Desktop Map Design: Some Odysseys of Form and Flow

Making maps on today's desktop platforms can be something of an odyssey that often obliges the designer to traverse minefields of non-integrated software. This article details the workflows for nine maps produced with desktop computer software. Each workflow falls across a row; each row references a captioned map that was a tangible outcome of the author's implementation of desktop cartography using image processing and other software tools. A need for early articulation of appropriate verbal goals to guide the power and charm of map design software is discussed.

Few people dispute that creating maps "on the desktop" (i.e. cartography using microcomputers) has considerably altered both map genesis and map production. My goal here is to usher a reader through a few specific desktop mapmaking processes undertaken during a half-year sabbatical. Creation and production processes afforded by new technology are often thought to be faster and more flexible than traditional methods and may result in workflows worth documenting and sharing. Of some interest is the way these flows express and interact with aesthetic zeitgeists past and in emergence today.

Making maps today that effectively communicate probably demands more than any single software application can alone provide. Grant Thrall speculates why (Thrall 1992):

At the first stage of the mass-market microcomputer revolution, a fantasy existed that integrated software could successfully combine into one program several interconnected modules whose functionality could otherwise only be obtained in stand-alone products.

He observed that it is rare that a module of an integrated software program can compete in features with the very best stand-alone applications. He claimed that such an integrated program lately "has been relegated to novice computer users or undemanding 'executive' computer users." Though Professor Thrall was referring in particular to "wholly self-contained [GIS] integrated software," his lattermost assertion seems generally true across the microcomputer worlds of Macintosh, and Microsoft DOS and Windows. But squarely within map design and pre-press production there does exist integrated software that seems to actually work; it is found on workstations offered by proprietary vendors (example: Intergraph) who supply "turnkey systems" (example: MGE). Common wisdom suggests one might best take a balanced view of the value of such integrated systems. For example, if modules of turnkey systems have a uniformly designed interface one may argue that as a clear benefit to desktop users. On the other hand, cost and steep learning curves are usually present as liabilities.

Until something quite revolutionary happens in the world of microcomputer software, a key to effective map design and production may be, on the one hand, to grin and bear the "disintegration" of our times, while on the other to continue identifying relevant individual software tools and intelligently interconnecting them, in the right order with the best conceptual and communication goals in mind.

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The smooth passing of data and imagery between stand-alone software tools has probably thus become the desktop map design “challenge of the 90s.” I sought to better understand this “disintegrated” new world of desktop cartography by undertaking the design and production of six “demonstration” maps. The matrix shown below is a detailed tabular expression that focuses on the presentation of workflows completed for these maps. Additional descriptions of anecdotal and technical interest accompany specific workflow depictions. The matrix also features three minor experiments in “illustrative” image processing, each also shown as a workflow sequence.

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*This map was created in MacDraw but had to be reworked in FreeHand.

*Relief base map was taken from Peeler and Pike

*Source of base map was of Hz. Minneapolis and survey (1967)

*See notes: Output to following format: Dec, Cho, Wol, and Supr. Each letter was demodulation process

*See notes: Output was in U.S. dot negative. Negative was emplaced 300% onto paper and output dot print was made

*See notes: Output was imported final Photoshop for use Quark Xpress prior to outputting

*See notes: Output to laser printer

*See notes: Output to laser printer
Divorce Transect: One-Tool Map
This map (right) demonstrates use of the geographer’s technique of transect analysis, i.e. data collection along a line that one traces across a landscape. I used the 114th meridian as my transect line and hypothesized notable differences in divorce rates in counties on opposite sides of this line because it separates a “Mormon” Utah from a more “Godless” Nevada. Choropleth data expression was employed. Software used was Aldus Freehand.

Minneapolis Neighborhood: Three-Tooled Map
The map at right depicts a four block neighborhood. A blueprint of streets, sidewalks, and house plans was procured from a county source, scanned, and then placed in the background layer of a Freehand document for drawing reference. An effort was made to plan the best use of gray values to portray various line and area features. ImageStudio was used to create black horizontal bands that functioned as distinctive backdrops for headline and subhead labels.

Short Printed Tutorial
A detailed log of notes on map genesis and development was made for the urban map. I created screen dumps of the various phases and wrote captions that referenced key steps. This was assembled into a narrative form within a Quark Xpress document (sequence of four pages featured to right). My goal was to transform images and notes into a brief tutorial on the specifics of large-scale urban map design.
Ghost Dance: Two-Tooled Map

Content for the demonstration map to the left was taken from an atlas of the western United States (Beck and Haase 1989). The goal was to restyle an existing atlas page completely on a "Macintosh desktop" in an effort to see what substantial value-pattern enhancements could be realized. (The context for this pursuit was purely experimental and non-commercial.) The basemap featured was scanned directly from Pike and Thelin's shaded portrayal of relief that was featured in Cartographic Perspectives (Pike and Thelin 1990-91). This scan was placed in Freehand and its value was uniformly lightened. Historical atlas information on Native American ghost dances (Beck and Haase 1989) was scanned and placed in a background layer as a reference for redrawing. Line, shade, and text were added to complete the map.

Horse Diffusion: Three Tools in Support of a Systematic Color Progression

A demonstration map (left) was another effort at redrawing from an existing atlas. The scan from the aforementioned United States shaded relief (Pike and Thelin 1990-91) was opened in Adobe Photoshop for coloring. An earth hue was chosen and applied across the entire map. The resulting file (3.5 megabytes in size) was placed in a Freehand document as an underlayer. An atlas page featuring the diffusion of horses (Beck and Haase 1989) was scanned and placed in a background layer as reference. I utilized a well-conceived color chart that featured perceptual dimensions of Munsell's color system (Brewer 1985) to help me make a modest selection from harmonic color progressions. I created a digital CMYK swatch table using red as a target hue (figure above). Several color progressions were then taken from this swatch and worked into line and text features on the map. (The map was then output to five different printers for making judgements about the appropriateness and quality of today's pre-press proofing technology.)
Frontiers Travel: Five-Tooled Map
A demonstration map was conceived that would compare travel times of the first
Columbian and daGaman trips with later
ocean voyages. Five tools were utilized. Azimuth software was first used to create
an azimuthal projection aimed at a globe
with the goal of precisely featuring Southern
African and North American continents with attendant graticules (upper left
figure). The screen was captured using
ScreenShot and opened in Adobe Photoshop for “illustrative” image processing.
Filters such as blur, diffuse, high-pass, and
sharpen were employed (lower left) in pursuit of a distinctive roughness and glow
that connoted “age.” Dozens of Photoshop versions were created, thus demanding
cataloging software. I used Pikture for the
purpose of quickly comparing and orga
nizing the retrieval of visual results (see
figure on page 16), eventually leading to a
final choice of a globe to serve as a
basemap. This globe was exported as an
EPS file and then placed into a Freehand
document. There it was duplicated and line
features and text were added (upper right).
The file was output to an imagesetter for
final review. The illustratively-processed
globe with its flowlines was also incorpo
rated into the design of a cover for hypo
thetical atlas pertaining to this theme
(lower right, second over) using Freehand.

Farmland Relief: A Seven-Tool Traverse
This map was a response to a request made
by an author who is writing about a farm
in the Rochester, Minnesota area. A topo
graphic sheet was provided that showed
the farm property as a penciled boundary.
I made an ink tracing of the contour sheet
and scanned it (top figure left). This file
was opened in Adobe Streamline which
was used to auto-trace the scanned lines.
The Streamline file was opened and saved
in Adobe Illustrator (top, second from left),
then opened in Freehand for manipulation.
Each contour was closed into a shape. Each
shape was then assigned a gray value
based on contour interval (top, third from
left). The farm boundary was crisply delin
eated (top, far right) and a screen dump
was made using ScreenShot. This was
opened in Photoshop and filtered so the
value ramp was smoothed. The file was
then inverted (middle row left) and placed
in StrataVision 3D, which has a feature that
creates relief based on value (i.e. the lighter
values are projected higher than darker
ones, simulating dimensionality). View
points were explored (lower left) and
one was saved, opened in Photoshop, light
ened, saved as a PDF file, and finally
placed in a new Freehand document.
Roads, creeks, buildings, and text were
added to finish the map (lower right).
U. S. Divorce Map
QuickMap: a table taken from census data was imported into this Hypercard-driven G.I.S. tool and a map depicting divorces by state was automatically range-graded and drawn as choropleth. The result was saved in a MacPaint format (part of the map is adjacent, screened-back).
Photoshop: the MacPaint file was opened in Photoshop and experiments were attempted to "texturize" the map, first using only the diffuse filter (center figure) and later using blur, noise, and diffuse in combination, the latter serving to create something of a "watercolor" feeling (far right).
Quark Xpress: the service bureau placed the final Photoshop file into Quark before outputting it to a imagesetter.

"Digital Pattern Painting" Derived from Erwin Raisz's Classic Work
Erwin Raisz was a cartographic champion of a special kind of map symbolization featured in many of the landform maps and atlases he designed. His textbook on cartography contained a chapter displaying a variety of physiographic symbols applied (as patterns) to his landform maps. In support of his expressive patterns Raisz stated (Raisz 1962):

"[Though] the idea of applying...obliquely viewed landform drawings to vertically viewed maps...is bad geometry, it turns out to be good psychology, as such drawings show the land more or less as we are accustomed to seeing it."

I endeavored to resurrect some Raisz landform patterns for a little digital experimentation (to serve educational goals).

• Scanning: I scanned a page of patterns from Raisz's textbook (Raisz 1962, 80) using Deskscan (figure top left).
• Photoshop: I launched Photoshop and opened the scanned patterns into it. I experimented to determine if and how some of Raisz's patterns might fare when brushed across the page. "Bad lands" (far left) and "plowed land" (immediately below) are shown. In advance of pattern painting I tried a suite of Photoshop filters to give a few pattern swatches some illustrative character (also below). Results evoke some ambivalence in my mind. Basically, one can get this kind of pursuit to work, but at a cost (in the end) of a visually-stiff appearance. Regarding the latter, perhaps a randomness algorithm (yet to be written) might be a desirable addition to the filtering task.
Has certain software that cartographers find most productive chained us to a limited set of connotative expressions? I recall Barbara B. Petchenik's seminal article from the early 1970's in which she articulated the need for "a systematic...attempt...in cartographic design to specify design goals for...maps...by means of several levels of verbal descriptors." (Petchenik 1974). Here are but a few the semantic descriptors she listed...

texture...hard-soft, coarse-fine
light...bright-subtued, light-dark, high contrast-low contrast,
clear-blurred, transparent-opaque/dense
emotions...joyful-somber, modern-traditional, crude-elegant

In many ways her list is quite timeless. Using it properly still can help one mix-and-match the right connotative feelings for a map to be successful. Image processing tools designers use today actually echo quite a few words from Petchenik's list—i.e. they are found as menu selections or dialog box buttons in Adobe Photoshop, Fractal Design Sketcher, and other art-based image-processing software applications: bright(ness), light(en), dark(en), contrast, blur, and opacity (refer to figures right). The presence of words like these in menus seems to suggest that by arbitrarily selecting software today we could in fact be led down predetermined pathways of forms and feelings, especially if we care little for the connotative goals that grow out of the map content itself. In my own mind assets and liabilities are starting to emerge more clearly from that creative haze over our digital desktops. Liabilities: given the ever-growing menus of our software tools, we may be in some danger of being too easily and too often "charmed." Assets: nevertheless, given the complexity achievable by the combination of such tools, we regularly uncover new choices that can yield quite surprising opportunities. What remains is a clear need for a verbal audit of map message goals (to be conducted jointly by map designer and client) that can then prime a "techno-inspired" pursuit of agreed-upon feelings. At that point connotations should be fully subject to the charm and surprise of today's most productive imaging tools. For now this may still remain something of an odyssey but, as the late Dr. Petchenik once suggested, it all might serve us better if guided by "a process...more comprehensive, coherent, and...explicit than it is now."


ACKNOWLEDGEMENTS

The author 1) credits the University of Oklahoma Press and McGraw-Hill for atlas and symbol pages used as a central reference in several demonstration maps herein, and 2) acknowledges that copyright of such source material is held by them. Due to the wholly educational nature of this endeavor, the fair use clause of copyright law is deemed fully applicable. All other maps © 1993 Kevin Byrne.

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The author thanks Paul Stayert for editorial comments.

RESUMEN

La edición de mapas y de plataformas computarizadas de desktop es una odisea que obliga al diseñador a trazar campos minados de flujos de trabajo no integrados. Este artículo detalla el flujo de trabajo de 9 mapas producidos con software para computadoras de escritorio. Cada flujo de trabajo se ejecuta a través de una hilera y cada hilera hace referencia a una matriz de encabezamiento que es un resultado tangible de la implementación cartográfica de libre diseño de desktop, usando el procesador de imágenes y otros programas de software. La necesidad de articular las metas para guiar el poder y el encanto del software debe discutirse.