

commissioned by the Polish monarchs in the sixteenth and eighteenth centuries. In style and content, especially with respect to the weakness of the monarchy and its effect on mapping, Mikos does not really advance beyond Karol Buczek's *History of Polish Cartography from the 15th to the 18th Century* (English translation, 1966).

All seven chapters present a similar chronological sequence in map use within each state, from occasional instances before the middle of the sixteenth century—sufficiently unusual to be worth comment by contemporary administrators—to the thorough naturalization of maps by the later 1600s so that their use disappears from the written record so that we can only discern cartographic activity from the maps themselves. Further comparison is difficult because each author has interpreted the topic differently. Marino, Barber, and Parker tend towards map use by the bureaucracy of each state; Buisseret, Vann, Mikos, and Barber (also) focus on map use (generally for military purposes) by the monarchs themselves. The first group are interested in 'special-purpose,' or dedicated mapping as part of the daily administration, mapping which does not necessarily require new surveys and data collection (and which might account for the apparent decline in map use in Spain, as Parker's gauge was the lack of new surveys). This special-purpose mapping is quite different from the more general-purpose maps of the second group, of whom only Vann makes the explicit caution that "an interest in geography must be distinguished from a systematic use of or dependence upon maps as instruments of national statecraft" (p. 157). Much of the information tendered by these authors falls in the category of general map appreciation rather than explicit map use; as a result they (excepting Vann)

appear to promote a rather old-fashioned view of the state as the person of the monarch rather than as a larger and more complex social institution. Clearly, there is much work yet to be done on the cartographic angle to the formation of the modern European state.

There are three other important themes which feature in several of the essays: the transition from a manuscript to a printed cartographic culture and the related conflict between map utility and map secrecy; the various forms of patronage and commission whereby the state supported mapping activities; and, the interconnections between the mapping activities of the different states. The precise manifestation of each of these is, however, contingent upon the internal constitution of the different states, so that they encourage little comparison.

The variation in essay content is reflected in the provision of illustrations; there seems to be an inverse relationship between the number of maps reproduced and the number of footnotes in each chapter. Barber's two chapters especially cry out for more illustration. More positively, the illustrations themselves—8 color and 84 monochrome—are of high quality and very few have been so reduced in size as to be hard to read.

In sum, this book is an important and significant 'first try' at understanding a fundamental episode of cartographic history. It has its problems but it nonetheless deserves a wide readership among geographers, cartographers, and historians (especially the chapters by Barber and Vann). It will feature in the cartographic literature for some time, yet it points the way to its own obsolescence: it questions more than it answers, it stimulates more than it satisfies. I look forward to the new research and the new books that will certainly follow.

### cartography bulletin board

#### KNOXVILLE AND KNOX COUNTY, TENNESSEE: A Case Study in Postscript Large-Format Desktop Mapping

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The University of Tennessee Cartographic Services Laboratory began its move from traditional photomechanical techniques to postscript desktop mapping approximately four years ago. This move was completely influenced by the valuable advice and information shared at annual NACIS meetings. Hopefully this article will give some help to cartography labs just beginning to use desktop mapping for the production of large-format (greater than tabloid size) projects.

For some time, large-format mapping on microcomputers has been hindered by software page size limitations, user inexperience, and the high cost and limited size of imagesetter negative output. Recent updated versions of software and advances in imagesetter technology have made it easier and less expensive to produce negatives for large, high quality four-color maps up to about 29" x 44". By combining sets of these large negatives, it is possible and economical to produce even larger maps.

The project reported on here consisted of the design and production of a 62" x 52" four-color wall map of Knox County, Tennessee, along with a 60-page 10" x 14" companion street atlas. All cartographic work was done using Aldus FreeHand on Macintosh II and Ilci computers with at least

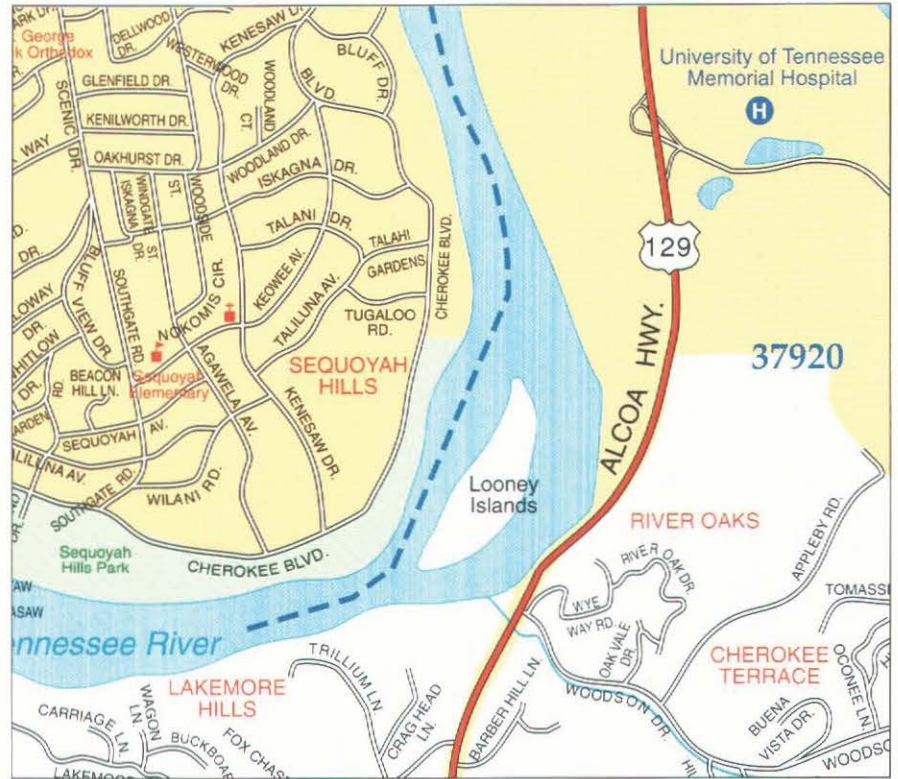


five megabytes of RAM. Other in-house hardware used was an AppleScanner and LaserWriter IINT. Traditional cartographic equipment consisted of Rapidograph pens and the occasional use of a Kargl projector.

The street atlas was the first component of this two-part project. Base materials were compiled from maps provided by the local planning commission GIS and tax offices, subdivision plans, and USGS 1:24000 topo maps. Working at different sizes and scales between hardware, software and base materials was our first problem. The base maps ranged in size from the six foot by nine foot GIS map to letter sized new subdivision plans. The street atlas pages needed to be 10" x 14", our scanner was only capable of 8.5" x 14", and Freehand had a document maximum document size of 40" x 40". Before you begin drawing, it would be wise to spend some planning time experimenting with these size and scale differences.

We decided to cut the GIS map which contained street and hydrography information into manageable panels of not more than 40" x 40". Since it was plotted onto vellum at the same scale as our topo maps covering the county, adding additional information was an easy manual tracing task. Next, we cut the panels into legal sized sections and scanned them into the Macintosh. These scans were then reassembled to their panel size in FreeHand, placed in the background, and screen digitized using the drawing tools. Geographic information was separated into layers to avoid confusion and drawn in preview mode for speed.

Once initial digitizing (boundaries, roads, and water) was finished on a panel, it was cut into 9" x 12.5" sections in Freehand in order to fit in the 10" x 14" street atlas pages. On each page a reference grid was added, text



Sample piece of street atlas map

was placed, and styles for lines and polygons were assigned. Topographic maps provided most of the physiographic features, stream names, and place names not found on other maps. New information was scanned, scaled, placed in position, sent to the background, and digitized in. We found that text requires more memory than linework, especially when it is attached to paths for labeling curved features. Large quantities of text effects screen redraw time so cutting the panels back to the 10" x 14" page size allowed us to work faster.

A primary goal throughout the project was to economize as much as possible. In order to save on costs, all proofs were output on the LaserWriter. Negatives were then made of four selected pages on a Linotronic 300 in order to check colors and registration via a Cromalin proof. Satisfied that all pages were done, final negatives were imaged and we let the printer handle it from there.

After publication of the street atlas, we began the task of putting together the wall map. Our time was well spent planning, talking with the printer about his size limitations, and locating the negative source. Needless to say these are critical tasks which, if not done first, can lead to a large-format disaster! We again had some size problems to deal with. Printing limitations required each of the 46 map pages to be reduced to 70% of their original size and we still had to keep in mind FreeHand's size limitation of 40" x 40". This time the final negatives would be made on the recently released Linotronic 930 which is capable of producing large, high quality negatives with an image area of up to 29" x 44" at moderately low cost.

We divided the project into quarters and let the printer assemble the four sets of registered negatives into the full sized wall map. Early planning at the street atlas stage included the addition of



a reference grid which proved to be our salvation for putting together the wall map quadrants. We ran each map page through a simple set of commands at 100% scale. First, in preview mode on the highest layer of the drawing we drew a rectangle with no fill that snapped to the map corners of a page. The rectangle was given the same line weight as the reference grid lines. Second, we selected all features on the page, unselected the rectangle, and then cut the remaining selected features to the clipboard. To finish the sequence we selected the rectangle and pasted the cut features into it using the "paste inside" command.

Still working at full scale and moving horizontally from page to page, we began shifting line and polygon features that did not quite match along the join lines. We also edited text and road sign repetitions on adjacent pages. To edit, you cut the contents of one page at a time, make changes, and then repeat the "paste inside" routine. Once the horizontal matches were done we did the same for the vertical matches. Satisfied that all editing was complete we moved into the final stage of creating the quadrants.

From this point on we worked only in preview mode to avoid screen redraw time. The size of the wall map was based on the original reference grid reduced to 70% of its size. The common lines between the four quadrants were the central horizontal and vertical reference grid lines. By moving the origin of the map to the intersection of these two lines we were able to determine the document sizes and origins for each quadrant. The next step was to set up guides for the page placements on each document at the reduced scale. Finishing each quadrant required pages to be pasted into the document, reduced to 70%, and snapped into position. After all pages for a quadrant were

placed, additional information that was needed such as titles, insets, legends, the reference grid designations, and copyright information were added. The final result was a very large-format four color wall map assembled from four sets of process negatives at the platemaking stage.

Our experience with large-format desktop mapping has been good in many ways. Like most labs that are utilizing this new technology, we find that postscript mapping has proven to be practical and cost effective. It gives the cartographer great freedom to experiment with traditional and new ways of displaying geographic information in black and white as well as color. It allows students to gain valuable experience helping with parts of major four color maps that in the past only a veteran cartographer could handle. Eight undergraduate and three graduate students helped in one way or another, which may not have been practical on a manual project this large because of individual differences in drawing or scribing ability.

The myth we always have to point out is that drawing map features and placing text with the computer is not always much faster than traditional methods. The real time and cost saving come when corrections, additions, and new editions to maps are needed. In addition, variations of the same map become possible because of the layering and style editing features that FreeHand offers. We no longer need to supply our darkroom with costly photographic materials, thus making the cost of cartography more reasonable for our customers. Cost savings and faster turn-around time on projects attracts new customers in search of good cartography.

The following are some suggestions when working with large-format desktop mapping projects:

- *During digitizing, use as few points as possible in order to cut down on file size. The handles associated with digitized points will help to more accurately trace your scan.*
- *FreeHand allows a wide range of design options for fills, linework, layering, and text. Use as many of these options as you feel necessary with one exception, do not use patterned fills or lines! They create havoc with linotronic imagesetters because they are bitmapped.*
- *Maximize your use of the layering capability. You can save time and confusion by isolating layers you are not working on, and it allows global changes to be performed if you change your mind about a style or a type spec.*
- *Forget about tiling negatives together as some service centers will suggest. The dots are hard to match and may leave lines across screened color areas. You will at best have to pay the printer more for the extra stripping time.*
- *Insist that the service center run your entire project at the same time and on the same imagesetter in order to avoid costly registration problems.*
- *Delete scanned TIFF images as soon as you have used all you need from them. Your document size will shrink and screen redraw will speed up.*
- *Larger scans are now available at reasonable cost. Using them may save you time during the initial digitizing process and Freehand for the Macintosh will accept PC TIFF images.*
- *Software packages such as Adobe Streamline are helpful for auto tracing lines and polygons. The drawback is that they tend to put down a large number of points thus adding to file size.*