cartographic perspectives

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cartographic perspectives on the news

THE CHANGING POLITICAL MAP OF EUROPE

As syndicated columnist Ellen Goodman recently observed, "This is the year that making history finally became a daily event." The political map of Europe in particular is changing at a dizzying pace. Boundaries that only last year seemed as permanent as an 'iron curtain' now appear as ephemeral as faded ink lines on yellowed paper.

The most impressive symbol of the Eastern European revolution has been the precipitous collapse of the Berlin wall and the impending reunification of the two Germanies. Cracks in the wall began to appear in May 1989 as Hungary opened its barbed wire border with Austria. By the fortieth anniversary of the German Democratic Republic in October, 20,000 East Germans had passed through Hungary on their way to West Germany, and thousands more loudly demanded democratic reform in the streets of East Berlin. On hand for the anniversary, Soviet President Gorbachev commented that the fate of reform in East Germany would be decided "not in Moscow, but in Berlin." East German President Erich

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WILEY'S VIEW

...The Soviets *LEAST* enthralled with the sweeping changes by Democracy...

Honecker's hardline regime was soon swept from power on the crest of a wave of public discontent. Under the amused gaze of East German border guards and the glare of western television lights, euphoric Germans from both sides of the wall celebrated the new year with sledges and pickaxes. Bits of the broken wall have become pricey souvenirs. Approximately 150,000 East Germans emigrated to the west through the opened border in the first quarter of 1990, as compared to a total of 344,000 in 1989.

The pace of German reunification has exceeded all expectations. With the assent of the World War II Allies, a treaty signed in Bonn on May 18, 1990 established that the two Germanies would become a single economic entity by July 2. The West German mark was adopted as the common currency, to be exchanged for East German marks at a 1:1 rate.

As the boundary dividing the two Germanies dissolves, the Soviet republics of Lithuania, Estonia and Latvia have taken bold steps to reassert the integrity of theirs. On March 11, Lithuania adopted a new constitution and formally declared independence from the Soviet Union, which responded by imposing an embargo of oil, natural gas and other raw materials shipments in April. Latvia followed with an announcement May 4 of the beginning of a gradual transition to independence. Estonia proclaimed solidarity with Lithuania on May 8 and dropped enforcement of the Soviet constitution without a formal declaration. On May 13, the Presidents of the Baltic states revived a 1934 political alliance and called for full membership in the United Nations. Stalin's 1940 annexation of the Baltic states, while never officially acknowledged by the west, is tacitly accepted. The United States has demurred from recognizing the Lithuanian declaration for fear of further weakening embattled Soviet President Gorbachev.

Already politically threatened by a worsening economic crisis, Gorbachev has (as of this writing) steadfastly required that Lithuania rescind its declaration. "The Lithuanian people are a wise people," he said, and will realize that Lithuania "needs independence, but within the framework" of the Soviet Union. President Landsbergis has insisted that while the declaration is not negotiable, laws enacted since by the democratically elected Lithuanian parliament may be. Gorbachev warned in public remarks that redrawing the Soviet Union's internal boundaries could lead to civil war. He recently told members of the Communist Youth League, "If we begin to divide up, I'll give it to you bluntly. We'll end up in such bloody carnage that we won't be able to crawl out of it."

Meanwhile, the European Economic Community is moving slowly toward an integrated Europe in which some of the meaning and purpose of national borders may be surrendered. Member nations Belgium, Denmark, France, Great Britain, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, and West Germany have endorsed a plan to adopt a single currency and central banking system by the end of 1992. At a conference in Dublin on April 28, the EEC also set a timetable for

(continued on page 42)

featured article

Choosing Tools: Nine Metaphors of Four-Dimensional Cartography

Philip J. Gersmehl

Animated maps are now technically and economically feasible. Like other forms of cartography, map animation has some unique design considerations, which involve a variety of tradeoffs. Making these tradeoff decisions is easier if we acknowledge that different animation software packages seem to embody a number of different perspectives — a 'flipbook' style of animation, for example, is suited to different tasks than a 'stage-and-actor' or a 'model-and-camera' program. This paper contrasts nine different animation metaphors, with special attention to the degree to which a given tool allows a cartographer to make particular kinds of revisions.

INTRODUCTION

A speaker walks over to a control panel and flips a switch: "Let's look at a map that illustrates the process." The room darkens; the screen changes to deep violet; and a small green and blue globe appears, turning majestically on its axis and growing in size as the viewer appears to move slowly toward it. On cue, bright yellow dots highlight the poles; after attracting the viewer's attention, they fade to a dull tan, and lines of latitude and longitude appear. The globe then fades from sight, except for the grid-lines and the outline of North America. Slowly, the spherical grid mutates into a plane coordinate system, and as it does, one can see how the continent is distorted as the grid is flattened. Then the viewpoint begins to shift, first sliding to the left and then curving around in a broad arc and approaching the continent from the west. Seen from this oblique view, the continent begins to lose its planar appearance. Mountain ranges appear as the narrator reads their names: the green-and-tan Coast Ranges, the snow-covered Sierra Nevada, the isolated volcanoes of the Cascades, the block-faulted Bully Choops, the elongated Humboldt Range and its many cousins, and finally the Wasatch and the rugged Tetons. In forty-five seconds the cartographer has conveyed a vivid impression of half a dozen relationships that are very difficult to communicate with words, or even with diagrams on a flat piece of paper (unless, of course, the audience is a group of cartographers with active imaginations and extensive collections of mental maps). It may be true that impressions of animated images seldom persist if they stand alone, but with timely reinforcement an animated map is one of the best ways to communicate ideas about spatial relationships and their changes through time.

As recently as half a dozen years ago, most cartographers could only dream about adding motion to their maps. The twin constraints of time and money made animation an unaffordable luxury, except for those lucky enough to be producing maps for the Olympic games, television commercials, and other high-budget enterprises. In the last decade of the twentieth century, the problem of inaccessibility has given way to the much more pleasurable task of choosing among perhaps fifty reasonably affordable and effective computer programs that can be used to make animated maps. That choice, however, is complicated by the fact that the phrase 'computer animation' is really rather vague; it encompasses many different kinds of computer-assisted graphical motion, with an equally diverse set of potential uses in map production.

The purpose of this article is not to provide a comprehensive review of animation software. Although I am reasonably familiar with perhaps twenty packages, and will cite some of them when appropriate, the suite of available programs is vast and it changes almost monthly. My primary intent in this paper is to address a more fundamental question: the identi-

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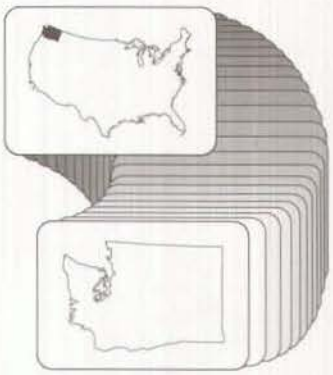
fication of design issues that are relevant to 'four-dimensional cartography' (a name that comes from the Einsteinian world-view, in which time assumes a dimensional status co-equal with the three perceived spatial dimensions of everyday experience (leaving aside, for the moment, some of the new and hopelessly counter-intuitive notions of superstrings and other n-dimensional world models)).

A 4-D cartographer has to deal with scale, data classification, visual hierarchy, and many other problems discussed at length in the literature of traditional print cartography. At the same time, the transientness and mutability of a television image can introduce some unique design issues and provide some unique ways of solving design problems. Successful communication of those solutions, however, requires a common vocabulary, a linguistic baseline that may be difficult to achieve because different animation programs may use different terms for the same action (or, even more confusing, use the same word to describe dissimilar concepts or actions). To help clarify this situation, it is helpful to view the field of map animation as a cluster of related but not identical notions, rather than a single seamless idea. In this paper, I use the term 'metaphor' to describe any one of these different views of the subject.

ANIMATION METAPHORS

To make their programs easier to master, most designers of animation software have elected to borrow jargon from a setting that they hope is more familiar to the user. Such a borrowing of conceptual vocabulary is a kind of metaphor, an implicit comparison whose purpose is to help clarify an idea. Describing various software vendors as adopters or proponents of different metaphors can make it easier to compare programs and choose the proper approach for a given mapping task. However, one should recognize the possibility of overlap (a heavy wrench, for example, could be used as a hammer; it would not necessarily be the most effective tool, but it could drive a nail into some kinds of wood). In my classes on four-dimensional cartography, I have found it useful to recognize at least nine distinct animation metaphors, described below in approximate order of increasing conceptual complexity. A given computer program seldom belongs exclusively in any single category; however, a typical program usually has a distinctive orientation that makes it possible to cite it as an example of a particular metaphor. With that caveat in mind, let us examine nine metaphors for map animation:

Slideshow

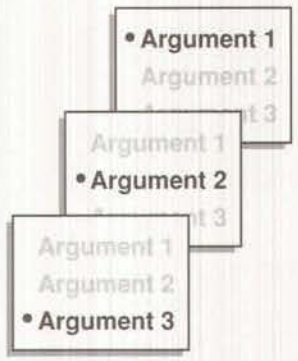


According to this metaphor, animation is an orderly but attention-grabbing sequencing of dissimilar still images — maps, photographs, diagrams, etc. Where a traditional slide show has blank-screen pauses between images, most computer programs for slideshow animation provide a variety of transitions from one image to another: fades, wipes, dissolve, pixellations, venetian blinds, insets, fly-aways, pagecurls, and many other effects with similarly evocative names. At their best, slideshow animations can be attractive, fast-paced, and easy to construct (albeit expensive in terms of the number of still images that are required for even a few minutes of rapid animation). Unfortunately for cartographers who prefer a wide selection of tools, good slideshow animation programs are like adjustable wrenches — they do many things reasonably well, and therefore they have already penetrated quite deeply into the business community, with a wide range of programs like Performer, Director, or Animagic on the Amiga, Grasp or Show Partner F/X on MS-DOS machines, and some uses of Hypercard on the Macintosh. For many users of business graphics, the words 'animation' and 'slideshow' are strict syno-

nyms, and the visual world is the poorer for it. A slideshow is, fundamentally, a sequence of dissimilar still images, and therefore it cannot accomplish the gradual change of scale or perspective that is one of the most seductive traits of a good animated map.

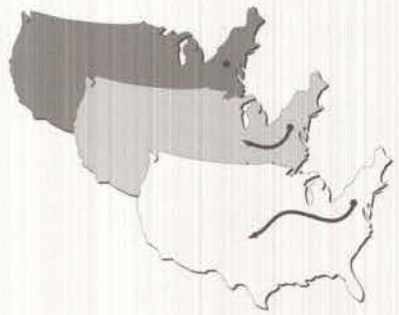
Teleprompter

In many educational settings, the metaphor of the teleprompter is more applicable than the slideshow. As proponents (and perhaps even slaves) of good outline form, many teachers view their material primarily as an orderly set of nested lists, and therefore a straightforward scrolling of key words or phrases can be a useful visual reinforcement for their spoken message. A slideshow program may have lists of words or phrases in its sequence of images, but the outlines tend to be static, whereas the user of a teleprompter program usually tries putting words and simple images on the screen in a more complex way, often in perfect synchrony with the spoken word. In a pinch, a colleague with a projector and a portable word processor can do a creditable job of providing simple teleprompter animation. In choosing a teleprompter program, look for a variety of backgrounds, fonts, and scrolling speeds or directions. The value of teleprompting is apparent in the fact that the market seems to be able to support dozens of these programs (usually described as 'title-writers' or 'character-generators').



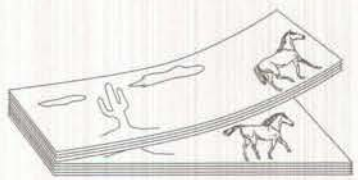
Pointer

If words are arranged on the screen so that their position is part of their message (i.e. as labels that appear on call to identify places on a background map), then the program is an example of the pointer metaphor, so called because the animation plays the role of a flashlight pointer in the hands of a live instructor. Perhaps the most well-known illustration of this category is the 'electronic tablet' used by some television sports announcers to help them analyze a play during a tape replay. A good pointer program should be able to handle text, a hierarchy of point and line symbols, and perhaps a selection of masks that cause background information to recede and thus help focus attention on the main message. Unfortunately for my simple taxonomy, the best of the pointer programs have become much broader and more sophisticated with recent updatings, and therefore it is probably fairer to note this metaphor only as a quick and often surprisingly effective way of using a more general-purpose program such as Autodesk Animator for the MS-DOS platform or Studio 1 for the Mac. A variant of the pointer metaphor is a simple tape recorder — a hardware-software package that transfers to videotape whatever the instructor (or another statistical or mapping program) is doing on the screen. Programs of this type include ColorSpace FX for the Mac, Instant Replay Professional or VGA Producer for MS-DOS machines, and a truly amazing assortment of software written for the Amiga.



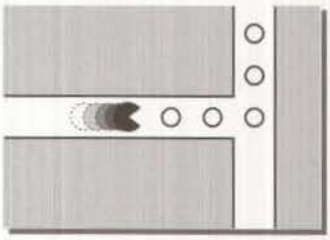
Flipbook

This metaphor has its root in a set of stapled cards that are held in one hand, bent slightly with the thumb of the other hand, and then released in rapid sequence. Each card has a slightly altered version of the previous scene, and, when flipped at the proper speed and viewed from the correct angle, the effect is like a motion picture (albeit a simple and short one). A good flipbook animation program should have an extensive set of easy-to-use image-modification tools and a mask or lasso tool that can surround and modify an irregular shape without resorting to pixel-by-pixel changes. Pageflipper or LightBox on the Amiga, Animator on the PC, and



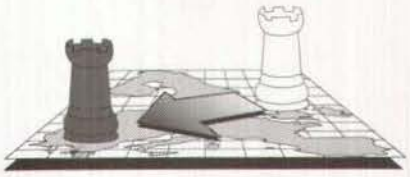
Studio 1 for the Mac have good flipbook capabilities. The latter has a demo animation of a robot assembly line that is a masterpiece of intricate optical illusion and suggestion. The TV character Max Headroom was a sophisticated Amiga flipbook, with an assortment of separate poses and color backgrounds that could be assembled in a sequence and synchronized to the narration. Even with that kind of shortcut, the flipbook technique is labor-intensive; each scene must be drawn (or at least assembled) in its entirety, and a convincing illusion of smooth motion usually requires about a dozen scenes per second. Image cloning and electronic modification can lessen this burden considerably, but with today's equipment the list of options is large, and the flipbook metaphor is seldom the easiest way to add motion to a map.

Sprite



A number of popular early video games (e.g. PacMan) illustrate the sprite metaphor. Animations of this kind have an assortment of small and simple-to-draw objects moving along a restricted set of paths on the screen. MovieSetter on the Amiga, early versions of Videoworks for the Mac, and one component of Grasp for the PC use this metaphor, which can be effective for showing concepts that involve persistent or repetitive motion, such as population migration, nutrient flows, and traffic patterns. In more sophisticated sprite programs, the objects have a variety of states (e.g. left foot forward, both feet even, right foot forward, etc.) that can be alternated to add an illusion of complexity to the motion (and incidentally help to mask the squareness that helps to make sprite motion computationally efficient).

Stage and play

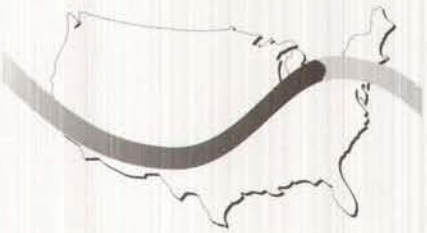


Later versions of the Macintosh program Videoworks (and its superset, Macromind Director) make extensive use of a Shakespearean metaphor: "All the world's a stage, and we are but players . . ." These programs structure an animated sequence as a stage with backdrops and actors (or *cels,* in a traditional painted animation variant of the metaphor). The backdrops are usually stationary throughout an episode, although the program may allow them to be panned sideways, zoomed in or out, faded, or traded with other backdrops. The actors, on the other hand, follow a more complex script that governs their appearance, motion, and relative position (a nicety that allows dominant actors to pass in front of others in a complex choreography). With this metaphor, a detailed animation of an event such as the Crusades might involve defining each army as an actor and a map of Europe as the stage. The difference between an actor and a sprite is the degree of allowable complexity and change — sprites maintain essentially uniform appearance and color, whereas actors can change in a variety of ways as they follow their scripts, which are usually described in stage terms, as opposed to the mathematical abstractions of a sprite program.

Color Cycling

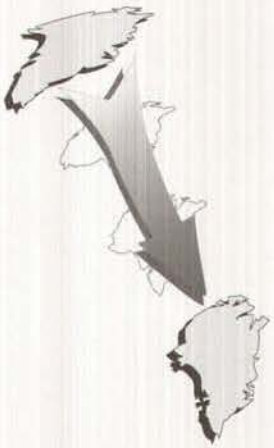
A hardware feature makes color cycling a uniquely efficient way of communicating motion along specified paths or across broad areas. In this kind of program, the animator uses a special 'brush' to lay down a specified series of colors with each stroke. After the image is finished, multiple frames are produced, with the colors automatically advanced one step along the designated series for each subsequent frame. When these frames are played back in rapid succession, waves of color appear to move down the paths. This metaphor has become common in the weather

segments of many television news programs. Its big advantages are efficiency of memory use and speed of construction. A good color-cycling program provides a range of brushes and color choices. With a program such as DeluxePaint for the Amiga, Macromind Director on the Mac, or Autodesk Animator on the PC, showing three or four complex paths of upper-air wind on a continental basemap takes less time than typing this paragraph. The learning curve for a color-cycling program with even a modest amount of color and brush flexibility, however, can be steep, because it is very easy to have a mismatch between the number of colors, the position of the brush, the length of the line, and the number of frames in the cycle, and the result can be a very jerky and uncommunicative animation.



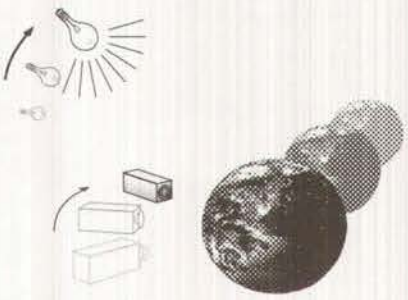
Metamorphosis

A metamorphosis program is designed to make it easy to change the shapes or other features of rather complex individual objects. Someone using this kind of program begins by defining an object with a series of points and placing those points in their appropriate starting and ending positions (say forty points showing the shape of Greenland on a cylindrical and an interrupted elliptical projection). The computer's job is to calculate the position of each point for each 'in-between' frame of an animation — much like the automatic creation of pages 2 through 29 between a given page 1 and page 30 of a flipbook. Fantavision, available for all three basic platforms, the Amiga, the Mac, and the PC, is the least expensive really interesting animation program around. It illustrates the principles of 'tweening' in a thoroughly entertaining way, and it can create some surprisingly sophisticated animated maps if provided with a detailed backdrop from a paintbox program. A number of other programs have tweening options. Animator adds 'tweenable' spline curves and polygons to a flipbook routine, whereas Swivel 3D and Super 3D for the Mac and a number of Amiga programs are able to make three-dimensional models 'tweenable.' In doing so, they cross the border into the domain of the last metaphor on my list.



Model and camera

The most flexible (and therefore almost always most demanding of computer hardware, designer foresight, and programmer knowledge) are the model-and-camera programs. These programs define objects as sets of three-dimensional coordinates for key vertices. They then construct the intervening surfaces, add texture to the surfaces, calculate highlights and shadows, define paths for movement of both object and camera, and then encourage you to go out for a long lunch while they render the commands for a three-second animation into visible form (unless, of course, you have a Silicon Graphics Personal Iris workstation or are using Wavefront on a Cray supercomputer, in which case you are obviously in the enviable position of being able to pay for the privilege of watching animations render in real time). Bell Labs has a powerful modeling program for MS-DOS computers with Truevision graphics adapters. Sold by a number of vendors under a variety of names, including Topas and Crystal 3D, this program provides broadcast-quality animation with millions of colors, multiple light sources, and realistic shadow and transparency effects. MacIvory for the Macintosh has similar capabilities with a somewhat gentler learning curve and a substantially higher cost (where have we heard that before?), but the Mac also has some simpler and less expensive modeling programs with changeable camera perspective, such as Swivel 3D and Super 3D. New Amiga-based modeling programs have been



appearing every month or two — well-reviewed ones include Opticks, Sculpt-Animate 4D, Turbo Silver, Caligari, and Zoetrope. Nine times out of ten, however, it is more cost-effective to use a modeling program only for short transitional effects, such as viewing a spinning globe from outer space, zooming in on a particular place, and then making a quick and hopefully imperceptible fade to a two-dimensional flipbook or tweening program for the rest of the story. A less costly variant of the camera metaphor involves moving the apparent viewpoint toward, away, or around a flat image. This kind of 'two-and-one-half-dimensional' optical illusion is able to provide a host of tilt and tumble effects that can give the viewer a refreshing new perspective on the world (or a serious case of vertigo-induced nausea, if the cartographer isn't careful).

CONCLUSION

The available animation programs provide plenty of choices, at a price. In that respect, they are much like print cartography, with digitizers and computer screens, airbrushes, scribers and photo-etched peelcoats, technical pens and stick-on patterns, and hand-drawn symbols all still useful for different kinds of maps. To help a cartographer choose the proper animation metaphor for a given task, it is helpful to ask a few basic design questions:

How can a cartographer attract or focus attention on a particular part of the map? In addition to the traditional variables of size, density, brightness, pattern, orientation, and complexity, animation affords a number of additional and potentially very powerful visual attractants, such as sudden appearance, vibratory motion, color change, flashing, and fringing of foreground objects or graying of the background information. Many of the basic principles revealed by psychophysical research can serve as a guide in choosing ways to depict specified ideas.

How can a cartographer design a hierarchy of backgrounds and objects in order to maintain an adequate amount of visual and auditory 'headroom' for the ones that should be emphasized? This question is complicated by the fact that one must keep brightness and color saturation within legal limits for broadcast (and contemporary American broadcast standards are notorious for their inability to handle strong reds and yellows, which are precisely the colors that cartographers like to use as attention-grabbers).

How can a cartographer ensure the variety and pace of information content necessary for successful television? The metaphor of a triage officer may be appropriate — one should lay out the entire story, define those topics that *must* be rendered within a particular metaphor, and use the proper tools for those topics. Then, consider the time-tested ideas of reinforcement and contrast in selecting graphic options for the intervening topics, where the range of acceptable tools is wider. In that context, it is always worthwhile to remember that television is not the only available medium; printed maps will continue to have a place, because the relatively low resolution and transitoriness of a televised image is simply not appropriate for some kinds of messages.

The final consideration for any cartographic project should be revisability. In print cartography, we use computer drawing programs partly because they make it possible to change area patterns much easier than with peelcoats and screens or stick-on film (and those tools became popular partly because they were easier to revise than ink, which in turn is easier to revise than gouged wood or fired clay). Within the suite of available animation tools, some metaphors make some kinds of revision much easier than others. For example, changing perspective is simple with a model-and-camera program and terribly time-consuming with a

color-cycling program; changing the color of an object throughout a four-second animation is very easy with a stage-and-actor program and frustratingly difficult with most flip-book programs. The selection of tools, therefore, usually depends on trying to strike a balance between the advantages of a given metaphor for a given subject and the costs of having to make the inevitable revisions within the constraints of the metaphor. In exploring those tradeoffs, we are just at at the beginning of a very long and exciting road into the future of four-dimensional cartography. ℗

A Glossary Of Terms For Computer-Assisted Four-Dimensional Cartography

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Italicized words are also defined separately in this glossary.

Animatable property — Trait of an entity that can be changed during the sequence of an animation. Different computer programs have different lists of animatable properties, which typically include some combination of position, size, orientation, shape, color, blur, brightness, reflectivity, and transparency; see everything below!

Anti-aliasing — Using intermediate colors to smooth the jagged appearance of diagonal or curved lines; anti-aliased typefaces look much better than solid-color letters and numbers.

Arc — Move the *camera* around an *object*; this is really a combination of *track* and offsetting *pan* or *tilt*.

Apply — Add texture to a 2-dimensional area. See *texture-map* and *wrap*.

Area — Two-dimensional feature, bounded by three or more *lines* in the same *plane*.

Attention point — Place on a *scene* where a normal viewer usually looks first. English-reading people tend to look toward the upper left-hand corner, although a bright color, moving object, or striking shape can divert their attention elsewhere.

Axis — Line around which a 2D *object* is rotated to create a 3D object.

A/B roll — Editing system with two or more tape recorders *genlocked* together, which allows images to *dissolve* from one to another.

Backdrop — Fixed part of a *sprite* or *cel* animation; the backdrop does not change *position*, although it can *fade* in and out of view.

Bandwidth — Duration of an electronic *signal*; when bandwidth is fixed, one cannot increase color complexity without reducing *resolution*; when one notes that the bandwidth of a high-resolution full-color computer display is on the order of 90MHz, it is easy to see why something must be given up in order to translate the image into *NTSC* television, with its bandwidth of about 5MHz.

Bias — Tendency of a *spline* curve to anticipate or overshoot the direction it must take after passing a given *point*.

Bit-map — A shape described as a set of *pixels* of a specified color.

Blend — Make a smooth transition between colors by creating new colors with intermediate *hue*, *value*, and *chroma*.

Bluing — Transferring information to another *frame* with a specified guide color or *template* that is easy to erase later. Named for the non-reproducing blue pencil that print editors sometimes use to mark corrections on a camera-ready manuscript.

Blur — Residual image that occurs when *objects* move too fast for eye fixations.

Board — Additional electronics added to a basic computer to perform specific tasks; animation usually requires frame-grabber, image-manipulation, math-coprocessor, and video-out boards, although some manufacturers combine several functions on one board.

Brightness Color *value*, from dark to nearly white. See *luminance*.

Brush Basic drawing tool; can be as simple as a single *pixel* or as complex as a fragment of a detailed multi-color *scene*.

Buffer Dedicated area of computer memory to store a *cel* or *scene*.

CAD program Computer-aided design program. CAD programs are usually *vector*-oriented and have many *layers*.

Camera point Imaginary *position* of the observer with respect to a 3D model; see *arc, crab, dolly, lift, lower, pan, rotate, tilt, track, zoom*.

Card See *board*.

Cel Picture (of any size) stored in a *buffer* or placed in a *scene*.

Choropleth Map with areal units that are political entities (counties, states) or other arbitrary *areas* that are not necessarily related to the phenomena that are the primary topic of the map.

Chroma *Intensity* of a color, from gray through dull to bright (Caution: that is not the same as dark to light; see *value*). High-chroma reds and yellows are prone to *crawl* and should be avoided.

Chrominance Color *component* of a television signal.

Clear, Delete, Erase, Move, Swap, Transfer, Zap Different programs use different commands to empty the screen and/or memory *buffer*; know these commands, and beware, unless you like losing a day's work in a microsecond.

Clearance Freedom from copyright obligations. Ordinarily, one can copyright only the form of a map, not the data displayed on it. Putting information on another basemap with a different projection may be enough to provide clearance, but if your source contained information that was not in the original data set, you may be legally liable for copyright infringement. Caution: many publishers deliberately put minor errors into a map to trap copyright infringers, and therefore it is always best to check the original data.

Clone Duplicate an *object, cel*, or *keyframe*. Cloning and then manipulating the clone is often the fastest way to create two not-quite-identical objects or scenes for an animation sequence. See *flipbook*.

Color temperature A way of describing spectral colors in terms of the temperature of the object that would emit those wavelengths; blues are 'hotter' than reds. Fluorescent light is hotter than incandescent.

Color-cycling animation Giving the appearance of motion by systematically changing colors through a designated series. The illusion is of a wave of color moving down a line or through an area.

Colorize Add color to a black-and-white image.

Component Signal Television *signal* that separates *luminance* and *chrominance*. See *YC signal*.

Composite signal Television *signal* that includes *chrominance, luminance*, and sound.

Complement Color that, when added, tends to turn a color into gray. Such as red added to green, yellow to purple, etc.

Compress Increase animation speed by making fewer intermediate *frames* between *keyframes*.

Cooler Dimmer and more red in *hue* . See *color temperature*.

Copyblock Device attached to a port on a computer to prevent software piracy. Many of the standard animation programs will not run without a copyblock physically attached to the computer.

Copyright Legal ownership of intellectual property. See *clearance*.

CPU Central processing unit of a computer.

Crab (or track) Move the *camera position* from side to side.

Tendency for colors to smear across the line borders of objects; *chroma*-crawl in *NTSC* television is most obvious with red and yellow, intermediate with magenta and green, and relatively minor with cyan.	**Crawl**
Cathode ray tube, the screen on a typical TV or monitor.	**CRT**
Instantaneous replacement of one *scene* by another.	**Cut**
Repeating a sequence of *cels* or colors to simulate a repetitive motion (e.g. a person walking, a bird flying, or a movement along a path). See *color cycling*.	**Cycling**
Subtractive color description, naming colors in terms of standard printers' inks (cyan, magenta, yellow, and black).	**CMYK**
Digital elevation model, a file of the *XYZ coordinates* of *points* that can be used to define a surface.	**DEM**
Cause an entity or *scene* to gradually disappear and be replaced by another.	**Dissolve**
Achieve the visual appearance of an intermediate color by randomly scattering *pixels* of the endpoint colors. See *blend*.	**Dither**
Move the *camera position* closer or farther from an *object*; unlike *zoom*, dollying will alter the perspective as well as the size of the *scene*.	**Dolly**
Vector-oriented graphics program. See *CAD*.	**Draw program**
Time code designed to accommodate *NTSC bandwidth*.	**Drop frame**
Darkened fringe that appears to raise an *object* above its *background*; often used to enhance *figure-ground* of a map.	**Drop shadow**
Add additional audio or video to an existing videotape.	**Dub**
Digital video effects, such as *pageturns*, squashes, and tumbles, which can be used during editing to combine animations, *narration* shots, and live scenes (often called ADO, after an early trademark).	**DVE**
Where two *surfaces* of an object join. An edge is defined by a *line* or series of *points*.	**Edge**
Decrease the speed of an animation by adding *frames* between *keyframes*.	**Expand or stretch**
Create a 3D *object* by 'pushing' a 2D object 'upward' or 'downward' from the plane of the map and into the third dimension.	**Extrude**
Cause an entity to gradually disappear (fade out) or appear (fade in or on).	**Fade**
Half (every other *scanline*) of an *interlaced NTSC* TV image.	**Field**
Entity that we want viewers to see as a unit (as opposed to ground, the surrounding or background information that we would prefer the viewer to be aware of but not focus on).	**Figure**
Add a color or pattern to the *area* that is enclosed by a specified color or range of colors ('fill to border,' 'fill to line').	**Fill**
Animation that consists of a sequence of slightly different *scenes* that replace each other in rapid sequence.	**Flipbook**
Move an *object* across a *backdrop*.	**Float**
Combination of *camera* motion to simulate an airplane moving through, over, or around a 3D *model*.	**Flythrough, flyover, flyaround**
Family of letters and numbers with a specific graphic style and size. Font names and other terms in animation are usually the same as in conventional cartography.	**Font**

Frame Single *image* (about 1/30th of a second in US television). Consists of two *interlaced fields* in *NTSC* television.

Frame-grabber Device to capture a *scene* from a tape deck or video camera and translate it so that it can be manipulated by a computer.

Genlocked Two or more sources (tape recorders, computers, or cameras) that are driven by the same synchronization clock and therefore can be overlayed or faded from one to another. See *A/B roll*.

Gouraud shading Creating lighted, shadowed, reflective, and *texture-mapped surfaces* on a 3D model. More realistic and time-consuming than *Phong shading*.

Grade, gradient Arrange a gradual sequence of colors between two specified colors. *Dithering* helps to eliminate a 'banded' look.

HAM (hold-and-modify) Obtaining a larger number of apparent colors by holding one *field* and modifying the *palette* before displaying the intervening *scanlines*.

Headroom The range of color that is available for emphasis. Making background colors too *intense* can limit headroom.

Hide Cause an *object* or *scene* to disappear. *See show*.

Highlight 'Hot spot' of light reflection, even from a dull surface.

Hit (hitpoint) Critical instant in an animation, such as when a window breaks, when audio and video should be perfectly synchronized.

Hotter Brighter and more blue in hue (radiometric definition). More intense white, red, or yellow and therefore more prone to *crawl* (television definition).

Hue Spectral characteristic (wavelength) of a color, from violet through blue, green, yellow, orange, red. See *subcarrier phase*.

HVC (HLS) Color description in terms of hue, *value (luminance* or *brightness)*, and *chroma (saturation)*.

Image *Scene* as displayed on a TV screen.

Intensity A fuzzy word that can mean *brightness* or *chroma (saturation)*. See also *headroom*.

Interlaced *NTSC* television has a nominal 525-line image that is made up of two *fields*. Every even-numbered line belongs to one field and every odd-numbered line to the other, and the two fields are displayed alternately. The persistence of one image while the other is being refreshed helps to eliminate perceptual flicker. Most computer displays are non-interlaced, and translating a computer image to television is therefore a non-trivial electronic problem.

Isoline Line separating areas of higher *value* (mathematical definition) from areas of lower value on a map.

Jitter Single-*pixel* shifting of points and thin lines, usually due to fluctuations in tape speed or electrical current.

Join Combine two animation sequences, often with a specified *transition* effect.

Jog-shuttle wheel Tape-deck control for playing television frames at any desired speed, from fast to very slow, forward or reverse.

Kerning Adjusting the spacing between particular sets of letters to improve overall appearance (e.g. by moving a lower-case o so that it fits partly underneath the horizontal arms of the uppercase F in the word 'Ford').

Key, keying Color (often but not always in the *superblack* range) that can be used to indicate areas of a scene that should be replaced with other information from the *keysource* during editing.

Keyframe Reference *frame*, showing *positions* and characteristics of *objects* at a particular time in an animation.

Portion of a scene that we would like to replace all areas of a given color (chromakey) or brightness (luminance key). Keying is a powerful tool for live video (e.g. the news where it can cause a map to replace a green patch on the wall behind a person sitting at a desk).	**Keysource**
Source of illumination in a *scene*. Lights may be described by *position, intensity,* width, color, and motion.	**Lamp (Light)**
Conceptual group of objects in a computer drawing program (see *CAD*). Logically similar to overlays or flaps in conventional cartography.	**Layer**
Raise the *camera* relative to an *object*, without changing the aim of the camera. The object will appear to move downward in the scene.	**Lift**
Source of illumination for a *surface* of an *object*.	**Light**
Increase the *value* of a color.	**Lighten (brighten)**
One-dimensional feature, defined by two or more *points*. Lines can exist within the *plane* of a map (two dimensions) or extend into the third dimension.	**Line**
Lower the camera relative to an object. Opposite of *lift*.	**Lower**
Lightness of a *pixel* or *scene* (see *value*).	**Luminance**
Area or color that is protected from alteration by *brushes* or other drawing *tools*.	**Mask**
Changing shape between *keyframes*. See *morph*.	**Metamorphosis (anamorphing)**
Set of regulations for communicating performance information (when a key is pressed or released, volume is changed, a drum is hit, a door slammed, etc.) to electronic musical instruments or sound-effects machines. MIDI *time-code* and *SMPTE* time-code are different, but translatable.	**MIDI (musical instrument digital interface)**
Combine separate audio and video tracks to produce a final output for broadcast or video-taping.	**Mix (mixdown)**
Computer-aided 3-dimensional drawing program, usually *vector*-based.	**Modeling program**
Single shape of an object that changes its shape between *frames*. See *metamorphosis* and *tweening*.	**Morph**
Voice-over or *talking head*. A favorite animator's trick is to *cut* to narrator in order to get out of an awkward projection, cluttered map, or other tight spot!	**Narration**
Closeness to another color. Having *RGB* or *HVC* numbers that are within a specified range.	**Nearness**
National Television Standards Committee, issuer of rules about *bandwidth, brightness,* color *intensity*, and *frame* speed.	**NTSC**
Set of *points* that define an entity in two or three dimensions. The points are then used to locate *edges, surfaces,* colors, etc.	**Object**
Degree to which an *object* prevents you from seeing other objects through it. Opposite of *transparency*.	**Opacity**
Apparent change in perspective that gives an illusion of 3-D motion in a 2-D series of images. These usually are described with commonsense terms such as lean, squash, spin, tilt, tumble, whirl, etc.	**Optic move**
Conventional adjustment for non-square home television screens. See *safe area*.	**Overscan**
Graphic routine to substitute one *scene* for another: these usually have fairly intuitive names, such as horizontal wipe, cross-fade, dissolve, flip-over, fly-away, page-curl, shatter, shrink-down, tilt-down, venetian blind, etc.	**Pageturn**
Computer-aided color or monochrome image-creation program. Paintbox programs are usually *raster*-based.	**Paintbox program**

PAL The European equivalent of *NTSC*.

Palette Graphic display of colors that can be selected at a given time. 6-bit color allows selection of 4 levels of red, green, and blue, for a total of 64 colors; 16-bit color allows 32 levels of each, for about 32,000 colors; 24—bit color has a palette of 16.7 million colors; and 32-bit color adds gray-scale information for better definition.

Pan Turn the *camera* sideways while it stays in the same *position*.

Pantone Color description in terms of pre-mixed printers' inks.

Pedestal Darkest legal level of blackness in an *NTSC* television image. *Superblack* is reserved for *keying* and other information.

Phong shading Creating simple lighted and shadowed surfaces on a 3D model. Less realistic but quicker than *Gouraud shading*.

Photo-realism Having enough colors and detailed enough resolution to be visually indistinguishable from a live image.

Pixel A single point of light on a television screen or computer graphic image. A pixel has *position*, color, and *intensity*.

Point Non-dimensional feature, with x, y, and z coordinates in 3D space. Most computer drawing programs use a series of named points to define *lines*, *surfaces*, and *volumes*.

Position Mathematical description of location in real or conceptual space. *XYZ coordinates*.

Posterize Produce a simpler and often stronger image by reducing the number of colors in a scene and making them more intense.

Preview Display a *model* with shaded *surfaces* but not full *rendering*.

Radiosity Total illumination of a surface in a *ray-tracing* program. It includes light from all sources, both direct from *lights* and reflected from other *objects*.

Raster Horizontal line of *pixels* on a TV screen.

Ray-tracing Mathematically following the motion of light from various sources to the objects in a *scene*. Sophisticated ray-tracing programs are able to produce *highlights*, shadows, and several generations of reflections from objects of varying *reflectivity*.

Reflectivity Degree of reflection from a surface. Reflectivity terms are usually intuitive and include dull, satin, iron, glass, silver, mirror, etc.

Render Display a 3D model with fully colored, *transparentized*, *highlighted*, and shadowed surfaces.

Replace Substitute a color for another specified color or range of colors. Replacements can be global or selective (under a *brush*).

Resolution Number of *pixels* per *image* or screen. A Macintosh or IBM-VGA monitor has a resolution of 640 horizontal pixels by 480 vertical; the resolution of standard NTSC television is about 330 distinguishable vertical lines (theoretically 660 pixels) by 486 horizontal scan lines (nominally 525, but they use *overscan* to accommodate non-square home television receivers).

RGB Color description in terms of *CRT* colors: Red, Green, Blue. A *signal* that sends those three messages separately. See *composite*.

Rotate Create a 3D *object* by 'spinning' a 2D object around a specified *axis*. When you spin a camera clockwise or counter-clockwise around the axis of its lens; the *scene* in the *frame* spins the opposite way.

Rotoscoping Breaking a smooth motion (i.e. a person walking) into a sequence of still images. Named for an early film technique.

RS-170A NTSC specifications for color, *chroma*, *overscan*, *pedestal*.

Area near the center of a television image, visible on TV sets with non-square picture tubes. See *overscan*.	**Safe area**
Chroma or color *intensity*, from dull gray to intense color.	**Saturation**
Create a row of illuminated pixels across a TV screen. Enter an image into a computer memory by analyzing it one scan-line at a time.	**Scan**
A single horizontal row of *pixels* on a video screen.	**Scanline**
Collection of *objects* and *backdrop*. An *image* of a scene is what the viewer sees on the video screen at a given instant.	**Scene**
Darkening due to interposition of another *object* between an entity and a *light* source.	**Shadow**
Cause an *object* or *scene* to appear.	**Show**
Series of electrical pulses that define *image* and sound. See *component*, *composite*, and *NTSC*.	**Signal**
Society of Motion Picture and Television Engineers. 'Simptee Time Code' is a standard way of describing time (hour, minute, second, frame) for audio and video *mixing*.	**SMPTE**
Alter an image by reducing the number and realism of the colors. Usually, muted colors are replaced by ones with more *chroma*.	**Solarize**
Smooth curve fitted through a series of precisely located but potentially movable *points*.	**Spline**
Object that moves through a scene without changing its shape. Sprites may cycle through several alternative shapes (e.g. PacMan).	**Sprite**
Equipment that stores maps, photographs, and other still images and displays them on call, often with appropriate digital effects *transitions*.	**Stillstore**
Series of sketches that show the general sequence of events in an animation. A good storyboard has *timecode*, *keyframe* characteristics, and *transition* effects.	**Storyboard**
Method of describing color *hue* as an angle on a 360-degree scale. See *vectorscope*.	**Subcarrier phase**
Colors darker than the *NTSC pedestal* (about 5 on a 64-level gray scale). These are indistinguishable from black on a standard television screen and therefore have no visual function, but they do provide a place to transmit *keying* and other information.	**Superblack**
Area defined by several *edges* of an *object*.	**Surface**
Place where a subpart is attached to a primary *object* (e.g. a knuckle where a finger is attached to a hand).	**Swivel point**
Scene with a *narrator* speaking directly to the camera.	**Talking head**
Guide for painting a scene. See *bluing*.	**Template**
Amount of straightening of a *spline* curve. Full tension will make a series of straight lines out of the curve.	**Tension**
Painting an *object* with a picture stored in a *buffer*.	**Texture mapping**
Turn a camera up or down while it stays in the same *position*.	**Tilt**
Device to improve synchronization and thus reduce *jitter* and *chroma-crawl*.	**Time base corrector**
Temporal position of a *frame*, in hours, minutes, seconds, and *drop* or non-drop frames. See *SMPTE* and *MIDI*.	**Time code**
Graph showing *keyframes* and other events in an animation sequence. A *storyboard* is a diagram of intent, whereas a timegraph is a record of result.	**Timegraph**

Toggle A program feature that can be shifted between two states and exists in one or the other at all times (e.g. draw or erase, *mask* or write, *keycolor* or image, alter *palette* or not, etc.). One must learn what features are toggled in a given program and check them frequently to avoid accidentally doing something that is not intended.

Tool *Brush*, eraser, paint-roller, *blender*, or other device to alter the appearance of an *object*, *backdrop*, *cel*, *scene*, or other graphic element.

Track Move the *camera* point from side to side. See *crab*.

Transition Replacing one scene with another with a *cut*, *dissolve*, *wipe*, *key*, or more complex effect. See *pageturn*.

Transparency Degree to which an *object* allows you to see other objects through it. A 100% transparent object is invisible.

Tweening Creating intermediate stages between *keyframe*. The computer calculates intermediate values for any designated *animatable properties*.

Undo Program command to cancel the last action. To avoid extreme mental anguish, one must quickly learn what kinds of actions can be undone in a particular computer program (and develop a habit of saving work before performing any non-undoable action).

Value Brightness of a color, from dark to nearly white (graphics definition). Data number associated with a *point*, *line*, or *area* (mathematics definition).

Vector Line connecting two *points* in 2D or 3D space.

Vectorscope Instrument to display color on a radial graph with *hue* as direction (*subcarrier phase*) and *saturation* or *chroma* as distance from the center. Used to test whether colors meet *NTSC* specifications.

Vertex Point where several *lines* come together. The vertex is the most information-rich point in its general region of an *object*.

Virus Insidious program that gets into a computer and makes it do things you don't want it to do, such as writing obscenities on the screen, deleting files, or trashing the hard disk. To protect our departmental computers from viruses, we insist that you never (NEVER) put any floppy disk that contains a boot track or an executable program (a file or group of files ending in .EXE or .COM) into any departmental computer at any time for any reason.

Voice-over Spoken words that accompany a map or other image on the screen. See *narration*.

Weaken Reduce the *chroma* of a color (say yellow) by adding its *complement* (purple). The color becomes grayer (de*saturated*).

Wipe Substitute one *image* for another as a *line* or *object* moves across the *frame*. Wipes can have different directions and speeds. See *transition*.

Wireframe Display a 3D model with a few *lines* that outline the major *edges* of an object.

Wrap Add texture by painting a 2-D image onto the surface of a 3-D object. See *texture-map* and *apply*.

XYZ coordinates Mathematical description of spatial *position*.

X-move Moving an *object* left or right within the *plane* of the screen.

Y-move Moving an *object* up or down within the *plane* of the screen.

YC signal Television signal that sends *chrominance* and *luminance* information separately. YC is one kind of *component* signal.

Z-move Moving an *object* toward or away from the viewer.

Zap Cause a *point*, *line*, *object*, *scene*, or *buffer* to disappear from the screen or computer memory. See *clear*.

Zoom

Enlarge a portion of a *scene* without moving the *camera* point closer. Zooming does not alter the perspective relationships among *object*. See *dolly*.

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Graphics produced by the Deasy GeoGraphics Laboratory

Nueve Metafóras de la Cartografía Cuádimensional – La Selecíon de Aperos

Extracto

Corrientemente la cartografía animada es económica y técnicamente factible. Como otras expresiónes cartográficas, la animación de mapas exique que el cartógrafo considere un diseño especifíco y conceda la posibilida de su alteración. El decidir la forma de alteración es mas sencillo si uno reconoce que distintos paquetes de software de animación contienen distintas perspectivas–por ejemplo, el estilo de animación "flipbook" acomoda una distinta tarea que el programa de "actor y escenario" o el de "la camera y el modelo". Este excrito compara nueve metáforas de animación distintas, con un énfasis a los aperos que asisten al cartógrafo a hacer cambios especificos a su diseño cartógrafico.

cartographic techniques

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.

FIRST ANNUAL SOFTWARE REVIEWS DIRECTORY

Robert P. Sechrist, Indiana University of Pennsylvania and Anne Gibson, Clark University, editors.

In response to the first issue of *CP*, Ruth Anderson Rowles suggested that an "annual list of of software reviews might be useful in planning software purchases." A good idea. *CP* number 2 included a 'call for mapping software review editors' who would be "willing to compile references from a wide variety of sources . . ." We are grateful to Bob Sechrist and Anne Gibson for harvesting the following list.

We hope to prepare an extended version of the list next spring. If you are interested in serving the cartographic community by maintaining such a list over the coming year, please contact David DiBiase, *CP* editor.

MS-DOS BASED SOFTWARE

Atlas*Draw. Stategic Location Planning Inc., San Jose, CA 95117, (408) 985-7400. Reviewed by J. Clark Archer, *The American Cartographer* 16:3 pp. 210-15. Digiting, editing, and cartometric analysis.

Atlas*Graphics. STSC, Inc., Rockville, MD 20852, (301) 984-5123. Reviewed by J. Clark Archer, *The American Cartographer* 16:2 pp. 134-38. Mapping software.

CCS Designer. Dexxa International, Burlingame, CA 94010. Reviewed by Lee De Cola, *The Professional Geographer* 41:4 pp. 494-95. Entry-level CAD package.

CoStat, CoPlot, CoDraw. CoHort Software, Berkeley, CA 94701. Reviewed by Rod B. McNaughton, *The Professional Geographer* 41:4 pp. 495-96. Statistical, plotting & drawing trio.

IDRISI. J. Ronald Eastman, Graduate School of Geography, Clark University, Worcester, MA 01610. Reviewed James B. Moore & Judy M. Olson, *The American Cartographer* 16:2 pp. 138-43. Image processing/geographic information system.

LaserCAD. A.I. Systems, Salt Lake City, UT 84121. Reviewed by James E. Moore, *The Professional Geographer* 41:4 pp. 496-97. General purpose drafting package.

Population Pyramids. Applied Population Laboratory & Center for Demography & Ecology, University of Wisconsin, Madison, WI 53706, (608) 2639484. Reviewed by Kavita Pandit, *The Professional Geographer* 41:2 pp. 233-34. Educational program teaching population pyramids demographically.

Roots. Laboratory for Computer Graphics & Spatial Analysis Graduate School of Design, Harvard University, Cambridge, MA 02138, (617) 495-2526. Reviewed by Peter F. Fisher, *The American Cartographer* 16:1 pp. 286-88. Fully interactive digitizing package.

SPSS/PC+, SPSS/PC+Mapping, SPSS/PC+Graphics, SPSS/Data Entry 11. SPSS Inc., Chicago, IL 60611, (312) 329-3300. Reviewed by Stan Duffy, *The American Cartographer* 16:1 pp. 57-60. Statistical package.

Surfer. Golden Software Inc., Golden, CO 80402, (303) 279-1021. Reviewed by Thomas W. Hodler, *The American Cartographer* 16:3 pp. 215-18. Contour and three-dimensional surface rendering package.

Survey System 1.1C. C & G Software Systems, Atlanta, GA 30341. Reviewed by Ryan Rudnicki, *The Professional Geographer* 41:4 pp. 498-500. Surveying package.

The Map Collection. MapWare, Long Beach, CA 90815, (213) 985-7808. Reviewed by Joseph Poracsky, *The American Cartographer* 16:1 pp. 288-93. Cloropleth, point symbol, contour & fishnet-type maps generator.

THEMAPS. Systems Research Institute, Pune, India. Reviewed by Manosi Lahiri, *The Professional Geographer* 41:4 pp. 500-01. Mapping package.

TurboCAD. Pink Software Development, Atlanta, GA 30350. Reviewed by Thomas W. Hodler, *The Professional Geographer* 41:2 pp. 234-35. CAD software.

MACINTOSH-BASED SOFTWARE

Adobe Type Manager 1.01. Adobe Systems, 1585 Charlestown Rd., PO Box 7900, Mountain View, CA 94039-7900, (415) 961-4400. Reviewed in *MacUser* February 1990 pp 64-65, *MacWorld* February 1990 pp. 180-181. PostScript type enhancer.

Accu-Weather Forecaster. Metacomet Software, Hartford, CT 06103, (203) 233-5911. Reviewed by Carlos Martinez, *MacUser* August 1989 pp. 64-68. Telecommunication & weather analysis package.

Aldus Pagemaker Color Extension 1.0. Aldus Corp., 411 First Ave. S., Seattle, WA 98104, (206) 622-5500. Reviewed in *MacWorld* December 1989 p. 185. Desktop publishing color-production extension.

Aperture. Aperture Technologies, 84 West Park Place, Stamford, CT 06901, (203) 975-7587. Reviewed in *MacUser* April 1990 p. 61. CAD/database hybrid application.

Azimuth. Graphsoft, 8370 Court Ave., Suite 202, Ellicott City, MD 21043, (301) 461-9488. Reviewed in *MacUser* April 1990 pp. 76-80. Map-drawing package.

Blueprint 1.0. Graphsoft, 8370 Court Ave., Suite 202, Ellicott City, MD 21043, (301) 461-9488. Reviewed in *MacWorld* February 1990 p. 195. CAD and drafting package.

DeltaGraph. DeltaPoint, 200 Heritage Harbor, Suite G, Monterey, CA 93940, (408) 648-4000. Reviewed in *MacUser* March 1990 p. 56. Graphing application.

Fontographer. Altsys, 720 Avenue F, Suite 109, Plano, TX 75074, (214) 424-4888. Reviewed in *MacUser* January 1990 pp. 75-77. Font design program.

KaleidaGraph 2.0. Synergy Software, Inc., 2457 Perkiomen Ave., Reading, PA19606, (215) 779-0522. Reviewed in *MacWorld* April 1990 p. 197, *MacUser* February 1990 p. 71. Plotting and analysis program.

Mapmaker 4.0. Select Micro Systems, 322 Underhill Ave., Yorktown Heights, NY 10598, (914) 245-4670. Reviewed in *GIS World* 2:6 pp. 24-26. Map-making software.

MiniCad. Graphsoft, 8370 Court Ave., Suite 202, Ellicott City, MD 21043, (301) 461-9488. Reviewed in *MacUser* December 1989 pp. 67-68. Two and three dimensional CAD program.

Origins. Deltasoft, PO Box 55089, Tulsa, OK 74155-5089, (918) 250-5594. Reviewed in *MacUser* March 1990 pp. 70-72. 2-D drafting and 3-D rendering CAD program.

PixelPaint Professional 1.0. SuperMac Technology, 485 Potrero Ave., Sunnyvale, CA 94086, (408) 245-2202. Reviewed in *MacUser* December 1989 pp. 62-63, *MacWorld* December 1989 p. 184-185. 24-bit color paint program.

Publish It! Timeworks, 444 Lake Cook Rd., Deerfield, IL 60015-4919, (312) 948-9200. Reviewed in *MacUser* December 1989 pp 60-61, *MacWorld* January 1990 pp 197-199. Page layout program.

Roots. Laboratory for Computer Graphics and Spatial Analysis, Graduate School of Design, Harvard University, Cambridge, MA 02138, (617) 495-2526. Reviewed in *The American Cartographer* 16:4 pp. 286-288. Interactive digitizing application.

Springboard Publisher II. Springboard Software, 7808 Creekridge Circle, Minneapolis, MN 55435, (612) 944-3912. Reviewed in *MacUser* April 1990 pp. 74-76. Desktop publishing package.

StrataVision 3D 1.0.2. Strata, Inc., 249 East Tabernacle, Suite 201, St. George, UT 84770, (800) 869-6855. Reviewed in *MacWorld* April 1990 p. 201. Computer-aided drawing and visualization package.

Smart Art. Emerald City Software, 800 Menlo Ave., Suite 102, Menlo Park, CA 94025, (415) 324-8080. Reviewed in *MacUser* January 1990 p. 83, *MacWorld* December 1989 p. 188-190. PostScript effects for type and graphics.

Super 3D. Silicon Beach Software, 9770 Carrol Center Road, San Diego, CA 92126, (619) 695-6956. Reviewed in *MacUser* March 1990, pp. 65-67. Tool for drawing 3-D objects.

Swivel 3D. Paracomp, 123 Townsend St., Suite 310, San Francisco, CA 94107, (415) 543-3848. Reviewed in *MacUser* March 1990, pp. 65-67.

Voyager Carina. Software, San Leandro, CA 94577, (415) 352-7328. Reviewed by Carlos Martinez, MacUser September 1989, p. 89. Educational desktop planetarium.

Wingz 1.0. Informix Software, Lenexa, KS 66219, (913) 492-3800. Reviewed by Lawrence Stevens, *MacWorld* June 1989, pp. 148-49. Spreadsheet with 3-D graphics.

World Class Laser Type. Dubl-Click Software, 9316 Deering Ave., Chatsworth, CA 91311, (818) 700-9525. Reviewed in *MacUser* December 1989, p. 70. Specialty laser type fonts.

USGS COMPUTER PROGRAMS

Over the past 25 years the U.S. Geological Survey has published about 500 publications that contain computer programs. A new indexed listing of these publications has been released by the USGS as Open-File Report 89-681. This listing includes all USGS publications with computer programs that were published through August 1989. Most of the reports included in the new publication provide computer programs only as hard-copy source code, although some of the more recent publications include programs on diskettes.

USGS computer programs are written for many different applications (resource appraisals, earthquake studies, water-quality analyses, seismic exploration, image processing, mapping, etc.), and they are of potential interest to geophysicists, geochemists, geologists, and hydrogeologists.

The report citations are listed numerically by USGS publication series Professional Paper, Bulletin, Open-File Report, Water Resources Investigations, etc.). They are supplemented by author, subject indexes, and computer-acronym. The price of each publication is included in its citation. Some of the more popular computer programs included in the report are:

§ GSMAAP and GSDRAW; a program for IBM-compatible microcomputers to assist in compiling and drafting geologic maps and illustrations.

§ Potential-field geophysical programs for IBM-compatible microcomputers.

§ PCCONTUR, a general purpose contouring program for microcomputers.

§ muPETROL, an expert system for classifying world sedimentary basins.

§ SEISRISK III, a program for seismic hazard estimation.

§ MODPATH, programs that compute and display ground-water flow pathlines.

Copies of USGS Open-File Report 89-681, "Computer Programs Released as U.S. Geological Survey Publications through August 1989," can be purchased for $11.00 per paper copy or $4.00 per microfiche copy from Books and Open-File Reports, U.S. Geological Survey, Federal Center, Box 25425, Denver Colorado 80225. Orders must specify the Open-File Report number and title and must include a check or money order payable to the Department of the Interior – USGS.

REMOTE SENSING NEWS

Landsats 4 and 5 continue to operate nominally. Development of Landsat 6 continues with launch scheduled for 1991.

The Office of Management and Budget has reportedly decided to redirect funds totalling $9.5 million to cover operation of Landsats 4 and 5 through the second half of Fiscal Year 1990. Funding from the NOAA budget only carries Landsat operations through the first six months of FY1990. "EOSAT is still waiting for official notification from the government on funding direction for the last six months of FFY 1990," said EOSAT President C.P. Williams.

The NOAA Budget request for FY 1991, released earlier this week, includes $36.3 million for the Titan II launch of Landsat 6. The source of operations funding for Landsats 4 and 5 in FFY 1991 is to be decided by the Administration and Congress.

Quayle Pledges Support. In a December 20, 1989, letter to Rep. George Brown of California, Vice President Dan Quayle outlined the administration's policy on maintaining the continuity of the Landsat program. "We plan to continue operating the Landsat satellites 4 and 5 as long as they function and to complete manufacture of Landsat 6," Quayle said, adding, "We plan to replace Landsat 6 in about 1996." The Vice President, who also serves as chairman of the National Space Council (NSC), noted the administration had not seen the need to include Landsat 7 development funds in the Fiscal Year 1991 budget, but the NSC will address that issue later this year. An NSC report on Landsat 7 recommendations, originally scheduled for release in 1989, is due out later this year.

Landsat World Update, January 31, February 28, 1990.

The SPOT 2 Earth observation satellite was successfully launched into an 830 km high sun synchronous orbit at 8:35 P.M. EST on January 21, 1990. All systems are reported to be operating successfully. SPOT 2, and its predecessor SPOT 1, are part of a series of commercially operated satellites which acquire detailed digital images of any location on Earth. While SPOT 2 was originally intended to replace SPOT 1, the latter is still operating successfully and both satellites will be operated concurrently.

The SPOT system worldwide, and particularly SPOT Image Corporation in the U.S., have been at the forefront of commercial remote sensing since the launch of SPOT 1 in February, 1986. SPOT worldwide sales exceeded $20 million in 1989, an increase of over 30 percent from the previous year.

For further information contact: Clark Nelson (703) 620-2200.

THE GIS TUTOR

GIS Tutor is a set of HyperCard stacks developed at Birkbeck College in England. It is an excellent example of the effective use of the hypermedia concept applied to education.

GIS Tutor is an interactive program using pictures and animation to explain some basic GIS concepts and terms. The user may take full advantage of the hypermedia organization by following his or her train of thought through the stacks, rather than the author's fixed idea of information organization, as in a book. The tutor consists of 11 stacks and requires almost 800k of disk space, but the divisions between stacks are transparent to the user.

GIS Tutor is oriented to newcomers to the GIS field, but even old hands will likely find something of interest. Topics covered include data capture, editing, data structures, analysis, and transformations. In addition, it includes a bibliography of GIS literature, a GIS systems directory and an index (called an encyclopedia in the program). Navigation around the stacks is accomplished via clickable arrows and buttons, and no previous Macintosh experience is presumed. An index map and contents page allow the user to go directly to the subject of interest. The explanations of user navigation in the stack are good, but some beginning users may become confused if they hold too tightly to the analogy of traditional print media. The stack design only allows the user to jump back and forth between 'chapters,' a process so transparent that some users may be unclear as to their location in the stack. This should not present a real problem, however, since it really is not necessary for the user to know his or her physical location in the stacks.

Usually it will take two or three hours to go completely through the tutor, but the user can easily go through as little or as much of the stack as desired and then just pick up where he or she left off. The tutor tracks the sections completed and offers the user the option of printing a report of sections completed at the end of a session. The artwork and animation are quite good and the careful user will notice considerable detailing incorporated into the stacks.

GIS Tutor requires HyperCard to run and, as a consequence, is subject to some of its limitations, such as limited screen size and monochrome display. The minimum hardware requirement is a Mac Plus with an external drive. Suggestions for improvement include an attached user notes stack and a glossary explaining terms not familiar to users. However, a major upgrade, GIS Tutor II, which will roughly triple the size and content of the tutor is already in the works and should be available sometime in the late spring, according to co-author Dr. Jonathon Raper of Birbeck College.

Overall, this is an excellent tutorial on the basics of GIS, which is primarily directed to beginners. The graphics and animation make the subject very understandable and even fun. The interactive format allows the user to proceed at this or her own pace and seems to be much more effective than the traditional print media.

The GIS Tutor is distributed in the United States by GIS WORLD, Inc. and sells for $99.95.

GIS World, February/March 1990

ANIMATED CONGRESSIONAL VOTING PATTERNS

Two Carnegie Mellon University political economists are creating animated maps on videotape of Congressional voting patterns. The video maps have enabled Keith T. Poole and Howard Rosenthal to reveal some interesting patterns in a massive set of data.

The 11 million roll-call votes made in Congress from 1789 to 1989 are the raw material. The votes of individual members of Congress are mapped along two ideological dimensions. The horizontal dimension ranks the economic ideology of the member: conservatives are placed to the right of center on the map, and liberals are placed to the left of center. The vertical axis ranks the social ideology, with conservatives above center and liberals below center. With these two dimensions, the model represents over 85 percent of the 11 million individual votes involved.

This spatial model is surprisingly good at showing voting clusters. In fact, the researchers have devised a maximum likelihood algorithm that plots a cutting line that separates the yeas from the nays. The video maps show

that pre-Civil war members voted more or less along party lines on economic issues but literally split north and south on the social issue of slavery. In the 20th century, there has been an ideological implosion and the plotted positions have moved closer together. Although, according to Rosenthal, "there's always an economic redistribution conflict coexisting with whatever is a critical disturbing issue at the time."

Pixel: The Magazine of Scientific Visualization, January/February 1990

SURVEY RESULTS SUGGEST INCLUDING AUTOCAD IN CURRICULUM

Charles A. Noran, Department of Geology and Geography, Hunter College, recently completed a survey to determine how and to what degree AutoCAD was being used. The results of his survey were to be used to determine the appropriateness of teaching AutoCAD as part of Hunter College's graduate curriculum in geography.

Utilization

Noran surveyed 100 engineering, cartography, and photogrammetric organizations across the U.S.A. by questionnaire. Forty-one responded. Of those responding, 68 percent were AutoCAD users. Of those, 70 percent relied exclusively on AutoCAD for their automated mapping and GIS needs. The remainder used products such as ARC/INFO, Intergraph, MicroMap, Kork DMS and MPAS 300. Fifty percent of the firms reported using the program for automated cartography, 32 percent for GIS applications, 22 percent for engineering projects and 25 percent for digital photogrammetric mapping. Unfortunately, Noran's questionnaire did not probe more deeply into these applications.

Training

Noran also inquired as to the level and source of AutoCAD training. Organizations reported having between two and twenty trained AutoCAD users. The mean number was eight. Nineteen of the forty-one responding organizations reported conducting in-house AutoCAD training. Five relied exclusively on outside training programs; fourteen relied exclusively on in-house programs. The balance relied on a combination of in- and outside training. On a scale of one to ten, 1 – not useful and 10 – indispensable, the average usefulness of previous AutoCAD training was 6.1.

Conclusion

Based on his survey, Noran concluded that the widespread use of AutoCAD and the prevalence of in-house training programs argue for the inclusion of AutoCAD training in a graduate geography programs. He feels the program's versatility and flexibility will permit its easy integration into a department's curriculum. He recommends its use in courses in automated cartography, photogrammetry and airphoto interpretation, in particular.

AutoCAD — Yes and No

There is no question that AutoCAD has captured a major share of the Computer-Aided Design and Drafting market. From our own research, we know that most photogrammetric firms are frequently required to deliver planimetric and topographic base maps to design engineers in DFX format for use with AutoCAD. In most of these cases, the basemap is produced in a format other than DFX and translated into that format for delivery.

We also acknowledge the growing popularity of AutoCAD-based software, such as TerraCAD, FMS/AC and MunMap-Geo/SQL, for the development of municipal utility system inventories and geographic information systems. Yet, we wonder about Noran's conclusion.

If a geography department considers itself responsible for training personnel for engineering and photogrammetric mapping firms, we agree with Noran. To the degree that it views its mission as the teaching of the principles of cartography and geographic information systems, we suggest that priority be given to programs such as MapInfo, Atlas*Graphics, MapMaker, Atlas* GIS, GISPlus or PC-ARC/INFO.

For additional information, contact Charles A. Noran, (212) 772-5267.

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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.

ACADEMIC CARTOGRAPHY LABS IN THE U.S. AND CANADA: A SURVEY

Roy Doyon,
University of Massachusetts
Anne Gibson,
Clark University

In mid-1988 we surveyed academic cartography labs in the U.S. and Canada. Our intent was to gather and disseminate information on those labs in the hope of providing some perspective on what academic cartography lab managers do and how their jobs are structured. The survey contained questions on personnel data relating to the lab manager, his or her responsibilities, lab clientele, the type of work performed, production methods, equipment, staffing, and billing policy.

The questionnaire

Two hundred and ten questionnaires were sent out, one to each graduate school of geography in the United States. We also sent questionnaires to a few universities in Canada. Subsequently, we discovered that Ellen White of Michigan State had compiled a listing specifically of academic cartography labs (see page 26). By comparing the two mailing lists, it appears we sent surveys to all the labs on Ms. White's list with one or two exceptions. Seventy questionnaires were returned, representing a response rate of 33 percent. Since many geography departments have no cartography lab, it is more appropriate to look at the response rate for cartography labs alone. Ms. White lists eighty academic cartography labs and we received responses back from forty on her list, or 50 percent. We also received responses from another eleven labs that were not on Ms. White's list, for a total of fifty-one responses or 56 percent out of a known ninety-one labs.

Defining a professional cartographic lab

For our initial analysis, we decided to focus on a subset of forty-three labs — those headed by someone who appeared to have been hired to serve specifically as a cartographer or cartographic lab manager. We chose to set aside about eight labs headed by a teaching faculty member who operated a lab 'on the side.' Although it was sometimes difficult to distinguish between the two on the basis of our questionnaire, an examination of title and time spent teaching yielded fairly good clues. We felt intuitively that there might be a difference between a lab managed by a professor of cartography/geography whose primary responsibility was teaching and research, and a lab run by someone hired primarily for that purpose.

Personnel

We begin by looking at the personnel data on lab managers. First, while most respondents listed the word cartographer in their title, those doing cartographic work had a variety of titles, including cartographic technician/instructional support specialist, university cartographer, cartographic technologist, graphics and cartography lab manager, principal illustrator, senior research assistant, and geological drafting specialist. The respondents' actual personnel classifications (figure 1) ran the gamut from support staff (43 percent) to administrative staff (19 percent) to technical staff (17 percent). 12 percent reported being classified as faculty (figure 1). Two of these were either PhDs or PhD candidates, and one with a master's degree had the title of instructor and staff cartographer. However, other lab managers who taught courses were not classified as faculty.

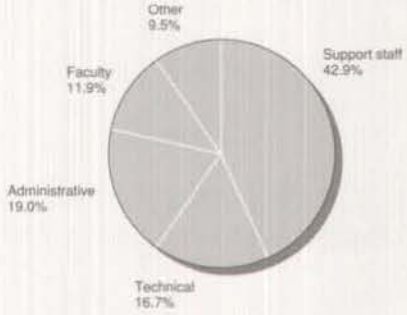

Figure 1: Personnel classification of respondents

Of the forty-one labs responding to this question, a master's degree was the level of education most preferred for this position (59 percent), but 37 percent required only a bachelor's degree. Only one university required its lab manager to hold the doctorate. Of those thirty-seven cartographers indicating their degree, 57 percent held a master's degree (two of whom were pursuing the doctorate) and two held PhDs. Fields of expertise included library science, art, mathematics, physical geography, education and instructional systems technology, in addition to the expected geography or cartography.

Salary statistics (figure 2) are for those thirty-seven respondents indicating that they were employed full-time. Sixty-five percent fell in the $20-30,000 range, fairly equally split above and below $25,000. Of the eleven (30 percent) indicating salaries greater than $30,000, five were Canadian, expressed in Canadian dollars. Four U.S. managers commanded salaries of $30-35,000 and two, $35,000 or more. Of these last two, one held the doctorate and one a bachelor's degree.

$15-20,000	11
$20-25,000	1111111111111
$25-30,000	11111111111C
$30-35,000	1111CC
$35,000+	1CCC

1 = one U.S. manager
C = one Canadian manager (Canadian dollars)

Figure 2: Salary distribution of full-time lab managers

The position of lab manager may or may not include teaching responsibilities. From the wording of the questionnaire, it is difficult to tell whether those indicating salary included in that figure any additional salary for teaching. Of the twenty-seven persons who indicated that they did teach, only ten indicated receiving additional salary for doing so. For some lab managers, teaching was part of their base responsibility, while for others it was an 'extra' that they might provide on top of their regular duties.

Sources of funding

There are three sources of funding for lab manager salaries: from a general college/university budget, from the geography department specifically, or from payment for

work performed. The majority of lab manager salaries (79 percent) were funded wholly by one source: 45 percent by the college, 31 percent by the geography department, and 5 percent from work performed. The remaining eight salaries (19 percent) were funded by two sources. Three received funding from both the college and the geography department, and another three from the geography department and work performed. Two salaries were funded by the college and income from jobs.

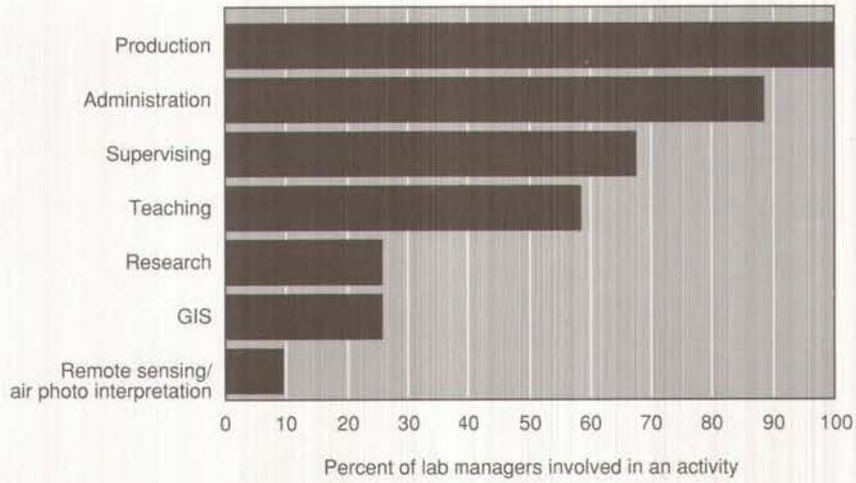

Figure 3: Responsibilities of lab managers

Lab responsibilities

The next section of the questionnaire focused on the responsibilities of the lab manager, including the production of maps and other information graphics, involvement in GIS and remote sensing/air photo interpretation, teaching, cartographic research, administration and supervising. All lab managers, of course, participated in the production of maps and graphics (figure 3). Participation in other possible areas of responsibility varied considerably. A large majority of managers had administrative duties and a smaller majority (67 percent) spent time in a supervisory capacity (not all labs have staff additional to the lab manager). Slightly more than half included teaching among their responsibilities. Only about one-quarter of our sample were involved with GIS or cartographic research, and fewer than one in ten with remote sensing. Figure 4 indicates a rough estimate of the average time spent by lab managers in any one area of responsibility, with about 50 percent of their time devoted to production, another 27 percent to supervising and administration combined, and 11 percent to teaching.

A complementary set of questions gives added perspective on the place and function of cartography labs. Just slightly more than half of lab managers were expected or encouraged to initiate map projects, and only about 33 percent to initiate research or project grants. A little over 40 percent were encouraged or expected to solicit business outside the university. One manager wrote that he was prohibited from competing with local businesses. The non-profit or public nature of the college in which the lab resides

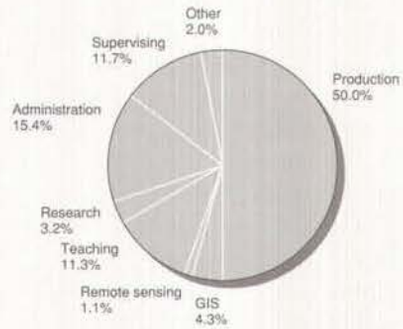

Figure 4: Breakdown of responsibilities: estimate of mean time spent on each

may make outside solicitation problematic. It is a question which needs further exploration.

Despite the fact that few managers are classified as faculty, about 56 percent of those responding indicated that they were invited to participate in faculty meetings, and slightly more than half of those had voting status to at least a limited extent. Seventy-one percent of those participating in faculty meetings were doing some teaching, as opposed to only 28 percent of those not invited to participate. All but one of those with voting status did some teaching.

Budgeting and staff

Slightly more than half of the labs had a budget whose profits or losses rolled over from one fiscal year to the next and about 40 percent of the labs operated with a budget separate from that of any other department.

The number of staff (figure 5) provided in addition to the lab manager is important in that it effects the amount of work that can be performed and shapes the responsibilities of the lab manager. A manager with a staff to supervise will spend more time in an administerial and supervisory capacity and less time in 'hands on' production. Slightly more than two-thirds of the labs had some staff in addition to the lab manager, consisting of some combination of full-time and part-time persons. Part-time staff can be graduate students, undergraduates (both work-study and non-work-study), and occasionally non-student personnel. The average number of employees in addition to the lab manager for all labs was 2.5. This figure was however, somewhat skewed, as two labs reported ten and eleven employees

respectively. Only five labs responding (12.5 percent) had at least one full-time person besides the lab manager. Fifty-eight percent of labs utilized student assistance. Forty-two percent had graduate student assistance and 51 percent used undergraduates.

Clientele and billing

Cartography lab clientele (figure 6) included the resident geography department, other university departments, and non-university persons or businesses. All labs did work for their geography departments, and six labs (14 percent) did so exclusively. Thirty-seven labs (86 percent) did work for other university departments, and 65 percent for non-university clients. On average, 57 percent of clients came from geography, 28 percent from other university departments, and 15 percent from outside the university.

Billing policy for work performed varied considerably from lab to lab. Charges varied according to type of client (whether geography personnel, non-geography personnel, student or non-university), type of funding (grant-supported or not), the experience level of the staff member doing the work; and type of task. Fifty-one percent of respondents specifically mentioned that their billing policy reflected the type of client. Fully one-quarter of the labs responding indicated that they never charged for labor, and 23 percent that they did not charge for materials. Of those labs that did charge for labor, hourly rates ranged from a low of $7.65 per hour to about $20 per hour. One lab charged $40 per hour for work for non-university clientele. Not surprisingly, highest rates were charged to non-university clients. Frequently, geography department staff were not charged or were charged the minimal rates.

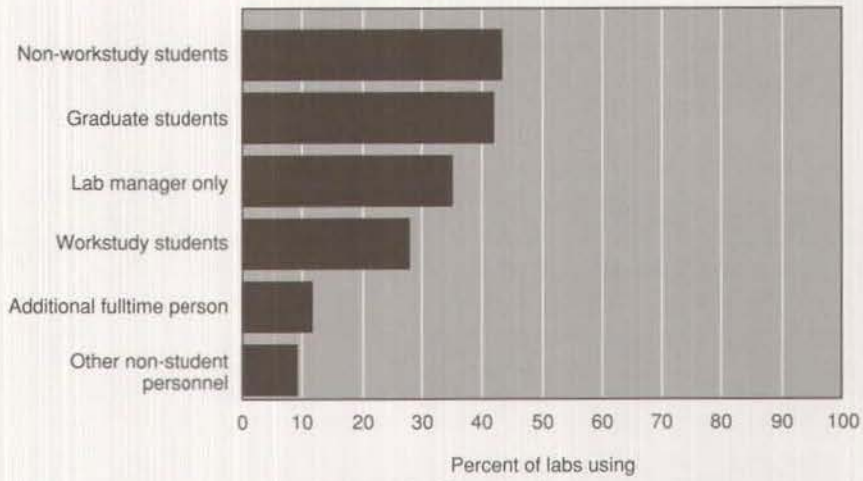

Figure 5: Staffing resources

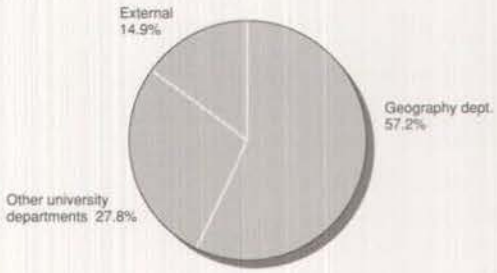

Figure 6: Mean clientele breakdown

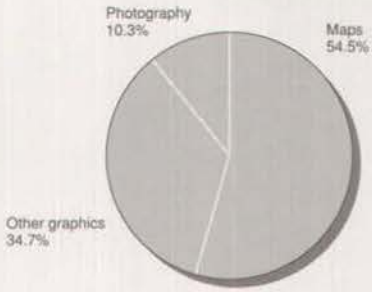

Figure 7: Mean product breakdown

Products

About 55 percent of cart lab products (figure 7) were maps while 35 percent were non-map graphics. The remaining percentage consisted of photographic products (photostats, slides, etc.) About 80 percent of the products were produced by conventional (manual) methods. Less than 20 percent were produced using automated methods (figure 8). Of the 80 percent produced conventionally, 70 percent were done with pen and ink and about 30 percent were scribed. Of all graphics produced, over 80 percent were rendered in black and white and less than 20 percent in color. About 45 percent of the labs were able to produce halftones. Only about 15 percent of the total production time was spent on data collection and analysis as opposed to 85 percent devoted to production. Mechanical lettering methods were chosen about 6 percent of the time. Machine produced lettering was utilized an average of 29 percent of the time and dry transfer lettering 5 percent. Hence approximately 40 percent of the time a manual lettering method was used. Some form of phototypesetting was used about 38 percent of the time and computer produced type was a solution approximately 23 percent of the time. Although almost 50 percent of the labs had access to a microcomputer, only about 23 percent were using it to produce lettering. Most labs have several lettering techniques at their disposal. Of the labs that used only one lettering method, approximately 12 percent used an in-house typesetter and about 7 percent used microcomputer-generated type exclusively. More than 60 percent of the labs did some color proofing and the most used proofing techniques were Kwik-Proof and 3M's Color Key.

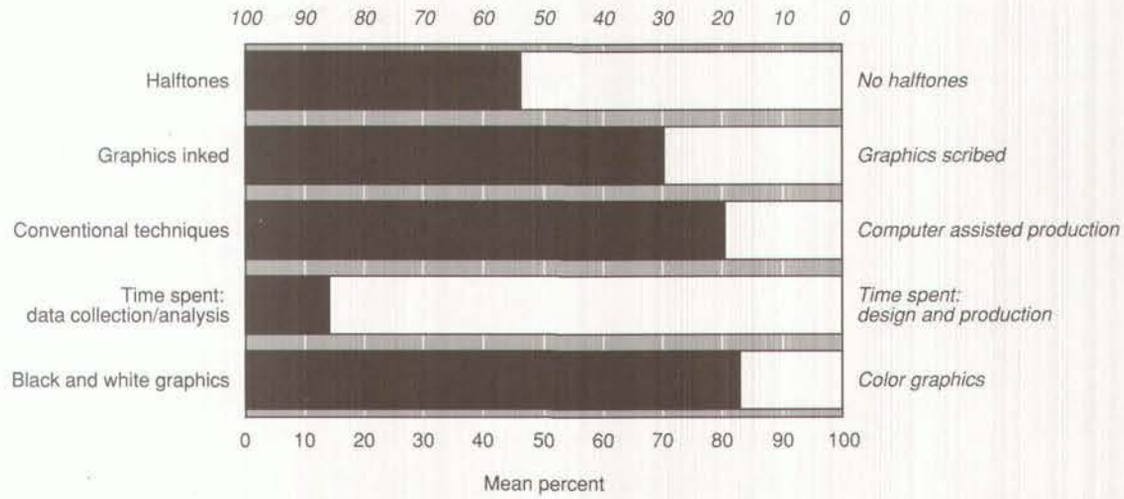

Figure 8: Production Options

Conventional production equipment

Most of the labs surveyed appeared to be well equipped with conventional production equipment (figure 9). Over 80 percent had a copy camera, a vacuum frame, and a projection device — such as a Map-O-Graph — for scaling artwork and over 67 percent had point light sources or platemakers, scribing equipment and 35mm cameras for producing slides or other photographic products. Almost 40 percent had access to phototypesetters, though from the data previously presented it appears that few labs actually utilize them. With the data collected it is possible to estimate (albeit in rough fashion) the capital outlay for the conventional production equipment for a basic cartographic laboratory (table 1).

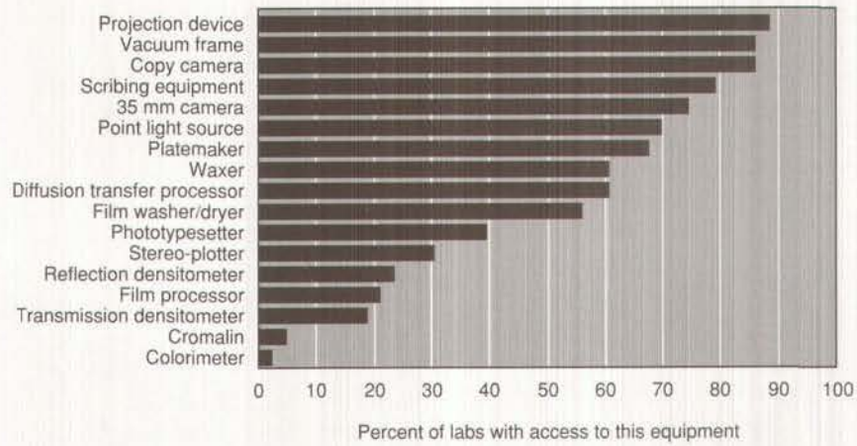

Figure 9: Conventional production equipment

ITEM	COST
Projection device	$ 3,500
Vacuum frame	2,000
Copy camera	5,000
Scribing equipment	1,000
35mm camera, copy stand	1,000
Point light source	400
Platemaker	4,000
Waxer	750
Diffusion transfer processor	750
Film washer/dryer	1,000
Lettering equipment	2,000
Lab furniture	5,000
Misc.	4,000
TOTAL	$30,400

Table 1: Cost estimate for conventional cartographic lab

Computer equipment

Perhaps one of the more exciting aspects of modern cartography and graphic arts is the on-going application of automation. The survey indicated (figure 10) that 60 percent of the labs had access to an IBM or compatible PC and over 40 percent to an Apple or Macintosh machine. Over 50 percent had color monitors, plotters, and digitizers and more than 25 percent had scanners. These figures are particularly interesting in light of the fact that less than 20 percent of the graphics produced in the labs were done by automated means. In general, the labs appear to possess the necessary hardware to produce a significantly larger percentage of their graphics via automated methods. The low percentage reported may reflect either an absence of applicable software, a lack of expertise, or perhaps a lack of capital.

Conclusions and prospects

We conducted our survey to more clearly understand the nature and function of academic cartographic laboratories. The data we collected indicates that cart labs are characterized by as much variation as similarity. Lab manager classification, status, and responsibilities vary considerably. Some labs function as a service to an individual academic department while others are viewed more as small

businesses residing within a university community. Those that administer cart labs need to consider carefully the function of the lab within the university setting. Is it a service department akin to a library or computer center, whose primary functions are to provide hands-on experience for students and low cost graphics in support of faculty research, or is it a self-supporting business? In the latter case especially we recommend that lab managers compare the pricing levels of local graphic artists for comparable products and set more competitive billing policies. We do feel that in general cart labs are underselling their services and that until more reasonable billing policies are generally adopted cart lab managers will not be accorded the recognition which their academic training and skills would seem to warrant.

Since we sent out our questionnaires tremendous changes have occurred in the availability of graphic software and hardware that is certain to have a substantial impact on the cart lab. Desktop mapping as described by Mattson (1989) in an earlier issue of this journal clearly has advantages, both in cost and in quality, that will undoubtedly attract the attention and influence the decision-making of cart lab managers in the future. Conventional production techniques for producing small-format maps will be supplanted by automated desktop mapping techiques. Cart lab managers will have to face the issue of whether or not to maintain their darkrooms which desktop mapping renders practically obsolete. Conventional production techniques as well as darkrooms will continue to be cost-effective for larger format maps (i.e. those over 11 by 17 inches) until size constraint are no longer a limitation. In general, desktop mapping will force lab managers to decide which services are essential and cost-effective and will greatly influence which mix of skills will be required for future cart lab managers. ℘

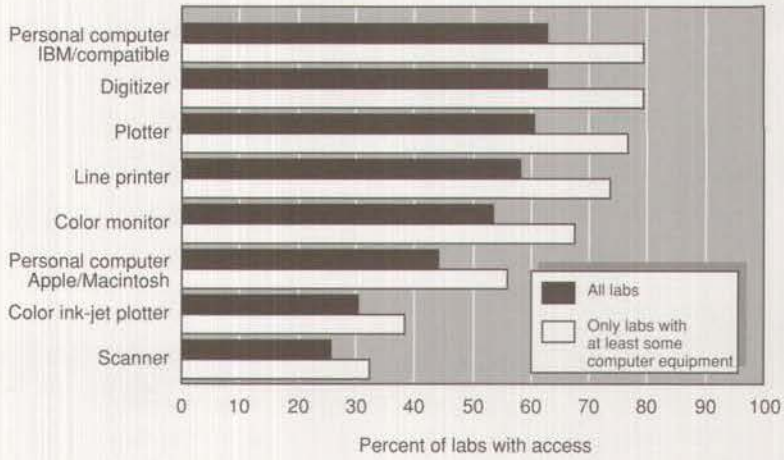

Figure 10: Automated equipment

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compiled by Ellen R. White, Michigan State University

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This directory originally began with a list compiled by Onno Brouwer at the University of Wisconsin. It has been added to with gleanings from the *AAG Guide to Graduate Departments* and by informal survey. Special thanks go to Donna Schenstrom, University of Wisconsin-Milwaukee, and to Craig Remington, University of Alabama, for their additions and updates.

CORRIGENDUM

Last issue's Cart Lab Bulletin Board item 'The placement of points in FreeHand paths' contained a misstatement. According to Wes Lem of Adobe Systems Inc., it is not true that "[n]ew versions [of Adobe *Illustrator 88*] for UNIX platforms (NeXT and Sun) have also been announced." In fact, a version is under development for the NeXT computer, but Adobe currently has no such plans for the Sun.

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.

Kasturi, Rangachar; Fernandez, Rodney; Amlani, Mukesh and Wu-chun Feng (1989) Map data processing in geographic information Systems. *Computer*, December 1989, pp. 10-21.
reviewed by
Laurence W. Carstensen Jr., Virginia Polytechnic Institute and State University.

This article is a case study of the application of artificial intelligence techniques in answering geographical queries typically associated with Geographic Information Systems (GIS). The authors describe a system that can answer fairly complex queries through output map displays illustrating pertinent information.

The paper begins with an introduction to GIS and its terminology. The introduction mentions several applications of GIS briefly to indoctrinate an audience not generally familiar with maps or GIS. A discussion of data models, based entirely on Donna Peuquet's 1984 paper, 'A Conceptual Framework and Comparison of Spatial Data Models', is very basic to familiarize the reader with the notion that there are alternative data representations that may be selected for various tasks. At the end of the

introductory GIS section the authors pose the question, "can we teach a computer to read and understand a road map?" This is the basic research question, and the paper that follows describes attempts to do so.

A summary of current efforts to use artificial intelligence and expert systems in map data processing mentions several significant efforts including AUTONAP (a name placement expert system), GENTLE (generalized topographical land-use expert system), and others dealing with generalization, digitizing, urban planning, as well as KBGIS (knowledge-based GIS) described in the *International Journal of GIS* (1987). Most of the information in the introduction of this paper is well known to geographers and cartographers who deal with GIS more regularly than would the electrical engineers who regularly read *Computer*.

After the introduction, the paper takes a more detailed view of the system itself and concludes that it is possible to teach a computer to read a road map (though understanding is not demonstrated). Aside from the CPU (a VAX-11/785), the hardware consists of a scanner and a raster output device for map plotting. Map data are entered in raw raster format at a density of 120 pixels per centimeter. The software components include:

§ The preprocessor takes raw scanned data and separates them into text and graphics layers. Text is processed by optical character recognition techniques, and graphics are passed to the image processor.

§ The improcessor operates on the graphics layer from the preprocessor to extract spatial and structural information. Functions for skeletonization (line-thinning), line following, and symbol identification are the heart of the image system.

§ The query processor analyses queries of the database after they have been entered by the user. Queries must be in a very specific format, thus the query processor operates on translations performed by the natural language processor.

§ The natural language processor is necessary because the query processor format was deemed too complex for users to learn. The natural language processor accepts English commands and parses them to the correct format.

In order to create a response to a query, the system has to perform a number of tasks requiring integration among the processors. As an example, to find the shortest distance (by road) between two cities, the system must be able to:

§ Recognize characters to locate the names.

§ Locate the cities (this is done by locating the names and finding a city symbol near each name).

§ Define an initial window that includes the probable maximum area to search for the shortest path.

§ Discriminate the roads from other map lines.

§ Estimate the length of each road segment and compute the shortest sum of those lengths.

§ Compute the likelihood of a shorter path than that initially found by enlarging the search window and recomputing paths in the larger window if needed.

The authors illustrate the use of the system for three different map reading queries. The system effectively answers all three queries (locating a state, subsetting the roads to those within a single state, and shortest path analysis), and is found to be a useful prototype for paper road map reading.

I was not aware of the journal *Computer* before I was asked to review this paper. An occasional scan of the table of contents would be in order, especially as a reference for articles on cartographic and geographic information processing strategies. If this paper is a fair sample, *Computer* is a good source of fugitive cartographic literature.

Meigs, Philip B. (1990) World Geo-Graphic Atlas. Landmarks of Book Design: First of a Series. *Print*, 44:1 (January/February 1990), pp. 93-101 and pp. 141-142. *reviewed by Richard E. Lindenberg, Kent State University.*

The journal *Print* describes itself as America's graphic design magazine. Although it is uncommon to find an article in it related to maps or geography, the first subject for a series on excellence in book design is Herbert Bayer's 1953 *World Geo-Graphic Atlas*. Philip Meigs, a teacher of design and design history at Virginia Commonwealth University, reviews the atlas and concludes that "It pioneered new ways to present information about the world" (p. 93).

The atlas was commissioned in 1948 by the Container Corporation of America (CCA) to mark its twenty-fifth anniversary in 1953. Bayer had been associated with the influential Bauhaus design school in the 1920's and emigrated to the U.S. in 1946. The CCA had earned a reputation as a patron of design and had given Bayer assignments since 1937. When work began on the atlas in 1948, Bayer expected to spend half of his time for two years on the project. When the final camera-ready copy was shipped to the printer five years

later, he and three assistants were working on it full-time.

Bayer had an interest in natural phenomena as well as maps and diagrams. He saw the atlas not as just an exercise in book design, but also as a chance to rethink the conventional idea of an atlas as simply a collection of maps. He placed the hyphen in the word 'Geo-Graphic' in the title to indicate that the atlas had "in addition to many GEO-graphic maps, many GRAPHIC illustrations of subjects closely related to modern geography" (Bayer 1953, p. 4).

Bayer organized and edited all the material in the atlas and wrote much of the text. He traveled to cartographic centers in the U.S. and Europe in his search for the best graphic methods for mapping and illustrating complex geographic information. The article includes twenty-seven figures reproduced in lush color. Most of these are maps and illustrations from the atlas. Perhaps the most fascinating illustrations are three figures which are sketches of the page layouts originally done in pastel, pencil and colored pencil which are shown with the final pages in juxtaposition.

The author estimates that 4000-5000 separate pieces of art were prepared for the book. The figures and the text are adequate testimonial to Bayer's originality and fastidious attention to detail. His uncompromising attitude resulted in the printing being done partly by Rand McNally and partly by de Agostini of Italy. The story of the design of this atlas is an inspiring account of a significant personal and cartographic achievement.

REFERENCE

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cartographic artifacts

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February 1984-September 1989, Citations from the Compendex Database. National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. November 1989, 134p, supersedes PB88-8868526. PB90-850439/WNR; price code: PC N01/MF N01.

This bibliography contains citations concerning applications of computer techniques to cartography. Topics include automatic mapping, geographic data bases, computerized photomapping, and descriptions of appropriate algorithms and hardware. Applications for mineral resource exploration and land use analysis are also considered. (This updated bibliography contains 292 citations, 50 of which are new entries to the previous edition.)

ANNOTATED BIBLIOGRAPHY ON TACITICAL MAP DISPLAY SYMBOLOGY.

J.K. Schmidt, Human Engineering Lab., Aberdeen Proving Ground, MD. Aug 89, 120p, AD-A213 257/9/WNR, price code: PC A06/MF A01.

An annotated bibliography on tactical military symbology is provided with corresponding documentation to enhance its use as a reference. The present work is an effort to bring together a rather disparate literature base connected with the portrayal of tactical information on anything from a conventional paper map to an advanced digital map. In addition, pertinent research references concerning specific information encoding techniques are included. Each of the 210 citations presented from the literature contain reference information and an abstract or summary. All listings are indexed by author and subject. Keywords: map symbology; tactical situation display; map display.
Contact: National Technical Information Systems, 5285 Port Royal Road, Springfield, VA 22161.

EOSAT PUBLISHING GIS DIRECTORIES

After surveying almost 100 domestic firms offering remote sensing value-added services, EOSAT has updated the U.S. edition of its Directory of Landsat Related Products and Services. The directory provides the names and addresses of value-added companies, cross referenced by state and application specialties. EOSTAT is offering a new publication that includes information on more than 200 companies worldwide involved in development and use of geographic information systems (GIS). The publication is called Landsat & GIS: A Directory of Geographic Information Systems and Related Products and Services.
Landsat World Update, February 28, 1990.

EOSAT INTRODUCES NEW LINE OF TM DIGITAL PRODUCTS

All Landsat Thematic Mapper (TM) digital products are now offered in an improved computer tape format, known as Fast Format, which reportedly will speed product delivery and reduce customers' computer time. Earth Observation Satellite Co. (EOSAT) will begin delivery of the new Fast Format products March 1, 1990.

The prices of many Landsat products will be raised March 1 — the first increase since 1988–and EOSAT is capitalizing on the timing of the price increase to facilitate the customers' transition

to Fast Format. EOSAT began accepting orders for Fast format products January 22.

For more information, contact: Kevin Corbley, Media Coordinator, (301) 552-0547, (800) 344-9933, ext. 547; RCA Telex: 277685 LSAT UR.

GRASS 'YELLOW PAGES'

The GRASS Interagency Steering Committee wants to put together a GRASS 'Yellow Pages.' The purpose of this document is to consolidate information on organizations providing services for GRASS users. The document will be revised annually. Any organization that provides training, software distribution, data development, data translation, hardware configuration, programming applications, documentation, turn-key systems or other services that might be of interest to GRASS users is welcome to submit a listing. Advertisements can also be placed.

The GRASS 'Yellow Pages' will be distributed annually with an issue of the GRASS *Clippings* newsletter and also distributed at technical meetings, through the GRASS Information Center and through various GRASS distribution and training sites.

Please provide the following information if you would like to place an entry: name of organization, point of contact, service/system provided to GRASS users, address and telephone number.

For details concerning format, deadlines, fees, copies, and other information contact Marlo Oechsel, USA-CERL/EN, P.O. Box 4005, Champaign, IL 61824-4005, (217) 352-6511, ext. 533.

NOAA PUBLISHES FIRST EEZ SEAFLOOR MAP

The National Oceanic and Atmospheric Administration (NOAA) has published the first highly accurate bathymetric map of the U.S. Exclusive Economic Zone (EEZ), depicting the underwater Monterey Canyon off southern California. The map includes a three-dimensional isometric view inset of the area covered by the map.

The 1:100,000-scale Monterey Canyon Bathymetric Map is the first of a series of EEZ maps to be produced using multibeam survey data, which produces a photographic-quality representation of the seafloor. Established in 1983, the U.S. EEZ includes all waters and the seafloor within 200 miles of the United States coast.

The Monterey Canyon map, and the approximately 40 additional multi-beam survey maps of the EEZ to be produced over the next two years, will be useful to oceanographers, geologists, geophysicists, those in commercial and recreational fishing, state and local government planners, and anyone needing a precise view of the seafloor for non-navigational purposes.

Earlier bathymetric maps represented the seafloor using lines of soundings of water depths taken at intervals of roughly 3 to 10 miles. The Monterey Bay map and the others to follow will use depth soundings taken over nearly 100 percent of the seafloor.

"The difference in accuracy and bottom coverage between the old bathymetric maps the New Monterey canyon maps is like night and day," said NOAA Captain Christian Andreasen, chief of NOAA's Nautical Charting Division. "Our ships, equipped with multi-beam survey systems to 'sweep' the bottom, recorded about 20 million soundings to produce the Monterey Canyon map, compared to about 50 thousand soundings that would have been taken with a single-beam survey system."

The 46 by 26-inch Montery Canyon Bathymetric Map depicts the seafloor about 70 nautical miles seaward of the California coast between Point Lobos, south of Monterey, to Sand Hill Bluff, north of Santa Cruz, including Carmel Canyon, Monterey Bay, Soquel Canyon, Ascension Canyon, and the newly named Cabrillo Canyon and Ano Nuevo Canyon.

The map is available for $10 from the Distribution Branch, National Ocean Service/NOAA, Riverdale, MD 20737-1199. Phone: (301) 436-6990.

THE FUTURE OF THE NATIONAL MAPPING PROGRAM

The National Research Council has recently published *Spatial Data Needs: The Future of the National Mapping Program*. The 78 page report was prepared by the NRC's Mapping Science Committee, which was established in 1987 in response to a request by the Director of the U.S. Geological Survey. In its request, the USGS asked the NRC to:

1) Examine the needs for the geographic and cartographic data provided by the USGS. Do the Survey's current mapping activities and products adequately address these needs?

2) Examine and advise on USGS programs of research and development of hardware and software for original data acquisition, processing, storing, marketing, and distribution of digital cartographic data and synthesized information products to the user community.

3) Examine the scope and content of the USGS's activities in geographic information systems (GIS) and recommend their role in assembling and maintaining digital data bases from within the USGS and from other sources.

4) Respond to requests for guid-

ance on mapping and geography.

The Committee's report was prepared to address the first and third of these charges in a specific fashion, and to provide general guidance on the second. The Executive Summary of the report follows.

"The U.S. Geological Survey (USGS) has an exceptional opportunity to contribute significantly to the overall economy of the United States by becoming proactive in managing spatially referenced digital data (srdd). This conclusion was reached by the Mapping Science Committee in its study of the technological transformation that has occurred in recent years related to the integration, processing, and display of spatial data for the purposes of making decisions.

"If ours is to be an information-based economy that is competitive on a global basis, there is a crucial need for a coordinated and efficient national information infrastructure to facilitate the sharing and communication of information resources. This must include a geographic or spatial data component dealing essentially with where things are to support all manner of resource, transportation, planning, administration, marketing, and communication activities. The most important function of the USGS's National Mapping Division (NMD) in the future will be to act as the federal coordinator of the national geographic data infrastructure, not just to produce maps and derived digital data.

"The paper or analog map, traditionally the primary tool for decision support, is being supplemented by combinations of computer hardware and software known as geographic information systems (GIS). These digital systems are becoming increasingly powerful, and therefore the demand for digital data for use within them is increasing. The committee discovered, through briefings with the USGS and several other federal agencies and by conducting an extensive set of interviews, that this demand is being met by data-generating organizations that include federal agencies, state and local governments, and private firms, as well as by data sets produced and/or managed by the USGS/NMD. As a nation, we can expect to experience substantial redundancy and excessive cost if uncoordinated, unstandardized, localized data base building continues unchecked.

"The committee believes that NMD should expand its role in inventorying and managing general-purpose srdd and in making such data available to user communities. The committee found that there is significant and often wasteful duplication of effort in digitizing map data at a wide variety of scales, one of the most important being the 1:24,000 scale of USGS map production. The capability of the new computer-based tools creates the possibility of and the demand for even more current information for decision making. The committee believes that to better prepare to meet the future spatial data needs of the nation NMD must begin a process of redirecting its roles, goals, and mission to better serve not only the USGS and the Department of Interior, but the cartographic enterprise as a whole. To accomplish this, NMD must be restructured to better meet future user requirements. NMD must expand its role in coordination of mapping activities both within and beyond the federal establishment. The committee urges other federal agencies to participate in supporting the development of the National Digital Cartographic Data Base (NDCDB) and to follow NMD's lead in creating and adopting national standards. The USGS will be looked to for leadership in the area of standards and in the structuring and operation of an enhanced NDCDM — a national spatial data base. The committee also believes that there is a need for NMD to examine innovative ideas for continuing and strengthening its existing work-sharing and cost-sharing programs, including the concept of a data donor program. NMD must continue to be sensitive to the emerging needs of the federal agencies for the operational production of special-purpose continental and global scale map products, such as those associated with programs such as the global change initiatives and those of the Decade for Natural Disaster Reduction Program. Finally, the committee also recommends that NMD expand its research program and improve its ties with universities and public and private sector users, in the interest of improving the overall quality of our national cartographic enterprise."

The entire report is available from the Board on Earth Sciences and Resources, National Research Council, 2101 Constitution Avenue, Washington, DC 20418.

CANADIAN METROPOLITAN ATLAS SERIES

The latest *Metropolitan Atlas Series* was released in December 1989 and contains 12 volumes. Each volume displays the results of the 1986 Census for one major Census Metropolitan Area (CMA) in Canada by using maps, graphs and explanatory text in an 11 by 17 inch format. The 12 centres covered are St. John's, Halifax, Quebec, Montreal, Ottawa-Hull, Toronto, Hamilton, Winnipeg, Regina, Calgary, Edmonton and Vancouver. Each volume contains 35 thematic maps and associated graphs, grouped into 5 major themes: demography, family and social issues, housing, employment and income. The basic geostatistical unit used to portray the

thematic information is the census tract, an area roughly the size of a city neighbourhood, with an average population of about 4,000.

Although most maps are straightforward one-variable choropleth maps using soft red patterns, a number of themes incorporate different techniques to convey the spatial distribution of the data. For instance, three different ethnic origins are mapped together using dots of 3 colours. Also, the distribution of separate but related variables (such as education and income) is brought to life using two-variable choropleth maps with 3 colours and 9 classes. The two largest CMAs (Toronto and Montreal) have 53 by 36 cm maps, while the other CMAs have maps of 28 by 22 cm.

As a result of a user survey conducted on the 1981 *Metropolitan Atlas Series*, major improvements were incorporated in this 1986 Series. For instance, the development and use of an up-to-date urban ecumene permits a more accurate spatial representation of Census data. As well, the maps focus on a 'window' area which includes a very large percentage of a CMAs population (up to 97percent), with a dramatic increase in the scale of the core area. Thirdly, each theme includes either a graph which compares values across all 25 CMSs in Canada, or a scattergram of 2 variables.

In addition, each *Atlas* volume contains a helpful Census Tract Reference map in colour, and two transparent plastic maps containing, respectively, the boundaries of Census Subdivisions (municipalities) and Forward Sortation Areas (the first 3 digits of a postal code). These can be used as overlays to view the same themes using different geostatistical units.

The maps are supplemented by informative explanatory text on each major theme written by subject matter specialists, and by an extensive set of appendices with notes on data quality, the derivation of map variables and a set of selected map summaries.

The volumes in this Series (catalogue numbers 98-101 through 98-112) are priced at $24. except for the (larger) Toronto and Montreal volumes, which are priced at $30. The complete set of 12 Atlases (Catalogue number 10-520) is available for $240. representing a 20% discount. The Atlas volumes can be ordered by writing Publication Sales, Statistics Canada, Ottawa, K1A OT6, or by calling the national toll-free order line, 1-800-267-6677.

XEROXABLE U. S. ATLAS

The United States Today is the latest reproducible atlas published by World Eagle, Inc. The 8.5 by 11 inch atlas is printed in black and white, and contains comparative maps, tables and graphics depicting resources, commodities, trade, cities, food and agriculture, health, schools, jobs, energy, industry and demographics. The atlas is available in paperback, looseleaf or hardcover bindings at costs of $25.50, $26.50 and $36.95, respectively. Contact: World Eagle, Inc., 64 Washburn Avenue, Wellesley, MA 02181; (617) 235-1415.

NEW GIS TEXT AVAILABLE FROM ACSM

Fundamentals of Geographic Information Systems: A Compendium is a new publication co-published by the American Congress on Surveying and Mapping (ACSM) and the American Society for Photogrammetry and Remote Sensing (ASPRS). This volume focuses on the fundamentals, principles, and issues in geographic and land information systems (GIS/LIS).

Fundamentals of Geographic Information Systems was compiled and edited by William J. Ripple. It is a follow-up to his first GIS compendium entitled *Geographic Information Systems for Resource Management*, published in 1987, which concentrates on GIS/LIS applications.

Topics covered in this 248-page, softbound compendium include a definition of GIS, a history of technology, requirements and principles for GIS implementation, GIS data-quality issues and error assessment, how to select and evaluate a GIS, and a guide to sources on GIS literature. A comprehensive listing of GIS newsletters and editors is also included.

William J. Ripple is Director of the Environmental Remote Sensing Applications Laboratory (ERSAL) in the College Forestry at Oregon State University in Corvallis. Ripple has 12 years experience in research and applications of geographic information systems and remote sensing for the study of vegetation and other natural resources.

Fundamentals of Geographic Information Systems sells for $45.90 to ACSM members and students, and is available to non-members for $65. Orders must be prepaid; send check or money order to ACSM Publications, 5410 Grosvenor Lane, Bethesda, MD 20814. To order by phone with VISA or MasterCard, contact: ACSM Publications, (301) 493-0200.

new maps

WORLD. World seismicity, 1979-1988. (NEIC Poster 1). Denver: National Earthquake Information Center, 1990. 3 spheres on 1 sheet. (U.S. Geological Survey, NEIC Maps, Box 25046), Federal Center, MS967, Denver, CO 80225).

CANADA. Canada–land cover associations. (National Atlas of Canada, 5th ed. - MCR 4113). Ottawa: Geographical Services Division, Energy, Mines and Resources Canada, 1989. Scale 1:7,500,000.

CANADA. Canada – native peoples, 1740. (National Atlas of Canada, 5th ed. - MCR 4094). Ottawa: Geographical Services Division, Energy, Mines and Resources Canada, 1988. Scale 1:7,500,000.

UNITED STATES. Electing the President, 1789-1988. (National Atlas sheet). Denver: U.S. Geological Survey, 1989. $4.50.

MASSACHUSETTS. Metro Boston transit map. Taunton, MA: Arrow Publishing Co., 1989. $1.95.

NEW YORK. Erie County. (New York Digial County Base Map Series). Albany: State Department of Transportation, 1990. Scale 1:75,000. $4.50 or $6 (Map Information Unit, State Department of Transportation, Office Campus, Building 4 - Room 105, Albany, NY 12232).

CALIFORNIA. AIDS in LA. Northridge: Center for Geographical Studies, 1989. $5 (Center for Geographical Studies, California State University, Northridge, CA 91330).

CALIFORNIA. Calfiornia: land managed by the Bureau of Land Management and other federal agencies. Sacramento: Bureau of Land Management, 1989. Scale 1:750,000.

NORTH SEA. Tectonic map of the North Sea and adjacent onshore areas.Working: GECO Exploration Services, 1989.

GERMANY. The Berlin region. (Washington: Central Intelligence Agency, 1989.) Scale 1:75,000. SuDoc No. PrEx 3.10:B45/3.

ISRAEL. Gaza Strip, August 1988. (Washington: Central Intelligence Agency, 1989.) Scale 1:150,000.

SOVIET UNION. Soviet pipeline map. London, Ontario: Department of Geography, University of Western Ontario, 1989. $27 (Order from Milford Green, Department of Geography, University of Western Ontario, Social Science Center, London, Ontario N6A 5C2.

AFRICA. North-Central Africa. (Washington: Central Intelligence Agency, 1989.) Scale 1:5,000,000.

ANTARCTICA. Oblique maps of Antarctica. (Miscellaneous Investigations Series I-1992). Denver: U.S. Geological Survey, 1989.

NATIONAL ATLAS OF CANADA

The ACML Bulletin No. 73 (December 1989) on Pages 11-17 provides an outline of published and proposed map titles for the *National Atlas of Canada*, 5th edition. Forty one maps remain to be published with the completion date by 1992. Canada has produced more national atlases than any other country. The publication dates of the National Atlas of Canada are 1906, 1915, 1956, 1974, and 1985- .

new atlases

Atlas of China. Chicago: Rand McNally & Co., 1990. 48 p. ISBN 0-528-83385-5. $8.95

Attenborough, David. *The Atlas of the Living World*. Boston: H.M. Houghton Mifflin Co., 1989. ISBN 0-395-49481-8. $39.95.

Barnaby, Frank (ed.). *The Gaia Peace Atlas: Survival into the Third Millenium*. New York: Doubleday, 1988. 271 p. ISBN: 0-385-24190-0. $29.95.

Bayley, Christopher. *Atlas of the British Empire*. New York: Facts on File, 1989. ISBN 0-8160-1995-9. $40.

Census Canada 1986: Metropolitan Atlas Series. Ottawa: Statistics Canada, 1989. $24 (Canada) $25 (Other countries) $30, $31*/set $240 and $250 (Statistics Canada, Publication Sales, Ottawa K1A OT6). Clacary, Edmonton, Halifax, Hamilton, Montreal*, Ottawa-Hull, Regina, St. John's, Toronto*, Quebec, Vancouver, and Winnipeg.

Courbon, Paul. *Atlas of the Great Caves of the World*. St. Louis: Cave Books, 1989. 369 p. ISBN 0-939748-21-5. $25.

Friesel, Evyatar. *Atlas of Modern Jewish History*. Oxford: Oxford University Press, 1989. ISBN 0-19-505393-1. $39.95.

Harris, Geraldine. *Atlas of Ancient Egypt*. (Cultural Atlas for Young People Series). New York: Facts on File, 1990. ISBN 0-8160-1971-1. $17.95

India Market Atlas. Hong Kong: Business International Asia/Pacific, 1988. $345 (Business International, 215 Park Avenue South, New York, NY 10003.

Keegan, John (ed.). *The Times Atlas of the Second World War*. New York: Harper & Rowe, 1989. 256 p. ISBN 0-06-016178-7. $45.

Lobel, Mary D. (ed.). *Atlas of Historic Towns: London From Prehistoric Tmes to 1520*. Oxford: Oxford University Press, 1989. ISBN 0-19-822979-8. $110.

Manley, John. *Atlas of Prehistoric Britain.* New York: Oxford University Press, 1989. ISBN 0-19-520807-2. $39.95 (Mainly photos and text).

Messenger, Charles. *The Chronological Atlas of World War Two.* New York: Macmillan Publishing Co., 1989. 255 p. ISBN 0-02-584391-5.

Middleton, Nick. *Atlas of Social Issues.* New York: Facts on File, 1989. ISBN 0-81760-2024-8.

Milner-Gulland, Robin. *Cultural Atlas of Russia and the Soviet Union.* New York: Facts on File, 1990. ISBN 0-8160-2207-0. $40.

NBC News: World NewsAtlas. Skokie, IL: Rand McNally & Co., 1990. ISBN 0-528-83371-5. $7.95.

Pope, Rex (ed.). *Atlas of British Social and Economic History Since c. 1700.* New York: Macmillan, 1989. ISBN 0-02-897341-0.

Price, David H. *Atlas of World Cultures: A Geographical Guide to Ethnographic Literature.* New York: Sage, 1989. 156 p. ISBN 0-8039-3240-5. $35.

RAC Motoring Atlas Britain. London: George Philip, 1989. 128 p. 9th ed. ISBN 0-540-05551-4. L4.95.

Rand McNally Photographic World Atlas. Chicago: Rand McNally, 1989. 192 p. ISBN 0-528-83363-4. $34.95.

Raza, Moonis. *An Atlas of Tribal India: With Computed Tables of District-level Data and Its Geographical Interpretation.* New Delhi: Concept Publishing Co., 1990. 461 p. ISBN 81-7022-286-9. $100 (Available from D.K. Agencies (P) Ltd., H-12, Bali Nagar, New Delhi 110015).

Rigby, Philip. *Atlas of Australia and the World.* Port Melbourne, Vic.: Philip George & Son, 1989. 144 p. ISBN 0-88665-488-2. $59.95.

Sergeevam, S.I. (ed.). *Atlas Mira.* Moscow: G.U.G.K., 1988. 33 p. incl. 206 maps. Rbl. 9.26.

Smith, Richard M. *The Atlas of Arkansas.* Fayetteville: University of Arkansas, 1989. 226 p. ISBN 0-55728-047-9. $30.

Times Atlas and Encyclopedia of the Sea. New York: Harper & Row, 1989. 272 p. ISBN 0-06-016287-2. $59.95.

United States Today: reproducible maps. Wellesley, MA: World Eagle, Inc., 1990. $25.50 (paperback), $26,50 (looseleaf), and $36.95 (hardcover).

World Bank Atlas. Philadelphia: World Bank Publications, 1989. Order Stock # 11354. $5.95 (World Bank Publications, P.O. Box 7247-8619, Philadelphia, PA 19170-8619).

World Market Atlas. Hong Kong: Business International Asia/Pacific, Ltd., 1989. 218 p. $385.

map library bulletin board

This forum is offered to encourage communication among map librarians at a time of rapid technological transition. Questions, comments, and announcements are invited.

Electronic information is a reality in many of our map libraries. What fears, experiences, and/or expectations await the map librarian in the 1990's? Abstracts of two articles are presented here to initiate this column. The first challenges us to think about the potential use of electronic information in the map library; the second describes one map libraries experience of establishing a public access computer-assisted mapping program.

North, Gary W. (1989). Will your library be the spatial data information center of the future? *Inspel*: Official Organ of the IFLA Division of Special Libraires, 23:2, pp. 130-136.

Abstract: In the earliest days of recorded civilization, people pressed square-ended styluses into wet clay to record information. Today they press square keys on a computer keyboard. Vast amounts of data about the Earth and man's activities are being entered into digital spatial data bases. These data have been structured so that they are described in terms of their exact geopraphic position on the Earth. The data, in the form of points, lines, or polygons, can describe geology, soils, water, forest cover, or population statistics. To use these data, geographic information systems (GIS's) are being developed to collect, inventory manage, analyze, and display the spatially referenced data sets. These systems will handle both raster (grid cell) or vector (line segment) data and allow the use of knowledge-based software to emulate the problem-solving process of the human brain. By having access to spatial data and the accompanying GIS and knowledge-based software, librarians will be able to expand their reference services. Because the library has been the center for published information through time and is the one place where all disciplines can truly live together, people will expect to find spatial data there also. The biggest problem in establishing this type of library system may be in just getting the approval to start. Because the data and the systems are now available is there any

wonder that I ask, Will your library be the spatial data information center of the future?

Hiller, Steve and Johnson, Jenny Marie (1989).
Public access computer-assisted mapping and the instructional program.
Reference Services Review, 17:4, pp. 87-90.
The decline in published thematic mapping, especially U.S. government census mapping, the growing availability and affordability of computers, and the rise of geographic information systems have been important catalysts in moving map libraries toward the establishment of public access computer-assisted mapping programs. Such a program began at the University of Washington Libraries in the summer of 1988. This paper describes the program and its use within the instructional program.

cartographic events

EVENTS CALENDAR

1990

June 10-13: **Canadian Cartographic Association** Annual Meeting, Victoria, B.C. Contact Dr. C. Peter Keller, Dept. of Geography, University of Victoria, P.O. Box 1700, Victoria B.C. V8W 2Y2; (604) 721-7333.

June 10-14: **1990 Special Libraries Association Geography & Map Division Annual Conference**, Pittsburgh, PA. Contact: David McQuillan, Map Library (Cooper Library), University of South Carolina, Columbia, SC 29208, (803) 777-4723.

June 21-22: **International Symposium on Mapping and Geographic Information Systems,** San Francisco, CA. Contact: Laurel Davis O'Brien, 1916 Race Street, Philadelphia, PA 19103; (215) 299-5478.

June 22: **ALA Preconference Workshop: 'Remote-Sensing Imagery: Identification, Control, and Utilization.'** Advance registration, postmarked by May 26, 1990 will be required. Contact: Nancy Vick, MAGERT Preconference, Map and Geography Library, University of Illinois, 1408 W. Gregory, Urbana, IL 61801; (217) 333-0827.

June 23-28: **American Library Association Annual Conference**, Chicago, Il. Contact: Brent Allison, University of Minnesota, S 76 Wilson Library, 309 119th Avenue South, Minneapolis, MN 55455; (612) 624-0306.

July 23-27: **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.

August 12-16: **URISA Annual Conference,** Edmonton, Alberta, Canada. Contact: URISA, Suite 304, 900 Second St. NE, Washington, DC 20002; (202) 289-1685.

September 23-28: **ASPRS/ACSM Fall Meeting,** Atlantic City, NJ. Contact: ACSM; (703) 241-2446.

October 1-4: **International Map Collectors' Society 8th Annual International Symposium,** Washington, DC, under the aegis of the Washington Map Society. Contact: Eric W. Wolf, 6300 Waterway Drive, Falls Church, VA 22044.

October 23-26: **Visualization '90**, San Francisco, CA. Contact: IEEE Computer Society, 1730 Massachusetts Avenue, NW, Washington, DC 20036-1903.

October 24-28: **North Amrican Cartographic Information Society** Tenth Annual Meeting, Orlando, FL. Contact: James F. Fryman, University of Northern Iowa, Cedar Falls, IA 50614-0406.

1991

March 25-28: **Auto-Carto 10-Tenth International Symposium on Automated Cartography,** Baltimore, MD. Contact: Auto Carto 10, Department of Geography, 105 Wilkeson, North Campus, State University of New York at Buffalo, Amherst, NY 14260.

September 23-October 1: **Mapping the Nations – 15th Conference of the International Cartographic Association,** Bournemouth, England. Contact: Conference Services Limited, Congress House, 55 New Cavendish St., London W1M 7RE, England.

March 25-28: **Auto Carto 10, Tenth International Symposium on Automated Cartography,** 'Advanced Research in Automated Cartography and Geographic Information Systems.' Sponsored in part by the American Cartographic Association.

The Tenth International Symposium on Automated Cartography (Auto Carto 10) will be held in conjunction with the spring meetings of ACSM and ASPRS on March 25-28, 1991. The theme of Auto Carto 10 will be 'Advanced Research in Automated Cartography and Geographic Information Systems,' and the meeting will consist of a single track of paper sessions through the conference. Thus, only about 30 to 40 papers will be accepted. To achieve high quality and consistency in the program, Auto Carto 10 will be (to the best of our knowledge) the first

conference in automated cartography or GIS to have a fully refereed program and proceedings. Prospective authors must submit full length draft papers which will be reviewed by the program committee. Papers accepted for Auto Carto 10 will be published as a peer-reviewed conference proceedings volume along with other proceedings of the meetings.

Auto Carto 10 will be closely coordinated with ACA sessions at the 1991 ACSM/ASPRS meetings, in order to ensure that all worthwhile submissions are presented. Papers submitted to the Auto Carto 10 program committee that address topics not central to the advanced research theme mentioned above or not chosen for presentation will be forwarded to the ACSM/ASPRS program committee for consideration for ACA sessions and proceedings.

Organizers and editors of proceedings:
David Mark, Department of Geography, 105 Wilkeson, North Campus, State University of New York at Buffalo, Amherst, NY, 14260, (716) 636-2283 and Denis White, NSI Technology Services Corporation, USEPA Environmental Research Laboratory, 200 SW 35th St., Corvallis, OR, 97333, (503) 753-6221.

Guidelines for submission of papers:
Send five copies of a draft paper (up to 20 pages) by September 7, 1990 to: Auto Carto 10, Department of Geography, 105 Wilkeson, North Campus, State University of New York at Buffalo, Amherst, NY 14260; (716) 636-2545, FAX (716) 636-2329.

Acceptance notices and reviewer's comments will be mailed by November 30, 1990.

June 10-14: **1990 Special Libraries Association Geography & Map Division Annual Conference**

10 June (Sunday)
8:00 P.M. - 12:00 (Midnight)
OPEN HOUSE

11 June (Monday)
9:00 A.M. - 12:00 (Noon)
REPORTS SESSION
12:00 (Noon)
LUNCHEON:
'Mapping Congress'
Dr. Kenneth Martis,
West Virginia University
1:30 P.M.
CONTRIBUTED PAPERS:
'Modern Map Making Through Computerized Technologies: Are the Days of the Printed Map Numbered?'
Michael Dobson, Rand McNally and Co.

'The Design and Implementation of MAPPER: Semi-Automatic Cataloging Advisor.'
Zorana Ercegovac, UCLA

'History of the Penn State University Map Collection.'
Karl Proehl,
Penn State University

'Mine Map Repository.'
Joseph Monaco,
U.S. Bureau of Surface Mining

'Color Microcartography.'
Malcolm Duffek,
Color Microimaging Corporation

Tour of Selected Foreign Cartographic Organizations.
4:30 P.M.
MAP ONLINE USERS GROUP BUSINESS MEETING
'Geodex–An Update'
Christopher Baruth, AGS Collection, Milwaukee, WI

12 June (Tuesday)
9:00 A.M.
BUSINESS MEETING
10:30 A.M.
ECONOMIC & GEOGRAPHIC IMPACT OF ENVIRONMENTAL ISSUES ON PITTSBURGH
'Pittsburgh: From Smoky City to Renaissance City.'

'Pittsburgh and Water Quality–Success and Failures.'
Thomas Proch, Penn. Dept. of Environmental Resources

'Geologic and Environmental Problems with I-279 Construction.'
William Adams, Pennsylvania Dept. of Transportation
12:00 (Noon)
WALKING TOUR OF PPG CENTER
3:30 P.M.
Visit to Pen-OH-WE Map Company
Host, John Kyle, President

13 June (Wednesday)
12:00 (Noon)
LUNCHEON
'Panoramic Maps of Oklahoma Towns.'
DonaldWise, Gillcrease Museum, Tulsa, Oklahoma
1:30 P.M.
ROAD MAPS
'Post War U.S. Road Maps – 45 Years of Change.'
Paul Stout, Ball State University and Charles Peterson III, Library of Congress

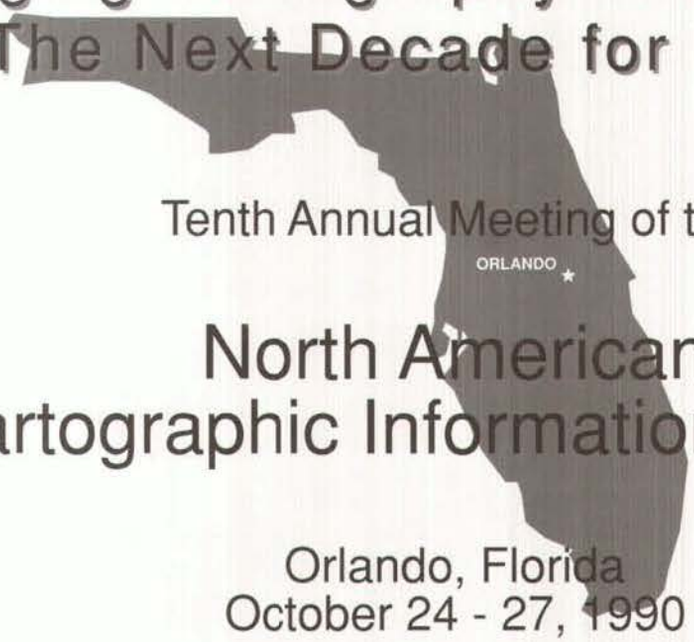
'Road Maps and Atlases in the Rand McNally Collection at the Newberry Library.'

'Strip Maps.'
Alan MacEachren,
Penn State University

'Modern Road Maps: A Dealer's View.'
William Hunt, Map Link

MAP TRADING SESSION TO FOLLOW
(continued on p. 40)

Changing Cartography in the Nineties
The Next Decade for NACIS



Tenth Annual Meeting of the

North American Cartographic Information Society

Orlando, Florida
October 24 - 27, 1990

The Tenth 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: *Changing Cartography in the Nineties — The Next Decade for NACIS*. Topics include:

* Atlases
* Canadian Cartography
* Cartographic Design
* Cartographic Educatation
* Cartographic Software/ Hardware
* Cognitive Cartography
* Computer Cartography
* Geographic Information Systems
* 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 X conference site will be the Holiday Inn on International Drive in Orlando, otherwise known as "The City Beautiful." This site provides easy access to Disney World, the Orlando International Airport and downtown Orlando. NACIS X will include a variety of paper and poster sessions, cartographic field trips, workshops, and panel discussions with recognized authorities from government, academic and private organizations. Registration, all sessions and hospitality will take place at the convention facilities of the Holiday Inn.

Contacts for information concerning:

The Society	*The Program*	*Poster Session*
North American Cartographic Information Society 6010 Executive Blvd., Suite 100 Rockville, MD 20853 (301) 443-8075	**James F. Fryman** Department of Geography University of Northern Iowa Cedar Falls, IA 50613-0406 (319) 273-6245	**Craig Remington** Department of Geography University of Alabama Box 870322 Tuscaloosa, AL 35487 (205) 348-1536

14 June (Thursday)
FIELD TRIP
8:00 A.M.
Tour of the University of Pittsburgh Map Library
Host, Bill Roselle, Director of University Library System

'Urban Rivers: De-industrialization, Redevelopment and the Three Rivers in Pittsburgh.'
Dr. Edward Muller, University of Pittsburgh
10:30 A.M.
Bus tour of Homestead, Pennsylvania and South Side Area
2:00 P.M.
Tour of Old Economy Village (Ambridge, PA) Historical Museum

For additional information, contact: Mr. David McQuillan, Map Library (Cooper Library), University of South Carolina, Columbia, SC 29208, 803-777-4723.

NACIS news

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MINUTES OF THE BOARD MEETING, SATURDAY, FEBRUARY 24, 1990
Orlando, Florida

Diana Rivera, Fred Fryman, John Sutherland, Craig Remington, Ron Bolton, and Jim Anderson present.

The meeting was called to order by President Rivera at 9:00 a.m. The first order of business was a discussion of local arrangements. Beverly Minor, mapping director for the Orange County elections office, was present for this portion of the meeting as she has volunteered to assist with local arrangements. A discussion was held on field trip possibilities. Possibilities are the Orange County GIS project, AAA, and a trip around the Orlando area. Fryman and Anderson visited AAA and feel that it would be a very interesting trip. Minor has visited the GIS and they are willing to conduct tours. Anderson will contact the local chamber of commerce about the possibility of a local tour. One suggestion was a behind the scenes tour of Disney World which Minor did not think would be possible, but Anderson will check it out.

Minor will check with the Chamber of Commerce and Convention Bureau on the availability of maps and brochures for the registration packets. Minor will also look into compiling a local restaurant list.

Anderson will draw a map of the local area to be sent out with pre-registration mailing. Anderson or Minor will also check with the airport authority for shuttle locations and pricing. Also, other local transportation options will be explored.

Anderson asked if any previous registration workers were interested in working in Orlando. Anderson will check with convention bureau on typewriters, etc. Minor will talk to Betty Carter, Supervisor of Elections, about being a speaker or suggesting a speaker, Anderson has contacted NASA about providing a speaker. Fryman will try to contact the St. Petersburg Times cartographer about giving a talk. Bolton suggested the possibility of moving the luncheon to Friday and scheduling a Kennedy Space Center tour for Saturday.

Anderson has agreed to take care of all local arrangements. Question of exhibits was discussed. Sentiment was expressed that Orlando might not draw national exhibits and Bolton said that federal agencies have had their budgets cut and will not be exhibiting. Sutherland suggested providing exhibit space for persons to display materials but not supply persons to staff those exhibits. Rivera stated that members would like to see some form of exhibits. Remington suggested expanding the cart lab poster session to map librarians and geography departments. A committee will be formed to contact government agencies and private agencies about exhibiting.

The next item of business was a general suggestion of the program. Fryman suggested a theme tied to the 90's. Anderson suggested a session on cartographic education in the schools. Bolton suggested systems changes in the 90's. Anderson suggested a session on census products and reapportionment. Rivera suggested getting out call for papers by mid-March and have May 30 as the deadline for submission of proposals and abstracts. Preliminary programs will be mailed out in August by Anderson. Packet will include preliminary program, registration forms, airline information and map, and hotel registration form. 'Changing cartography in the 90's the next decade for NACIS' was adopted as the conference theme.

Bolton felt that due to job responsibilities he needed to give up the executive officer position. He felt that the board should appoint someone to the position. Persons would need resources for mailing, handling correspondence, answering phone calls, etc. Bolton suggested someone who had been previously on the board. Anderson suggested making the transition after the Orlando meeting. Bolton agreed to serve until then. A decision will be made on a replacement at the summer board meeting.

Bolton felt that a clean version of the constitution and bylaws should be prepared and reviewed by Marsha Selmer and the Board. Anderson will retype and circulate. Copies of the constitution will be available at the annual meeting. Anderson will also check with Greg Chu about putting together a directory.

Greg Chu submitted a written treasurer's report. Chu asked about filing federal tax return. Bolton suggested that the Board empower Chu to pay an attorney or accountant to advise us of our tax status. Board approved. Anderson raised the issue of liability. Rivera will check with other organizations as to how they handle this issue. Bolton asked about reprinting past issues of *Cartographic Perspectives* as raised in Chu's report. Sutherland felt cost of printing back issues should be borne by people wanting them. Recommendation was made to compliment Chu on his report with an inquiry to be made concerning data base status. Rivera stated some outstanding bills were still due from the Ann Arbor meeting. Anderson suggested compiling new database. Board agreed (Treasurer's report follows).

Bolton mentioned that we would need to elect new vice-president, treasurer, and the board seats of Ellen White and Pat Gilmartin. Bolton recommended that we elect at least three new members to increase attendance at meetings. Anderson suggested looking at people who have run in the past but had not been elected. Several names were suggested and they will be forwarded to Juan Valdés. Bolton stated that we needed to form a separate tellers committee from the nominating committee. Anderson suggested a ballot be mailed out with the registration packet.

Bolton brought up issue of future meetings. A letter from Sona Andrews was circulated with recommendations for the site of the 1991 Milwaukee meeting. Bolton recommended that we give Andrews permission to negotiate a contract with the Astor Hotel. Anderson asked about proposed meeting dates. The hotel is available for any dates in October. Bolton stated that Kansas City had made excellent proposals for 1992, but we didn't have anyone to handle local arrangements. Rivera asked if the Board wanted to consider Costa Rica. Bolton felt that federal employees would not be able to attend. Bolton will begin inquiries in Philadelphia and Minneapolis.

Alan MacEachren submitted a report from the Publications Committee asking for suggestions for publication committee members. Several names were suggested and Rivera will forward names to MacEachren. Rivera proposed a change in editorial structure. Anderson proposed that DiBiase submit proposed structure and let the Board vote yes or no.

Rivera felt that summer board meeting should cover program discussion, other board business, and then discuss long-term planning document for NACIS. She felt that we should continue as we have from year to year or set some long term goals for NACIS's future. She suggested an extended meeting which would involve past presidents to discuss NACIS goals and objectives. Rivera suggested having the meeting at Michigan State. Rivera will survey the past presidents and least five agree to participate the meeting will be held. The Board agreed that $100 would be given to each past president to help cover expenses.

There being no further business to discuss the meeting was adjourned at 5:20 p.m.

—James Anderson, secreatary

TREASURER'S REPORT
February 22, 1990

I apologize for not being able to attend this board meeting in Orlando. As I had indicated to Professor Fryman, I am available by long distance phone call (call me collect) at (612) 927-5619 from 12 noon to 6 p.m. (Orlando time) on Saturday. Please call me collect as many times as deemed necessary.

To begin this report, I'd like to announce that I have purchased a very efficient and easy-to-use software that handles mailing and some classification functions. This software will be passed on to succeeding treasurers or secretaries. It is very easy to use, will handle up to 30,000 entries, will help us classify members by categories (institution, individual and student), and will sort ten different fields (3 simultaneously). Therefore, I am happy to report that members who have paid their dues are now being entered into this new software. However, I would like to see the old software being kept as a record since there is a large database of about 2000 entries already entered into it. Updating of addresses and new members is done in the new software database.

On January 9, 1990, I sent out the 1990 dues notice not only to 1989 members, but to all names on Jim Anderson's database who have been NACIS members at one time or another. This totaled about 650 entries. In addition, about 100 more names of likely membership candidates were compiled from all U.S. and Canadian graduate schools in geography and added to the mailing. Therefore, About 750 dues notice were sent out. As of today, we have received payment of dues from 15 institutional members, 25 student mem-

bers, 153 individual members, totaling 193. Fifteen of these 193 are new members (new this year and not counting those who joined before the Ann Arbor meeting). More dues are expected in as I can think of officers and board members who have yet to renew. My estimated final number for this year's membership may reach 350, but that remains to be seen. The next issue of *Cartographic Perspectives* will be (may have already been by the time you read this) mailed to all 750 on that list regardless whether they are members or not. The idea was to give away one excellent complimentary issue as a promotional piece in our membership drive and as an announcement of the 'birth of this baby' to the mapping and library community.

The next target for membership drive is map libraries nationwide; not only will they be targeted as institutional members, but their number is quite large. I will have access to this group's mailing list of 900+ members. A question arises as to whether we can fulfil their requests, DiBiase and I think we can. The question is: if all these map libraries would want *Cartographic Prospectives* dating back to the first issue, we will have to reprint them to accommodate this block of new members. DiBiase has all issues stored digitally so that reprinting is possible.

As for the financial status of the organization, we managed to consistently keep a buffer of about $15,000. As of today, our bank account balance stands at $18,204.46 with an expected expenditure of about $3,500 for the production of *Cartographic Perspectives* #3 and #4. At the same time, there should be at least 100 members who have yet to pay dues. For our last annual meeting at Ann Arbor, our income from registration and such exceeded all expenditures by about $900. It appears, at this point, that the amount of increased dues is just about equal to the added expenditures in the production of *Cartographic Perspectives* (hats off to Alan MacEachren for coming up with such precise numbers in advance). As our membership grows, I would expect the $15,000 buffer to increase, but that also remains to be seen. During the 1989 calendar year, our account yielded $837.56 in interest. I am assuming that the bank has already notified IRS that this organization has interest income. It is not clear to me whether we are still listed as non-profit organization; but even if we are not, we do not have an annual income of $25,000, therefore, we do not need to pay any tax. The question is whether we still have to file a return. I did not file one last year, maybe Jim Anderson can shed some light on this during his years as treasurer.

To sum it up, we are in good stable financial situation. Our efforts in recruiting new members should result in an increased savings. The publication of *Cartographic Perspectives* has certainly helped boost our image as an organization rising in importance in the mapping field.

—Gregory Chu, treasurer

THE CHANGING POLITICAL MAP OF EUROPE

continued from page 2

achieving political unity. Not all EEC members are as enthusiastic as France, the primary advocate of the process, and the eventual realization of an integrated Europe is by no means assured. Among the myriad difficulties yet to be worked out, the bitter, generations-old boundary disputes rekindled by nationalist movements threaten to confound the goal of European political and economic unity. In a December, 1989 issue of *Le Monde*, André Fontaine observed that "The cold war, waged in the name of ideological sympathies, has weakened the thrust of nationalisms. It is the duty of us all to make sure that the end of the cold war does not lead to their revival."

sources: Associated Press (Centre Daily Times), New York Times, World Press Review 1/90

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 Roger Wheate, Department of Geography, University of Calgary, Calgary, Alberts T2N 1N4, Canada; Bitnet: Wheate@UNCAMULT.

Cartographica. A quarterly journal endorsed by the Canadian Cartographic Association/Association Canadienne de Cartographie that features articles, reviews and monographs. B V Gutsell, founder and editor. ISSN 0317-7173. Contact: University of Toronto Press Journals Department, 5201 Dufferin Street, Downsview, Ontario, Canada M3H5T8; (416) 667-7781.

Cartographic Journal. Biannual Journal of the British Cartographic Society. Includes research articles, 'shorter' articles, official records of the Society, book reviews, and list of recent cartographic literature. Contact: Hon. Secretary, Charles Beattie, 13 Sheldrake Gardens, Hordle, Lymington, Hants. SO4 10FJ ENGLAND.

Cartography. Biannual Journal of the Australian Institute of Cartographers. Each issue contains two parts, the Journal proper and the Bulletin. The Journal contains original research papers, papers describing applied cartographic projects, reviews of current cartographic literature and abstracts from related publications. ISSN 0069-0805. Contact: John Payne, Circulation Manager, GPO Box 1292, Canberra, A.C.T. 2601, Australia.

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. ISSN 0894-2595. Contact: Siegfried Feller, publisher/editor, 8 Amherst Road, Pelham, MA 01002; (413) 253-3115.

Geotimes. Monthly publication of the American Geological Institute. Offers news feature articles, and regular departments including

notices of new software, maps and books of interest to the geologic community. Articles frequently address mapping issues. ISSN 0016-8556. Contact: Geotimes, 4220 King Street, Alexandria, VA 22302-1507.

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

Information design journal. Triannual publication of the Information Design Unit. Features research articles reporting on a wide range of problems concerning the design and use of visual information. Contact: Information design journal, P.O. Box 185, Milton Keynes MK7 6BL, England.

Map Online Users Group Newsletter. This quarterly publication offers feature articles, regular columns, product reports and indexes of interest to users of online map data base systems. ISSN 0749-338X. Contact: Edward J. Hall, editor, Map Library, Room 410 McGilvrey Hall, Kent State University Libraries. Kent, OH 44242.

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 representation of the diverse interests of the membership. The primary mechanism for soliciting featured papers will be a paper competition held in conjunction 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 before submitting a 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, contributors 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.

PostScript 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 finegrained 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; Bitnet: diabiase@essc.psu.edu.

COLOPHON

This document was desktop-published at the Deasy GeoGraphics Laboratory Department of Geography, Penn State University, using an Apple Macintosh IIcx. Word processing was accomplished primarily with WriteNow 2.0; page layout with PageMaker 3.01. Graphics not rendered with Aldus FreeHand 2.02 or Canvas 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. Text type is set in Palatino, a face designed by Herman Zapf. The featured color is PMS 130C.

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: _____

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Membership Fees for the Calendar Year/
Valor de nomina de socios para el año:
Individual/Regular: $28.00 U.S./E.U.
Students/Estudiantes: $ 8.00 U.S./E.U.
Institutional/Miembros institucionales:
$58.00 U.S./E.U.

Make all checks payable to/
Hagan sus cheques a:
NACIS
c/o Dr. Gregory Chu, Treasurer
Department of Geography
University of Minnesota
414 Social Sciences Building
Minneapolis, MN 55455

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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