

The authors provide very little information in this current edition as to their intentions, however, perusing the introductions of past editions gives insight not only into the purpose, but also the evolution of the content of the atlases over the past decade. Rather than compile a standard reference work, *The State of the World Atlas* is intended to be a work of cartojournalism and provides a frame of reference for the interpretation of events. The events involve issues of an international scale and the maps are often cross-referenced to one another. For example, notes for the map on global warming refer the reader back to maps on national income and unproductive labor. It also appears that the selections of topics in the atlas have also evolved over time, reflecting changing concerns in the world at large. Less emphasis is paid to nuclear threats (featured heavily in earlier editions) and more space is given economic and social domination by multinational corporations and large governments.

A major shift in the atlas production techniques has taken place since 1981. Originally, many of the maps were hand colored or used transfer patterns. Today's edition is computer-generated and, in a cartographic sense, a much finer product. Overall, the graphics are clever and well executed. A few of the color scales left me confused due to their color sequencing (e.g., *Mostly Down*, pg. 91; and *Diplomacy*, pg. 14) yet the somewhat unconventional use of color communicates well. The atlas, as a whole, is largely free of typographic and other production errors, although the notes for the first map, *The World of States*, refer to states in red and green where orange and beige appear on the map itself.

Overall, I found the atlas to be much more interesting than I had expected, a reflection on my

ignorance. Each plate is full of information that really only becomes apparent upon close study and a careful reading of the associated notes. I would recommend this publication to anyone

curious about our relationships within a global society.

*(An interview with the designers and producers of The State of the World Atlas appears on page 28-31 in this issue of Cartographic Perspectives.)*

## SOFTWARE REVIEW: ATLAS\*PRO and ATLAS\*GIS

*Reviewed by Robert Werner*

*Department of Geography, University of St. Thomas  
St. Paul, Minnesota*

A considerable amount of cartographic work is done with commercial software instead of specialized programs attentive to the needs of cartographers. This is true both for cartographic production and education. Examples of such commercial software are ATLAS\*PRO and ATLAS\*GIS. These programs will accomplish some of the needs of cartographic production and education, but have important limitations. Cartographers continually review many mapping and analysis programs, needing to evaluate them for their functionality and educational quality. This review is meant to contribute to this ongoing task.

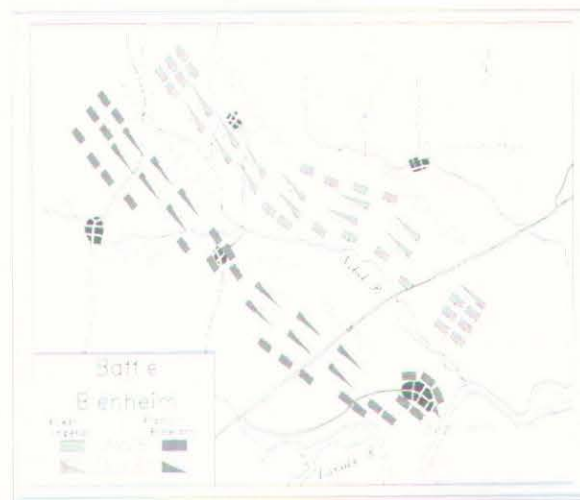
ATLAS\*PRO is a vector-based mapping program; ATLAS\*GIS is both a vector-based mapping and GIS program. Both programs are designed to run on an IBM PC or compatible, and there is a version of ATLAS\*PRO for Macintosh. ATLAS\*PRO is a subset of ATLAS\*GIS; in other words, ATLAS\*PRO and ATLAS\*GIS are the same programs and have the same functions and user interface, except that 1) ATLAS\*GIS has some GIS functionality, including union and intersection overlays, address matching, and buffering, and 2) ATLAS\*GIS supports digitizing tables. All comments below apply to both programs, with those two exceptions. Separate comments at the end address ATLAS\*GIS.

## HARDWARE REQUIREMENTS

Minimum requirements are an IBM PC-compatible, 80286 or above, with at least 640 Kb of RAM and 2 Mb hard disk, VGA or EGA graphics, and DOS 3.0 or later. My recommendation would be for an 80386 with a math co-processor, 1 Mb or more of expanded memory, and a much larger hard disk.

## TYPES OF MAPS PRODUCED

The programs are capable of producing choropleth, graduated symbol, dot, line symbol, point symbol, and other area-shaded maps.



*An example of a map created in ATLAS\*GIS*



## SPATIAL DATA

**Available with the program.** With purchase of ATLAS, you receive spatial data files of the world, U.S. states, all 3,141 U.S. counties, locations of 938 U.S. cities, interstate highways, M.S.A.s, 3-digit ZIP codes, 5-digit ZIP centroids, urban market areas (within TV broadcasting distances), and telephone area codes. These offerings change from time to time, so check with Strategic Mapping (the makers of ATLAS products) for current offerings.

The tutorials and data sets are oriented toward business applications. It would be helpful if some data set and tutorial instructions were included that walked a user through a natural resource GIS problem.

**Created by the user.** The user has several options to get spatial data. You can buy data files from Strategic Mapping, you can digitize it using ATLAS\*GIS, or you can buy the separate ATLAS Import/Export program to read DXF, Etak, TIGER, DIME, and comma- and tab-delimited ASCII files. ATLAS\*PRO for the PC does not support digitizing table input. ATLAS\*GIS does. (The old ATLAS\*DRAW program has been redesigned and integrated into ATLAS\*GIS). Both ATLAS\*PRO and ATLAS\*GIS do support screen digitizing of an already-existing file.

The user cannot access the format of geographic data. If users want to write a digitizing program or convert some old spatial data files (like POLYVRT or a user's homegrown format) into a form useful in ATLAS, they will have to work via some intermediate format like DXF, then use ATLAS Import/Export to get the data into ATLAS.

**Support of digitizing tables.** Again, ATLAS\*PRO for the PC does **not** support digitizing tables. ATLAS\*GIS **does**, and comes with drivers for over 40 digitizing tables. If a user needs a new driver, Strategic Mapping will supply it for free. This is a strong plus for the ATLAS programs, since none of us know what peripherals we will be using in the future. Users can expect excellent support of peripherals from Strategic Mapping.

**Import to/export from other programs.** ATLAS\*PRO and ATLAS\*GIS by themselves are weak in this regard. The separate program, ATLAS Import/Export, needs to be purchased in order to have much import/export power. By themselves, ATLAS\*PRO and ATLAS\*GIS import only old ATLAS\*GRAPHICS boundary files or ATLAS\*DRAW files. (ATLAS\*GRAPHICS was the precursor to ATLAS\*PRO, and ATLAS\*DRAW was Strategic Mapping's old digitizing program).

**File size.** Any one polygon can have 4,000 vertices or line segments. Some cartographers will find this to be a limitation. The upper limit of layers is 1,000 in the latest update of the software.

**Edit spatial data files.** The user can edit spatial data files within the program on the screen, or use ATLAS Import/Export to export, for example, to a DXF format, and edit spatial data in the CAD environment.

**Clipping and tiling.** Clipping (cutting off areas outside of a user-selected area) and tiling (merging of adjoining map sheets into one) are both possible. A variety of options are available for clipping. Any option used for selecting data can be used for clipping, including a user-defined window, box, circle, or polygon, polygons that border on other polygons, or entities inside, touching, or near other entities.

**Coordinate systems support.** Coordinate systems supported include

latitude-longitude, UTM, State Plane, and arbitrary user-defined coordinate systems, such as digitizer inches.

#### ATTRIBUTE DATA (non-spatial data)

**Available with the program.** Attribute data files to match some of the spatial data files come with the purchase of ATLAS, viz., 18 general demographic variables for all U.S. counties, FIPS codes and names for 36 U.S. states and 16 U.S. cities, and assorted attribute files for a few of the other spatial data files. Some of these data files are used in the tutorials, so the user does not have to prepare any data to learn how the program works.

#### *Examples of Geographic and Data Files*

- Census Tracts
- Census Block Groups
- Business data - 10.1 million locations
- Business data - by employee count or SIC code
- International demographics
- Major world cities
- Education and occupation statistics
- Purchase power index
- Shopping center data
- Bank locations and data
- Street maps

*Examples of some of the Geographic Files and Data currently available from Strategic Mapping.*

**Created by the user.** Attribute data files can be created using the ATLAS database management system (DBMS), any D-Base compatible DBMS, or ASCII files. Version 2.0 will also support spreadsheet files. Of course, ID fields must be present in attribute data files that match the IDs in the geographic files, in order for ATLAS or any program to match attribute data with geography. Fortunately, conventional geographic ID codes are in the data files, such as FIPS codes and zip-code centroids, so users can add their own data easily.

**Calculations within the program.** Any D-Base compatible expression can be used to perform calculations on attribute data. Thus, a wide range of calculations is available.

**Import to/export from other programs.** Full compatibility with D-Base types of programs allows straightforward import and export from DBMS programs. ATLAS will also import old ATLAS\*GRAPHICS files, comma- and tab-delimited ASCII files, and files with or without CR-LF characters. Version 2.0 will import data from spreadsheets: Microsoft Excel, Lotus 1-2-3, and Symphony.

#### EVALUATION OF PROGRAM FEATURES

**Ease of operation.** ATLAS is menu-driven like LOTUS 1-2-3, where the screen shows the next subset of commands available if a user chooses any one particular command. With almost 400 commands in ATLAS, the arrangement of commands is a major concern. ATLAS has done an excellent job organizing the commands into logical groups, and with just several hours of using the tutorials, a user will be able to run the whole program. Because the second line below the top command line shows the user the next set of options they will encounter if they choose any one particular command, it is easy to apprehend the arrangement of the commands. Also, the help facility is always available at the touch of F1, in case the user forgets some terminology or just needs a brief reminder of what a command does.

There is some inconsistency with standard cartographic terminology. ATLAS calls point-symbol maps "PIN" maps. What cartographers understand as a user-defined or an idiomatic method of setting class limits



in choropleth maps, ATLAS calls "discontinuous" and "continuous," which is a mistake because choropleth maps require discrete data. What is usually referred to as areas or polygons, ATLAS calls "regions."

**Manual.** The organization of the manuals is readily comprehensible. The contents of the manuals are quite complete. There is an index of suitable detail to find what you need quickly. A glossary would be helpful, especially because in the world of rapid software development, there are sometimes a proliferation of cartographic terms that mean the same thing, e.g. a line segment can be called a vector, segment, line, string, chain, arc, link, or 1-cell. The technical appendices of the manuals are reasonably good. All-in-all, the manuals are well-organized, thorough, and easy to use.

**Tutorials.** The tutorials are excellent. A user can easily learn the basics of ATLAS in about a day, using a series of 16 lessons in the tutorials. The ATLAS\*PRO tutorials are the same as ATLAS\*GIS, except that GIS has an extra chapter walking the user through GIS functionality. Sample data files are provided for the tutorials, viz., New York City with the geography of zip codes. The quality of the tutorials and ease of learning ATLAS is a strong plus, both for the software itself and for using it in the educational environment.

**Screens.** The screens are laid out well and resemble a CAD program, with a main drawing area, two command lines at the top, and data on the right side about files that are open, features that are currently selected, x,y coordinates of the screen crosshairs, and the scale of the drawing. The clarity of screen messages is good, once the user becomes familiar with a few nuances of ATLAS vocabulary.

**Help screens.** The help screens are always available with the F1 key. The help screens are context-sensitive. In other words, a help request at one place in the program will return help relevant to that place. The content of the help screens is printed in the manuals, but screen help is still a quick way to familiarize yourself with a detail. When help is invoked, the main map is saved by a screen-save routine, so that the map does not take long to be redrawn after help is sought. Help is not given in nested levels of detail, like in WordPerfect, where a user can go to successively deeper levels of help on some item. In ATLAS, help functions more as a reminder than a source of information that will tell you how to do something.

**Error handling.** Error messages are usually informative. Sometimes, however, they can be obscure or incomplete. For example, if a user tries to load a mapfile (a file of parameters previously used to make a map), but the geographic and/or attribute file is not where the mapfile expects them, the program returns a series of messages saying that it is simply unable to use the geographic file, and the obscure message 'error reading token block file Geo,' which is difficult to decipher.

**Design flexibility.** The design flexibility is quite good, and represents a quantum leap forward from ATLAS\*GRAPHICS. Fine-screen shading patterns are available, with density under complete control of the user. The choice of point symbols is good, with 95 symbols to choose from. There are 10 basic line styles (each has variable width), twelve colors can be chosen, and the percentage of fill for each color can range from 0 to 100. There are 16 area fill patterns, like cross-hatch, marsh, wave, and others.

*A user can easily learn the basics of ATLAS in about a day.*

*The design flexibility is quite good, and represents a quantum leap forward from ATLAS\*GRAPHICS.*



*The program will produce or transform geographic coordinates into eight different map projections.*

The map can be placed anywhere on the page, and be sized in any way. This is also true of other page elements, including the lettering, legends, and scale bar. This is tremendous cartographic flexibility. An inset can easily be created (as long as the inset is from the same geographic file as the map). A scale bar can be sized and designed in a variety of ways. The symbol library includes north arrows, or they can be created freehand. Neatlines can be turned on and off, and there are even choices as to line styles for neatlines. Text is infinitely sizable, and a variety of fonts are available. The program will produce or transform geographic coordinates into eight different map projections, including Robinson, Albers, all state plane projections, and UTM. A user must select a map projection from the set of supported projections and cannot enter the equations of other projections. Fortunately, though Mercator is one of the supported projections, the default world projection is Robinson.

A user can make a map inset (as long as the same spatial data file is used for both the map and the inset), but cannot carry labels to both the map and the inset. It is easy enough to switch the map and the inset, so labels can be on either, but labels can't be on both.

There is a little-known program that comes with ATLAS called Symbol Maker. It allows the user to screen-digitize a symbol, such as a line drawing of a logo, and store it in the symbol library. The symbol can then be accessed when the user is in ATLAS.

**Hard copy.** ATLAS supports a great range of output devices. Drivers come with the purchase of the program. As with input drivers, if a user buys a new output device, Strategic Mapping will supply new drivers free of charge. One hundred drivers come with the program, but because you can easily get any other, ATLAS supports virtually all output devices. ATLAS will also output HPGL and Postscript files. The program will also print reports of attribute data.

**Choropleth map options.** Nine choropleth classification algorithms are available. They include Jenk's optimal classifier, quintiles, standard deviations, user-defined class breaks, equal interval, and others. The default classification algorithm is equal numbers of data values in each class. Unfortunately, ATLAS calls this "quantiles," which is mistaken terminology when there are not five classes. The default classification method should probably be Jenk's optimal, so that users who are not sensitive to the data frequency distribution will get a classification that maximizes between-class variance and minimizes within-class variance.

The program does not produce data histograms, so the user cannot visually tell what class breaks to use. In this regard, ATLAS\*PRO and ATLAS\*GIS's predecessor, ATLAS\*GRAPHICS, was better. A user must export the attribute data and import it into a spreadsheet or graphics program in order to see a histogram. This should be changed.

Ideally, all choropleth maps would contain a frequency distribution of the data. That way, the map reader would have a good idea just how the cartographer set the class limits, and how much some data varies from the central tendency. It would be ideal to be able to import a frequency distribution into a graphics box in the map, but ATLAS does not allow this (and very few other mapping and GIS programs do either).

ATLAS will produce two-variable choropleth maps. One variable might be represented with a fill pattern and density, and the other by colors.

The default colors for choropleth maps are hierarchical. Many users don't know about the need for color and shading hierarchies, so good

defaults are necessary. It is still better to set the default colors to one color, say, red, and to shade areas by varying the percentage of fill. The colors available are the usual 12 color output of a PC monitor. It is difficult to design a color hierarchy with these colors. It is easier in one color, because the percentage of fill can be the hierarchy of shading.

ATLAS\*GIS does everything ATLAS\*PRO does, plus some GIS functionality, and support of digitizing tables. Like ATLAS\*PRO, ATLAS\*GIS uses the same user interface, plus a D-Base compatible file (or its own database) for attribute data. ATLAS\*GIS will perform union and intersection overlays, address matching, and buffers.

Examples of ATLAS\*GIS functionality include the following. 1) Attribute data can be aggregated inside of an area, to produce output to a larger area in a different layer. For example, census tracts could be aggregated into counties. 2) Buffers can be created around points, lines and areas. If a buffer is around a point, the shape is a circle; if the buffer is around a line, the shape is a corridor. A buffer can be created around an area by first converting the outside perimeter of the area into lines. Overlapping buffers inside an area of interest often have to be dissolved. Buffers can be created around more than one type of feature, e.g. a buffer around lines and points. Buffer width can be proportional to some attribute data value, e.g. wider buffers for streams with more flow. 3) Point-in-polygon operations can be performed to assign area data to points inside an area, or to carry attribute data associated with a point over to an area. 4) Overlay unions can be performed, combining points, lines, or areas into other features. 5) ATLAS\*GIS will perform overlay intersections, splitting lines or areas by other lines or areas. 6) For either unions or intersections, two methods of data aggregation and disaggregation are available: copying data from one feature to another (like carrying a name or an average data value from the input layer to the output layer), and proportional transfer (like splitting an area by one-third and carrying one-third of a total data value to the output layer). 7) ATLAS\*GIS will perform address matching, like taking a file of house addresses and matching them to a street segment file so you could map the houses.

- Upgrade for ATLAS\*GIS costs \$295 (and \$149 for ATLAS\*PRO)
- Import from spreadsheets: Microsoft Excel, Lotus 1-2-3, and Symphony
- Support of indexing by the database
- More options for address matching
- Faster screen re-draw (the company claims twice the speed) and sorting
- Automated routine for point dispersal (even distribution only, around, e.g., a point)
- Freehand objects can be anchored to the screen map or the page map
- New fonts and drivers
- ATLAS Script is available (a macro language and interface customization program)
- Line generalization
- Improved options for designing the layer legend
- Improved label options on map features

In general, ATLAS is a very user-friendly program that is easy to learn. This is especially an achievement because the program is relatively powerful. Screens and command hierarchy are well thought-out and easy for a user to assimilate. With almost 400 commands, design of the user interface is especially good. The tutorials are excellent, and the data that comes with them is satisfactory.

## ATLAS\*GIS

## THE NEW VERSIONS: 2.0

## CONCLUSIONS



ATLAS supports a wide range of input and output devices, and if a user needs a new one, Strategic Mapping will send one for free. Support of various spatial data formats is good once the user has purchased ATLAS Import/Export for \$495, however, a user must stick to a common spatial data format (DXF, Etak, TIGER, DIME, and comma or tab-delimited ASCII files), because Strategic Mapping uses a protected file format, for which the user does not have access. Support of attribute data formats is excellent, given that ATLAS interfaces with D-Base-compatible databases and the new versions import and export to spreadsheets.

Map design flexibility is quite good. Fine-screen shading patterns are available, as well as a wide range of point and line symbols. There is complete control of map elements, such as the map, inset, legends, lettering, and cartographic orientation.

A final criticism is that ATLAS does not always use standard cartographic terminology. What cartographers know as point-symbol mapping will be called "PIN" mapping. Idiomatic, or user-defined choropleth classification methods are called "discontinuous" and "continuous." This is a misnomer, since a requirement of choropleth maps is that data be discrete. "Quantiles," for the case of equal numbers of data values in a class, is odd terminology when there are not five classes. Other terminology could also be more standardized, like area or polygon instead of "region." This is not just a problem for ATLAS, though; consider that a line segment can be called a vector, arc, line, segment, string, chain, or one-cell.

## References

Werner, R.J. and Young, J. 1991. A Checklist to Evaluate Mapping Software. *Journal of Geography*. 90 (3): 118-120.

## interview

*The following interview with Malcolm Swanston, of Swanston Publishing, the designers and producers of the State of the World Atlas was conducted in February of 1992 by Andrew J. Skinner of the University of Derby, UK. A review of the fourth edition of The State of the World Atlas appears in this issue of Cartographic Perspectives (pages 21-22).*

### MALCOLM SWANSTON AND THE STATE OF THE WORLD ATLAS: PUTTING DERBY ON THE MAP

*by Andrew J. Skinner  
Derbyshire College of Higher Education (now the University of Derby)  
UK*

In 1981 Michael Kidron and Ronald Segal, in association with Pluto Press in London, published the *State of the World Atlas*, a political atlas that in its own words tried to be "truly international, not only in showing the world wide incidence of this or that condition or event, but in associating that incidence with an underlying structure." Editorially it was unusual in taking a political stance ("It is our contention that the destructive aspects of the state have come crucially to exceed the constructive ones"). Graphically it was dramatic, using saturated colors and bold symbols on a standardized projection (Winkels Tripel), mixed with cartograms and graphics.

Contemporary reviews were mixed. David Fairbairn in the *Journal of the British Cartographic Society* (1981) describes it as "a refreshing change from conventional atlases," but complains that "...cartographers were not chosen to meet the challenge of mapping

such diverse and intricate data. It is only by attempting important projects such as this that cartographers will be able to convince the public of their increasing usefulness in recording the changing world scene." Robin Kinross in the *Information Design Journal* (1982) praises the "vast amount of relevant information" but is more critical of the graphic presentation (although he describes the cartograms as "the most interesting and potentially effective graphic experiment...a simplification of the form of each state into an abstract rectilinear shape").

I have always been impressed by the look of the atlas, and colleagues who use it have very favorable opinions. It has been well received by the market, and it has been interesting to watch the publishers develop the theme into a number of companion atlases (also to see the number of imitations that have appeared on the scene).

It seemed to catch the cartographic world by surprise, not least because the design and production was done by a small and virtually unknown company with no cartographic 'track record.' The company was called Swanston and Associates, and was based in the British city of Derby (pronounced *Darby*), which has a strong printing industry but no traditional cartographic links.

In February of 1992 Malcolm Swanston agreed to talk to me about the origins of the *State of the World Atlas* and subsequent publications.

I first visited Swanston and Associates (now Swanston Publishing) in the early eighties when they occupied a number of small rooms in an old Georgian building in the center of Derby. It seemed remarkable to me at the time that such a notable publication had such humble beginnings. Now they are in more spacious accommodation half a mile away, and as