there!

I telephoned Martha, who was by now back home in California, and asked about Carlos. She explained that he had simply had too many family and business complications to deal with, and as sad as it was, he simply could not vanish for all of January. Besides, she said, he needed Heard Island (hi hi)!

Sometime during the day, Willy moved onto the ship. He did important things like arrange for the crates to be packed, secure storage space, and find the laundry rooms. He also installed his FT890 (the same one he had taken to Peter I) near the

bridge and hung the Fritzel dipole from the superstructure. We were on the air with TOØR/mm/port (just kidding!).

During the night, the 160 m gang had been at it again on the beach. The glow inside the large open wooden kiosk created a feeling of high mountains, even though we were on the ocean. The team concentrated fiercely, and racked up QSOs. I stood by as an observer. Somewhat to my surprise, some mild aggression, the kind seen in freeway drivers, emerged. Away from the radios the guys were open, friendly, and generous. While within 2 meters of the radio, they did a bit of posturing, a bit of demonstrating. I took all this as a good sign. They were eager to get going.

The experience on 160 m was fascinating. An interesting note came from Jerry WB9Z: "TOØR had a very nice signal here last night, interesting they were coming in over the north east, the same direction as ZS8IR a few weeks ago."

Reporting this to the Heard reflector, John ON4UN editorialized:

"These are the kind of crooked paths that we will have to expect on 160 meters (and even the other low bands). During winter in the northern hemisphere, signals tend to travel as long paths as possible. A typical example well-known in Western Europe is the path to ZL, which comes across South America during European summer, across Central America during the equinox period, and across North America during European Winter months. This means that the direction the signal arrives shifts a full 90 degrees with season."

John's comments were a deliberate heads-up of what might expected from Heard Island.

The next day, January 2, was moving day. Our two containers were trucked to the ship and we watched as they were lifted by crane and set on the deck. To our astonishment, one container was apparently too heavy, so we partially emptied it on the dock. I gleefully jumped on the tractor and rode it around the dock, to the ridicule of almost everyone. Still no one would drive it but me.

At that point, Bob Allphin K4UEE came up to me and said:

"You know the e-mail messages we left with Patrick last night to upload on the internet? Well, the dog ate them."

"You're speaking metaphorically, of course" I said, one eyebrow raised high. Arie was standing nearby:

"Don't laugh! The dog ate them! That is, the dog ate the disk!"

Later in the day, I got a ride to Patrick's. Sure enough, we had left the disk on a table on his front porch, waiting for him to return. The dog had chewed it like a plastic bone. The forlorn thing was in pieces, covered with dog tooth marks. Naturally, the messages were unrecoverable.

While at Patrick's, I took the opportunity to use his internet connection in real time. I needed to make some small but crucial changes in the VKØIR home page. I was very nervous. For the next month, all access to Heard Island news was going to be through the web home page. If I broke it, I would be the DX goat of the century. I used care like I would use were I defusing a live bomb... Got it! Web page still worked! I reached for a beer.

In the afternoon, the entire team moved onto the ship, and we began the series of daily strategy meetings. I took it as a good sign that when I arrived at these meetings, on time, everyone else was already there.

January 3 and 4 were workdays on the ship. We pulled everything out of the two containers and repacked it in landing crates and bundles. The helo could lift up to 1 ton, and it was necessary to make up packages that weighted no more than that. The generators were run and then drained again. Bob N6EK recovered all the computers from the outhouse—er, shipping container—and set them up in his cabin. Willy produced the extensive set of brass propane fittings he had made up in Switzerland. The green army transit cases were stacked five high, and the ones containing the Alphas were segregated. We opened the package of large white plastic canvas bags and loaded them with coax and other items that could withstand piling and tossing. The outhouse urinal was removed and outfitted with a funnel and plastic tubing for rapid deployment on Heard Island. Willy directed the filling of the French landing crates, each about 5x5x8 ft, sorting the items by type, location, and priority. The food alone used three of these crates. Two transit cases containing our primary landing tools and emergency gear were repacked and marked. One landing crate was filled with all the gear for a complete radio station: shelter, generator, lights, radio, amplifier, antennas, tables, and chairs. It was marked for deployment away from the main village. We used the hose to rinse the eight water containers and fill them with fresh water. And of course, I jumped on the tractor and rode it around the deck grinning widely, as if it was the first time I had done that.

This *was* the first time the team had actually worked together, and I was both surprised and pleased at the result. No one seemed to hold back, letting others do the hard work. Every team member was there, volunteering, men doing men's

Packing the boxes

Labeling the shipping cases.

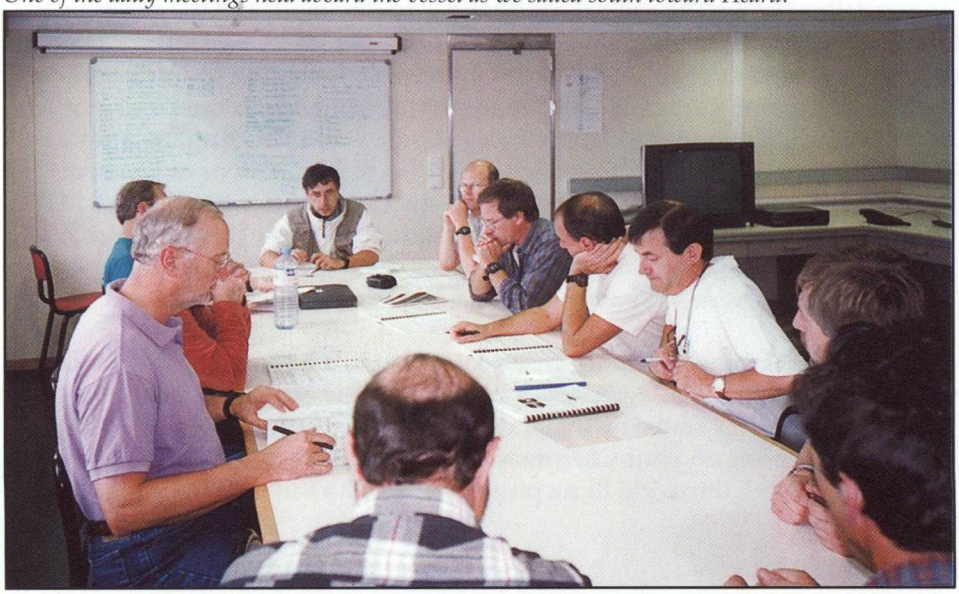
work. Most carried their handbook around with them, using it to find items on the packing lists. They had a penchant for using big black markers to write on the crates and cases: "Priority" "Needed immediately" "Do not use" I was not successful in conveying the fact that such marks are counter-productive, since they rapidly become obsolete. It was of little consequence, however.

All afternoon, we sorted gear and filled crates. Every now and then we would clear the deck and enormous trapdoors would open, big enough to lower a 20 ft. container through. Up would come more crates, and then the trapdoor closed and we returned to our sorting and packing. We looked at our 5,600 liters of fuel, 600 liters of propane, 3,500 liters of water, 2 tons of food. The weight was reported to be variously 25.6 tons to 35 tons. Whatever was correct, we were impressed.

The next day, Jan. 2, the 160 m operation now shifted to the dock in front of the Marion Dufresne. A full-sized 160 m dipole was strung from the ship's rigging, the feed line snaked along the dock to the table next to the van. Later, Willy, who is from Switzerland after all and apparently likes high places, made an incredible climb up a gigantic tower on the dock, to the very tip, probably 200 ft. high, carrying the antenna slung on his shoulder. At the top he attached one end and let the other end drop. After re-attaching that end to the ship's rigging, they pulled it up, and the antenna floated horizontally, in the clouds it seemed. The feed line dropped straight down to the table on the dock. There, in front of God and the curious, KØIR and WØGJ and K4UEE and RA3AUU and N6MZ and W3WL spent the night, while the rest of us slept.

The eve of our departure was one of celebration. The ship's bar did a brisk business. As the hour got later, the music and laughing got louder. I began to identify which of our team were up to the challenge; it became clear that some had more experience with ships' bars than others.

One of the daily meetings held aboard the vessel as we sailed south toward Heard.



January 5-10 - Sailing to Heard

TOØR finally went QRT, with 411 160 m QSOs from 50 countries in the log. The logs were posted on the web server, and the hit rate skyrocketed. We got a message from Lyndon that more than 1500 people had subscribed to the Heard reflector. John ON4UN was posting bulletins to the reflector, and our wives were calling wondering if we had left. It was time to get going! We had a public waiting out there, hungry for Heard Island!

Sailing was scheduled for 1600 local. Most of the team elected to stay close. Missing the boat would no doubt be followed by voluntary leaping into the volcano. We had our customary group meeting right after breakfast. Bob N6EK told us about the computers and the logging procedures:

"I have set up a computer next to the radio, and this can be used for practice while working the pileups. Before you operate, you must write on the paper station log. When you finish operating, you make another entry. This will give a reliable means for correcting any computer or logging errors."

I was inwardly glowing. The handwritten station log was one of numerous ideas that had emerged from the Easter Island XRØY expedition. It was good to see we were progressing.

"I think we should have a radio and computer just for practice, without any pressure to work pileups," I said. That idea wasn't so popular. Almost no one could fathom why we would need practice. I kept quiet.

Around two in the afternoon, several of the French hams arrived to send us off. One of the well-wishers was Conchita FR5GQ. We found her to be a delightful person and good friend. She brought us about six quarts of her homemade special fermented tea for use on Heard Island. Each bottle had a label that said it was for the VKØR [sic] team. We accepted them gratefully and added them to our stash of liquor, alongside the Tanquery, Jim Beam, J&B, and Captain Morgan's spiced rum.

Gradually the official cars and delivery trucks disappeared, and most of the guests drifted away. The ship's horn let out a mighty blast, and the gangway was lifted off the dock and tied to the rail. The last of our crates was lowered into the hold at 1536 hours (local), and at precisely 1600, an hour after the strike officially ended, the Marion Dufresne—all 120 meters of her, all 10,380 tons of displacement, her two dining rooms, forum, lounges, video-conference rooms, sports hall, library, verandah, hospital, pharmacy, 1000 tons of fuel, 30 tons of kerosene, 550 tons of fresh water, twin landing craft, three diesel generators producing 8 MW of power driving two propeller shafts, 2 flap rudders, and bow thrusters, her 31 labs with 650 square meters of floor space, winches, cranes, electronics, inflatables, her crew of 25 and a hundred passengers—backed away from the dock and pointed her bow south.

What was *not* aboard, to our consternation, was a helicopter. An hour out, as we scanned the horizon, a speck appeared and grew into a helo, and it settling gently on the big H painted on the stern deck. We were aghast. It looked like a toy, something to hang on your Christmas tree, perhaps. To make things worse, the pilot looked for all the world like a pizza cook, and he had his 11-year-old daughter with him!

Our fears were unfounded. Soon we came to understand that this is a Lama helicopter. It may look small, but boy does it have lift! It is rated to pick up a ton. By now we had totaled our gear at more than 30 tons. We were impressed when we learned that the round-trip sortie time at Heard Island was about 3 minutes. The arithmetic was easy: 30 trips, 90 minutes. While we were low on every estimate, it made us feel better. As we got to know the pilot, nicknamed Tonton (which means uncle), we came to realize that he could very well be our secret weapon. His skill alone might well determine whether we could make the landing on Heard Island by helo or by boat. Tonton turned out to be all we could have hoped, and we began to be very protective of him.

As we sailed smoothly south, I took a turn around the ship, seeing some of it for the first time. On the bridge is a transparent plastic panel mounted in part of the deck that overhangs, allowing you to look straight down about a hundred feet directly to the ocean. When I stood on it, my entire skin felt like I was awash with crickets. The forward-looking windows on the bridge have neat wipers and freshwater sprayers, just like my Nissan Sentra. The entire bridge is open; crew and passengers roam freely among the islands of instruments. The door to the bridge is connected to a switch that automatically douses the white passageway light and turns on a red night-vision light. Nearby is a small library stocked with hundreds of classics in many languages. The dining room has a video player that accepts NTSC tapes. There are dozens of small meeting rooms and labs. Everywhere are rubberized non-slip mats.

Willy gave us a tour of the radio room. For the first time we saw the inmarsat that we would have on Heard Island. It looked exactly like a briefcase with a telephone handset on the top. Willy explained that to use it, you just lift the handset, dial 011 and your number. Anywhere in the world. Of course, *we* had an unlisted number.

Peter explained that we would have four phone lines: (1) regular telephone; (2) fax; (3) data; (4) answering machine. Instantly we began to invent the message for the machine:

"Hello. You have reached the Heard Island Expedition. For a QSO, press 1 now. To make a suggestion, press 2 now. To reach the galley, press 3 now. To reach a member of the team, dial the extension now. For an operator, please listen on 20 or 40 meters."

We thought of installing a 900 number, and paying for the trip by collecting fees. We figured that it would be no use explaining to a wrong number where we were. We gleefully anticipated calling Australia to order a pizza, delivered; most of us didn't believe we would get it.

At dinner that night I recognized Hal Heatwole, the biologist from the 1983 VK9NS expedition, and I introduced myself. He in turn introduced Myriam Preker, a Canadian biologist living in Queensland, Australia. Both Hal and Myriam were on a quest for tardigrades, he for terrestrials, she for marines. We resonated, and for a short time I considered abandoning the radio team, eloping with Hal and Myriam to become a tardigradophile (just kidding!). After all, I had a permit to collect tardigrades on Heard Island.

January 6. Our first full day at sea. Hal was at our morning meeting:

"You should have very little difficulty siting your aerials. The terrain is not the problem, but the wind might be." We'd heard it before, but now it was beginning to take on some greater reality.

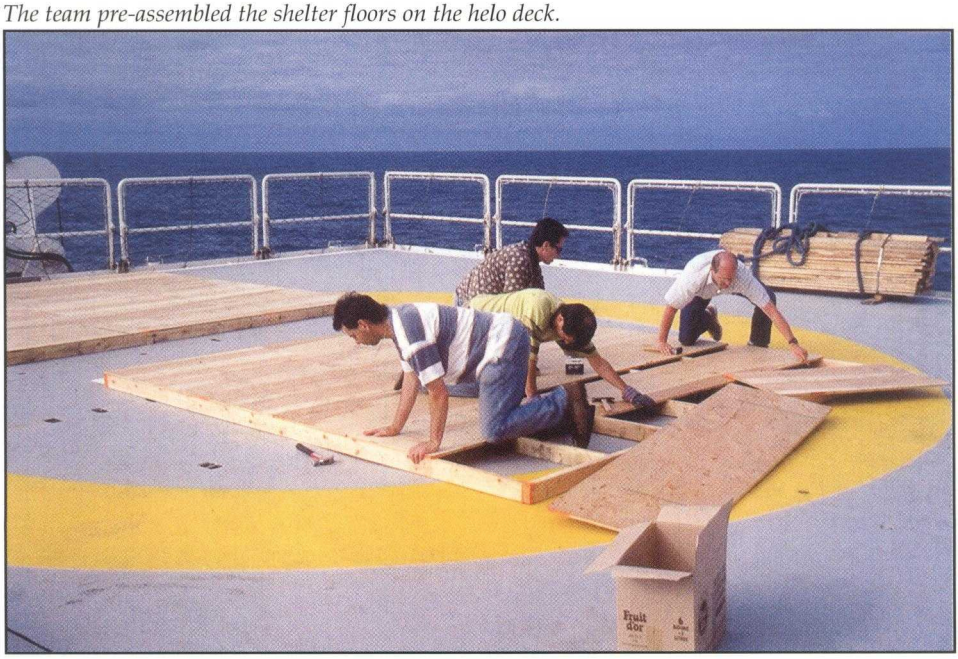
As well-prepared as the team was, it was clear that the meetings were essential. The team worked phenomenally well together, but I had some trouble getting them to take the next planning step. There seemed to be a general feeling that the equipment was packed and we had the manual, so any problem that came up could be handled on the spot. I harangued them about being totally prepared before we landed, so there would be no time lost to confusion. I emphasized that we must work for efficiency. I felt guilty talking to a talented team like this. But I knew I had to. They had to understand that when we landed on Heard Island, we would not have time to figure it out. Every man had to know exactly what he would be doing, and how to do it. The tools and materials had to be in the right place, and the timing had to be right. I gave them a criterion:

"If we're prepared correctly, no one will need to say anything. The less talking there is, the better we are."

The team listened and learned very well.

Peter took his turn at the team with the logging program. In spite of his exhortations over the past year, some on the team were simply not proficient at CT. He set up daily training/practice sessions. Bob N6EK brought all the computers to the meeting room, and hooked them up in a network. Peter walked around and around the table shouting out callsigns while we typed them on the keyboard. To

The team pre-assembled the shelter floors on the helo deck.



my amusement, he used real, recognizable callsigns, and several of the practicers were distracted enough to make remarks about who was being "worked."

As we worked with the computers, we began to have problems. Sometimes the entries would spontaneously change. Sometimes CT would quit. Sometimes the computers froze up.

"I'm seeing bugs," I said.

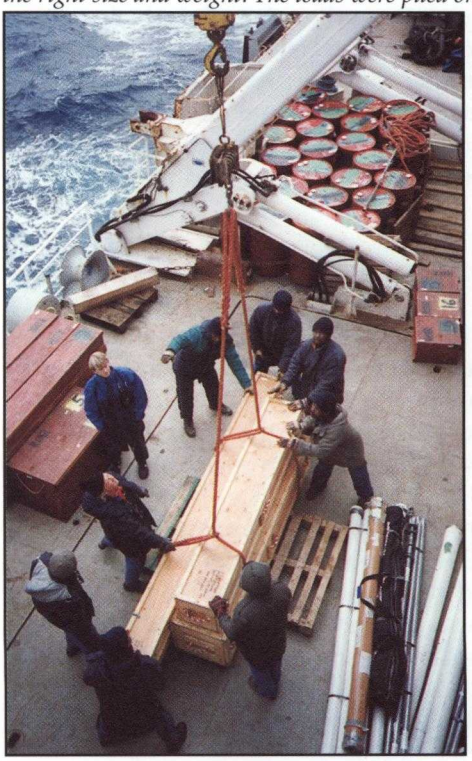
"That's not reasonable," said Bob. "I've never seen such bugs in CT."

"I don't doubt that," I countered. "But here we have field conditions. *You* may never make these errors and CT may not be making them, but *we* are making them here under less than optimal conditions. Reality is winning."

Bob quickly grasped the reality. It became apparent that there was at least one real bug in networked CT. Going back to edit a previous QSO caused the cursor on all the other computers to jump to the beginning of the call currently being entered, thus garbling the entry. Bob called the bug "spectacular." It was potentially devastating to our Heard Island operation. In addition, there may have been other problems with the network. On a single computer, everything worked fine.

To his great credit, Bob quickly proposed that we abandon the network. It was a courageous decision, since he had invested considerable energy implementing the network. It was, however, the right decision, we all agreed.

Preparing loads for the helicopter. A collection of antennas and a collection of tote boxes was about the right size and weight. The loads were piled on the helo deck to await the flights.



January 7. The sea a deep, deep blue. A few cumulus clouds and visibility to the horizon. A beautiful day. We were running at 14.4 knots. Time to go to Heard Island: 4 days 5 hours.

At the morning meeting, I formally appointed Wes Lamboley W3WL ombudsman. We spent some time going over the process of facing and solving people problems. In the Handbook I had set forth a formal procedure for resolving disputes. But I was concerned that this might not be enough. The ombudsman was the person you could talk with when there was no other alternative. The team relaxed. Just knowing that there would be somewhere safe to go with a problem probably served to vitiate many of those problems.

The site plan in the Handbook survived a penetrating and critical analysis by the group. It wasn't a pushover by any means, and there was lots of urging for major changes, particularly in the sleeping arrangements. Some thought they could arrange the bunks to give everyone more room. Others thought we should put the com shelter away from the sleeping area. We made a couple of good changes. The team voted to use the insulated shelters for sleeping, leaving the uninsulated one for the galley (reasoning: the galley has stoves and other heaters). More significantly, the 12x12 ft. warehouse was abandoned in favor of establishing a predominantly CW op site.

January 8. We continued working through the czar plans. Safety czar David VK2JDM offered up a brilliant suggestion: Why not pre-assemble the wooden shelter floors, and fly them to the island? This would eliminate all the complications of carpentry on the uneven ground, and trying to work with tools in bad weather. We consulted with Tonton, who agreed to do it. After lunch we established a carpentry shop on the helo deck. Four hours later the entire set of 2x4 and plywood floors, all ten of them, were neatly stacked, tied together and ready to fly. We figure it saved us 50 man-hours on the island, and may well have given us one extra precious day of operating radio. We pronounced it brilliant, and repaired to the bar.

January 9. At 0100 UTC, we were at 39° south latitude. Time to go to Heard Island: 2 days, 18 hours.

We continued to work on details, packing and repacking the landing crates. It was frustrating: we couldn't locate our tools and materials. If it turned out to be like this on HI, I thought, we'd be in trouble.

This was a day of rest and relative quiet. Many people were tired. The CT instructional classes went on, and we provided instruction in operation of the FT890 and FT1000MP radios.

Willy prepared a detailed list of the crates and their landing sequence. We worked out the strategy: KØIR, KK6EK, ON6TT, and 9V1YC (with the video camera) would land first. Then the helo would get Michel EA9AFJ, who would be my interpreter, while Peter and Willy remained onboard to sequence the off-loading. Then the helo would bring the landing tools and emergency supplies, then two groups of team members, then...

After a while, we could find no way to improve the plan. It was finished.

January 10. At 0200 UTC, we were at 44° south latitude, 500 miles from Heard Island, running 13 knots. Time to go: 1 day, 11 hours. It was chilly.

In mid-morning I was handed a fax from the AAD in Hobart, Tasmania:

"We have had reports from airlines that Big Ben is erupting. During your stay on the island, could you please record any observations you make of steam, smoke, or similar phenomena?"

Sailing to a live volcano! We had known this, but it was always theory before. Now suddenly we visualized rivers of red molten lava flowing down the glaciated slopes and across our campsite. We discussed what to do if we were threatened. Would lava make a good ground?

Willy found that all 500 (really!) loaves of bread that had been supplied by TAAF were completely rotted. The ship promised to replace them. Why, I mused. The new ones would just rot, too. But there just wasn't time to work every detail, and we packed hundreds of new loaves of bread.

A fair portion of our time was now spent signing envelopes and other printed souvenirs. Various team members had brought hundreds of these items, and it seemed that just when you finished one stack there was another. Several of us had made up rubber stamps with the logo, and these were passed around and used liberally. Even the captain borrowed mine, presumably to stamp passports and other important documents.

Sometime during this day, we simply ran out of things to talk about. Apparently we had worked through every issue of substance—except one: radio! My guess is that the team was already confident about the radio aspects. Almost as a postscript, I turned the last meeting over to Peter, who went through his extensive Handbook guide for radio operations. Peter correctly assessed the team as requiring little guidance about radio matters.

There was a protracted discussion about what we should do if the computers failed. It went something like this:

"Let's say I'm in a heavy pileup and my computer suddenly freezes, and I can't get it restarted?"

"You should call for help."

"But wait! In a storm in the dark? It might take 15 minutes or more to get help to my location. By then the pileup is getting out of control."

"Then we should agree to always have an expert on call."

"Forget it. If this happens, I'll pick up a piece of paper and write my logs. Hell with the computers."

The discussion actually got testy. It was clear that the team came from two viewpoints: those who thought the system should work the way it was designed, and those who thought we should be prepared for unexpected behavior. We had to adjourn and cool off over dinner. In the end, the issue was finessed, so there were no winners or losers.

John ON4UN also ran out of crucial things to say. He gave the position of the vessel, noted the lack of activity on the log server in Holland, reviewed the plan to put up all the shelters before coming on the air, and described the campsite in detail. He was an announcer without a show.

It was a nervous wait for everyone. We were restless.

The landing party: Ralph KØIR, Bob KK6EK, James 9V1YC, and Peter ON6TT.

The helo is away! In two minutes Heard Island will have visitors from another world.