inches (on 8 x 11 inch paper), then the area of interest on the base map cannot be larger than 12 x 18 inches. The primary base map cannot be smaller than the final map. The ideal size of a base map is about a third bigger than the final map. A 'public domain' map is preferred, that is a non-copyrighted map printed by the U.S. Government. Copyrighted maps may require permission and/or the payment of a fee for their use. The best statement concerning map copyright entitled Questions and Answers about Map Copyrights is available from the International Map Dealers Association, P.O. Box 1789, Kankakee, IL 60901. If in doubt, bring us several recent maps so that we may choose the best ones.

After identifying the best base maps we will work with you to delimit on photocopies your area of interest in the correct proportions. Then you will need to 'red pencil' the photocopy, indicating the information you wish shown on the final map. A copy of the draft text of the article or the relevant pages of a book is often useful to the cartographer during the design and proofing stages. Please provide these if possible. Only after seeing the complexity of the map will we be able to offer a cost estimate. Our costs are based on . . . (fill in). Simple maps cost about $100. We can normally produce the first draft of a map in one week. Subsequent drafts can usually be produced in three work days. Be sure that we understand both your money and time constraints before we begin.

We will be using an easy-to-change map-making method and we expect the first-draft map to be modified and improved. When we provide you a draft to consider please think about it carefully, proof all information, and either mark it up or approve it for final preparation. The first draft map will have laser printer lettering; the final copy will have typesetter lettering. Only after you approve our final copy will we prepare a copy for the publisher according to specifications.

Remember that you are the author of the maps as well as the author of the text. The author is responsible for the content of the maps. You, as author, do not expect your word processor person to write your text; similarly, do not expect your cartographer to 'write' your map. Cartographers serve to take your information and use it to produce a well-designed and well-executed product in accordance with the publisher's instructions. Please feel free to call . . . if you have any questions.

POSTSCRIPT

The final paragraph of the sample statement above elicited some discussion. What is the proper role of a cartographer? This paragraph should reflect your own philosophy. In my view, the cartographer exhorts the author to do all of the compilation with a little advice on the best source map and final map proportions and scale. Clients are more-or-less able to accomplish the compilation so the cartographer may need to do much of the actual work. My point is that we should exhort the client, then come to the rescue as necessary to create a product satisfactory to all concerned. None of us wish a bad map to come out of our lab. As professionals we will, of course, do what is necessary.

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 librarianship.

Mandel, Robert (1990) The world according to micros; *Byte*, July.
reviewed by Will Fontanez, University of Tennessee

"The World According to Micros" is an informative article written by Robert Mandel of Lewis and Clark College in Portland, Oregon. He opens with what is now the usual description about how little most people know about geography and suggests that "Desktop" mapping packages are the answer. I agree with his view that the recent introduction of electronic world atlases and thematic mapping packages help to address this problem in a big way. On the other hand, I hesitate to agree that microcomputer software packages are necessarily a low cost alternative to the traditional atlas. These mapping packages are tools which can help us know the places in our world better. Some of these packages go a step further and allow the user to display and manipulate current statistical information. I believe this second step requires some knowledge of basic cartographic principles and data display techniques in order to produce useful maps.

The bulk of Mandel's article divides mapping software packages into four distinct categories: fixed maps with data, customizable maps with data, maps without data, and data without maps. Fixed maps with data are the closest in form and function to the traditional hardbound atlas. In most cases these maps and data have already been compiled. You select points or areas which allow information

windows to activate. Custom software allows you the freedom to tailor maps and data to your own needs and many times include more than one thematic data display technique. Maps without data are essentially projection packages which allow the user to work with scale, viewing position, various coordinate systems, rotation, and distance measuring. I'm not sure data without maps should be included, but these packages do provide an extensive amount of geographically-coded data to help keep us better informed.

Mandel does a good job of describing which packages fall into a particular category and the strong points and shortcomings of each. I found his comments about the various packages quite candid and accurate with respect to the (Macintosh) packages I am familiar with. He lets you know about the quality and detail of the maps included, particular technical or hardware problems, data manipulation options and shortcomings, and in some cases, how useful a package is to learning. Also provided is a comparative table of the 24 different packages discussed and their qualities, as well as a list of costs, company addresses, and phone numbers. It would be a good idea to look over this article before your next mapping software purchase if you are a comparison shopper.

Finally, I agree with Mandel that the overall quality of these packages is quite good and gets better with each new release. One thing I would like to see is more input from professional cartographers during software development. For example, I think MapMaker is a very good product and I use it regularly, but its default shaded area (choropleth) maps have some basic cartographic problems such as: categories that overlap, poor light (low value) to dark (high value) progression and it allows you to use the choropleth technique inappropriately. Of course you can manually correct for these problems, but that assumes some prior cartographic training. There is more to data display on maps than simply merging a data and boundary file. Just because you know how to merge them doesn't necessarily mean you are effectively displaying an accurate geographic pattern or distribution.

Kenji Kimura; Yoshimasa Osumi, and Yoshirio Nagai (1990) CRT display visibility in automobiles, *Ergonomics* 33:6, pp. 707-718.
reviewed by Matthew McGranaghan, University of Hawaii, temporarily at the NCGIA—Orono, ME.

The paper does not explicitly address map displays, but the authors (from Toyota Motor Corporation's Human Factors Laboratory) are clearly thinking in that direction. The three experiments reported herein are straight-forward human factors experiments into the display of information on color CRTs in automobiles.

The first experiment addresses foreground-background color combinations to facilitate reading a display in the short time (they measured approximately one second) for which it is comfortable for a driver to look away from the highway. They derive a set of relations between recognition time, luminance contrast and chromaticity difference (in CIE 1976 UCS space).

The second experiment considered the upper limit on background luminance which does not seem "dazzling" to night-time drivers. Subjects "were sufficiently adapted to the same level of brightness as viewing oncoming headlights at night" before looking at a CRT screen. The change in pupillary diameter was measured as well as a subjective impression of "dazzle." A general equation is presented for predicting this luminance given the background's chromaticity.

The last perhaps is the most intriguing of these studies. In it, the authors attempt to define, in information theoretic terms (after Shannon and Weaver 1949), the amount of information which can be read from a display "at-a-glance." Subjects were asked to read "characters (numerals, numerals+hiragana, and alphabets)" from displays presented for one second. Error rates indicated that "... the amount of information which can be read at a glance was less than 20-30 bits."

This article exemplifies both the type of work in which cartographers should be involved for developing advanced automotive displays, as well as the difficulties inherent in reporting this kind of research. Cartographers can use the methods adopted by the authors (measuring pupillary diameter changes and applying information theory are interesting in this regard). However, the piece is disappointing in several respects.

None of the experiments is described in detail sufficient to allow replication. The first experiment considers foreground-background contrast without attention to the contrast's location in the color space, color categorization, or other concerns in color coding. The type and amount of low-light adaptation in the second experiment seems to assume a constant average illumination for on-coming cars. This seems unreasonable. The logic of measuring the information content of displays in the third experiment is sketchily presented at best, and the interpretation of "20-30 bits" is not clear. The result is that the direct application of these findings

(Fugitive Cartographic Literature continues on page 25)