

Mapping Names

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Using computers to make maps of geographic, personal, or other names can provide an efficient means of making numerous maps from the same database. Onomastic maps can be drawn using a variety of software, available for both DOS/Windows and Macintosh.

Computer Cartography

Mapping in general has become both easier and more difficult in the last decade or so with the availability of computers on nearly everyone's desk. While on the one hand it is easier because mapping software is available for every desktop computer, which seemingly unlocks the mysteries of cartography, on the other, it has become more difficult because each computer user is now expected to be able to provide maps with any article or lecture because the software is available, and yet the knowledge of how to make good maps is not as readily available as the boundary files from which they are made.

There are several ways to make maps using computers, ranging from drawing maps from scratch or scanning existing maps and manipulating them (both of these methods depending on drawing or illustrating software) to using software that is specifically designed to make maps, which generally comes with geographic information such as boundaries of counties, states, countries, and other political or natural units. Using drawing programs such as CorelDraw®, MacDraw®, Illustrator®, or Freehand® can provide good results, and these are different from manual cartography only in that mistakes can easily be corrected and changes can be made without the need to redraw each new map, time and time again; the computer will do it for you. What drawing programs do not provide is the link to the world in geographic

terms. Mapping software provides this link because it is able to read geographic coordinates and place information in its correct geographic location.

There are several useful concepts that apply to all mapping software that, once understood, make life much easier for the desktop cartographer. Although most mapping software is not as easily manipulated as drawing software, maps can be graphically enhanced using drawing software once the geography is complete. The software available for making maps ranges from quite inexpensive (under \$100) to fairly expensive (over \$500), and the range of cartographic sophistication ranges with the price: generally the more expensive, the more sophisticated. There is also software available for mainframe computers, but unless you do much statistical work on a mainframe, you will probably not use it for mapping. Back in 1988, I used SASGraph® on a VAX to make maps of my "Moscow" data (Vasiliev 1988 and map 1). The procedures and concepts for making those maps were not much different from making them today with desktop software. Graphically, the results were not very pretty, but they served their purpose.

Map 1. A 1988 map produced by SASGraph on a mainframe computer.



As examples of the mapping software available, I have chosen to describe two programs, one of which is available for both the DOS/Windows and Macintosh platforms and whose use is similar on both types of machines. Over the years, Strategic Mapping, Inc. has produced a number of programs that are geographic in nature: AtlasDraw® and AtlasGraphics® came first; these were combined with MapMaker® (another company's program) into AtlasPro® which has evolved into AtlasGIS®. (*GIS* stands for *Geographic Information Systems* and is a way of linking a variety of data to geographic locations for the purpose of statistically analyzing the activity of a place, be it land use or environmental planning or census). AtlasPro is available for both DOS/Windows and Macintosh and costs about \$500. The concepts needed to make maps using AtlasPro or AtlasGIS are the same and are generally the concepts needed to make any computer maps, including those using less expensive and less sophisticated software.

Although Windows on IBM-type PCs has brought the graphic arts world to more desktops, the Macintosh is often easier to use when working with graphics. With this in mind, the second piece of software I have selected is Macintosh-based. BaseMap®, made by GeoPoint, Inc. (about \$100) is simple to use, but has its limitations and so provides a good example of what can be done with less expensive software.

General Requirements for Computer Mapping

Any information can be mapped provided one has the information and its location. Much onomastic study focuses on the origins of names, their locations in space, and their changes over time. Maps are often used to depict some of this information. While toponymists make general use of mapping, since placenames are by definition mappable, any set of names that can be given a geographic location can be placed on a map.

When collecting information on names with the idea of mapping them, the minimum needed is the name and its location. Sometimes, other information associated with the name is what will be mapped. For example, one might want to show the frequency of occurrence of a surname in a particular area or the dates when certain placenames were chosen or the populations of the places with particular names or the type of name based on whatever categorization scheme the researcher

devises. These also can be mapped. Ideally, there would be geographic coordinates, in latitude and longitude, for each name. Sometimes these are not available, but, for the United States, the location of a place by state and by county is available and this information is often adequate. As an example, consider the set of populated places in the United States named Springfield.

Finding the geographic coordinates for places in the United States is a simple task. GNIS — the Geographic Names Information System — can provide the researcher with any and all names of places found on U.S.G.S. topographic maps. The information arrives on a disk or in printed form, and for each name, looks generally like this example of the record for Springfield, Louisiana:

State(s): LA, Louisiana
Feature Name: Springfield
Feature Type: ppl
County Name(s): Livingston
State/County FIPS Code: 22063
Topographic Map Name: Springfield
Map Reference Code(s): 30090-D5
Geographic Coordinates: 302544N0903255W
Elevation: 16
Variant Name(s): Bookters Landing (LA-T49/p89)

For placenames, GNIS is invaluable. It provides geographic information in a variety of ways. It tells us the state and the county as well as the FIPS (Federal Information Processing Standards) Code for states and counties. In the above example, the first two numbers (22) identify the state (Louisiana) and the last three (063) identity the county (Livingston). FIPS Codes are compatible with many pieces of software which can read them to locate and place information on maps. If a researcher's dataset contains only state and county information and no geographic coordinates, then this information can be transformed into FIPS Codes and used for mapping purposes. Tables of FIPS Codes are available from many government agencies. However, the information coded by FIPS Codes will be mapped in the center of a county and, therefore, only one piece of information can be mapped per county. This is a limitation of having only FIPS Code locational information and no

geographic coordinates. The geographic coordinates in the above example are read as follows: 302544N is the latitude 30°25'44"North; 0903255W is the longitude 90°32'55"West. It is useful to have coordinates to the seconds for more precise placement on a map.

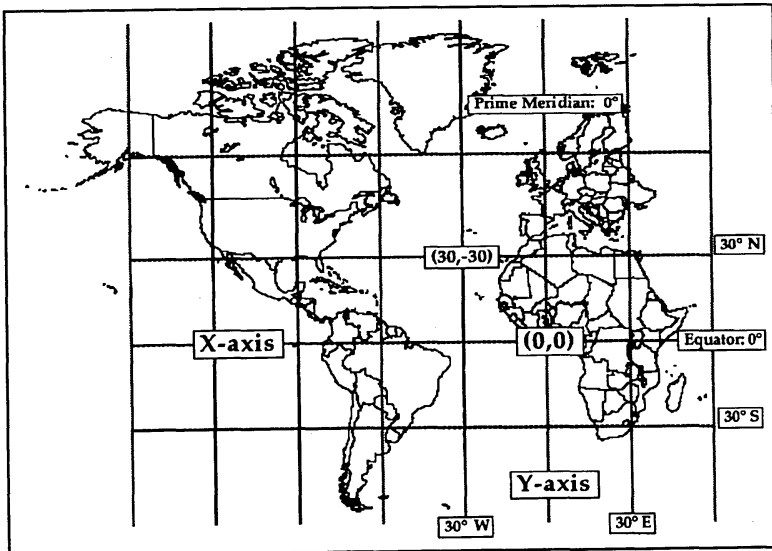
Steps to Making Maps

When making maps it is important to know from the start what it is that will be mapped. It is fairly easy to make graphic changes on computers, to vary the look of the final map in terms of the type of text or symbol or pattern. It is less easy to vary the content of the map without starting from scratch with each change in category of name or number of names on the map. My Springfield database includes places that have prefixes, such as New and North, and suffixes, such as Gardens and Acres. When using sophisticated software, one can choose, from all the Springfields in the database, those which should appear on the map. Less sophisticated software does not provide this option and maps every occurrence of the place which it finds in the database. To avoid underspecification, one needs to create the mapping database in such a way that it includes only those names that one wants to appear on the map.

The development of a names database is usually done in a word processing program, such as Word® or WordPerfect® or spreadsheet program such as DBase®. The database can be edited into files that include only what one wants to map. The final version of the database file must be saved as a TEXT or ASCII file so that the mapping software can import it and use it to generate a map. Generally, to be mappable, the names database must include at least the name, its geographic coordinates for location, and the type of feature that is being mapped, if each will be a point or a line. Towns or parks are point features and roads and rivers are line features. In addition, more sophisticated software needs identifying labels that are unique to each point so that it can discriminate between each place that is called Springfield to allow, for instance, for choice in mapping only those Springfields that one wants to map. These labels can be simple numbers or names or FIPS Codes, anything that is unique. If a given county has more than one Springfield, then a FIPS Code obviously will not work as a unique identifier.

Latitude and longitude coordinates provide the locational information to place each name correctly on the map. Mapping programs read coordinates in decimal form and as Xs and Ys. This means that each coordinate must be translated from the degree-minute-second format into decimals. My calculator will do this for me or someone might want to write a program to do this, if one is so inclined, or it can be done by hand by dividing the minutes by 60 and the seconds by 3600. Once this is done, the coordinates must be entered with longitude as the X column and latitude as the Y column. If one were to make a cartesian coordinate grid using the Equator as the X-axis and the Prime Meridian as the Y-axis, then the longitude values will fall on the X-axis and the latitude values will fall on the Y-axis (see map 2). Notice that West longitude and South latitude locations are negative values on this cartesian coordinate grid. And that is indeed how mapping software reads locational coordinates: the X column comes first and contains longitude values in decimal form, with West longitudes as negative values, and the Y column comes second, containing the latitude values, with South latitudes as negative values.

Map 2. Longitude west of the Prime Meridian and latitudes south of the Equator will have negative values on the Cartesian coordinate grid.



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For the two mapping programs used as examples here, AtlasPro needs more information than does BaseMap, but it is capable of more flexibility in mapping. An AtlasPro database needs a unique identifier for each name to be mapped, the name itself, a value to indicate that this is a point feature rather than a line feature, and the X longitude and Y latitude. A portion of the Springfield database looks like this:

01051	Springfield	1	-86.3750	32.5181
01025	Springfield	1	-87.7619	31.8336
01111	Springfield	1	-85.3172	33.2119
01077	Springfield	1	-87.3881	34.8881
05029	Springfield	1	-92.5575	35.2675

(This database was created by using a single tab between columns and a single hard return at the ends of lines).

The first column is the unique identifier, in this case FIPS Codes, since I wanted only one Springfield per county. The second column is the name of the place, the third is the value that tells AtlasPro that this feature has only one set of defining coordinates (thus it is a point feature), and finally are the longitudes and latitudes, stated decimally.

BaseMap's database is simpler: for point features it requires only the coordinates (also as longitude = X, latitude = Y and in decimal form) and the name of the point. The same portion of the Springfield database, in BaseMap form, looks like this:

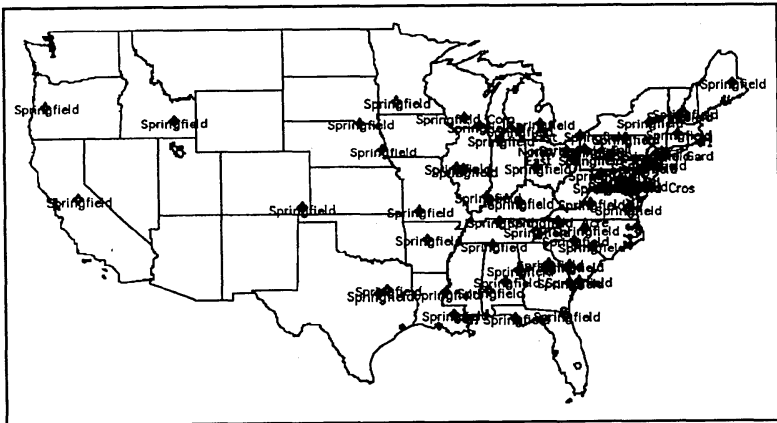
-86.3750	32.5181	Springfield
-87.7619	31.8336	Springfield
-85.3172	33.2119	Springfield
-87.3881	34.8881	Springfield
-92.5575	35.2675	Springfield

Once the database is established and contains all the information necessary for the particular piece of software being used, then the mapping process can begin. With AtlasPro, maps can be made using different map projections. This feature delights geographers because different projections show sections of the Earth in different, often more correct, ways. When mapping the United States, for example, a conic projection will give a better view than a cylindrical projection:

Map 3a. Springfields plotted on a conic projection.



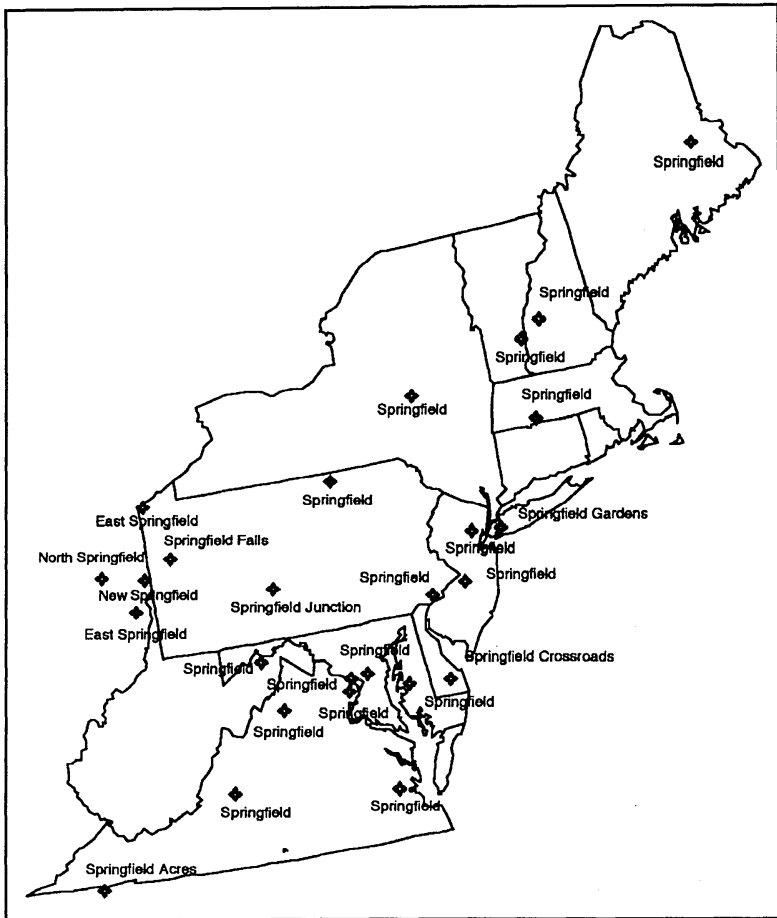
Map 3b. Springfields plotted on a cylindrical projection.



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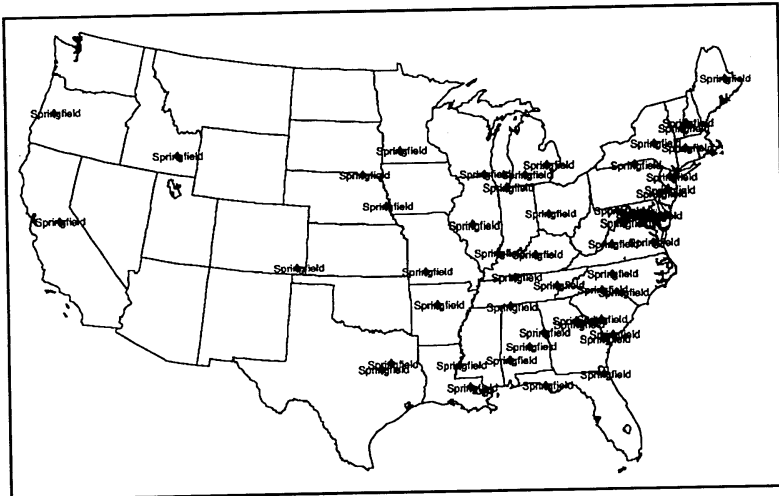
A conic projection does not distort the northern part of the country the way a cylindrical projection does. Map 3a shows Springfield plotted by AtlasPro on a conic projection of the United States. With a conic projection, areas on the map are proportional to areas on the globe, giving a much less distorted version of reality than with a cylindrical projection, such as map 3b, which was made with BaseMap. With cylindrical projections, areas further north appear larger than they actually are. BaseMap does not have the capacity to create conic projections and this is one of its limitations.

Map 4. Locations of Springfields in the original colonies.

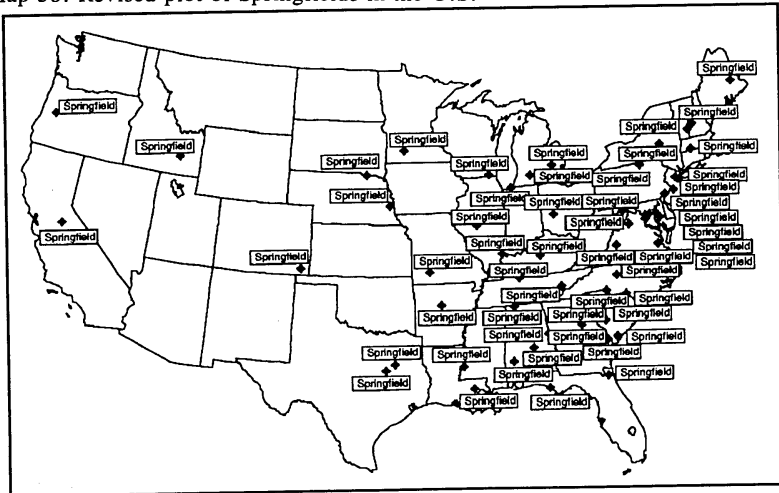


Because a program like AtlasPro has the ability to create a number of different projections, it requires that the name database be converted to what it calls a “geography” file. Geography files contain the coordinates for any geography section that will be mapped. To make a map of the United States with the location of all the Springfields, the mapmaker will choose geography files for each of the states and for the Springfields. With this flexibility, it is possible to map only those states in which one is interested: choose the 13 original colonies, if mapping Revolutionary War information, for example, or the east coast, as illustrated by map 4.

Map 5a. Initial plot of Springfields in the U.S.



Map 5b. Revised plot of Springfields in the U.S.



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When the desired states are chosen and the Springfield file is selected and imported the resulting map looks like map 5a. With so much overlapping, the map is confusing and hard to read. Each of the names is attached to a point symbol indicating the location of each Springfield, but the names and the points overlap. The "artistic" part of mapmaking can overcome these problems. Each of the names can be moved so that they do not overlap one another. This can be tedious work and requires some moving of the names by trial and error before they are finally located where they are both aesthetically pleasing and visually informative. To do this, one uses the mouse and clicks on the name one wants to move, holds the click on the selected name, and moves the name to its new location. The revision might look like map 5b. A title and other information can be added by using the Text Tool (a text editor residing in the mapping or drawing program). If one wants to add more graphic detail, then the map should be saved as a PICT file and opened in a drawing package such as Freehand or Illustrator or CorelDraw, and details added.

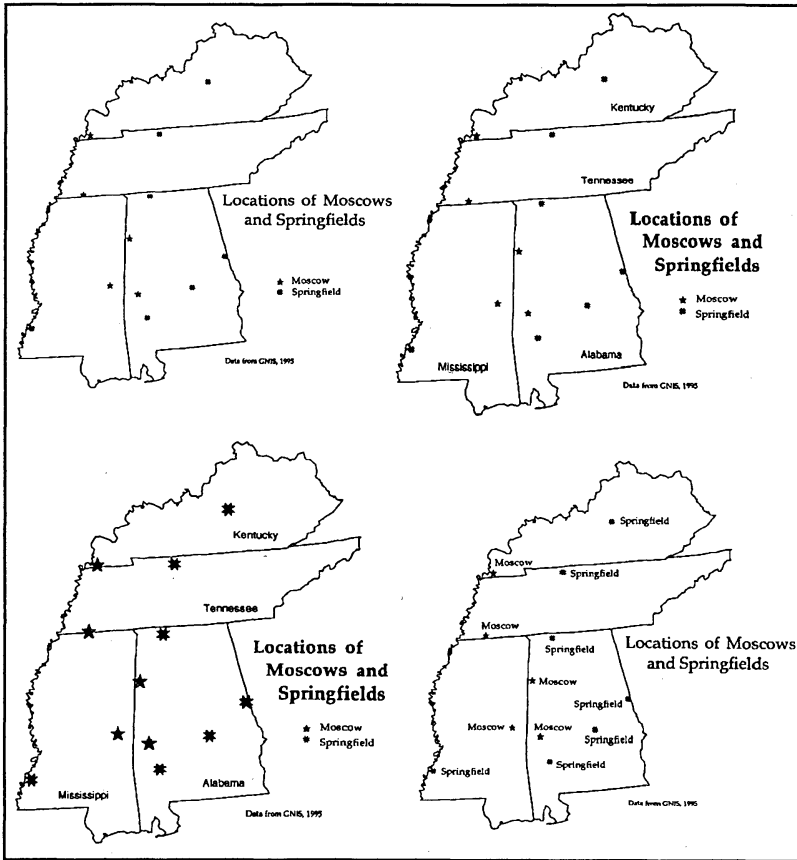
Because AtlasPro is more sophisticated than BaseMap, the first version of the map it generates contains no names at all, just location markers. The names are found in a layer of information that must be switched on in order for it to show on the map. This type of manipulation is found in many software packages and comes in handy when one wants to map different information on different maps of the same locations.

Sometimes a no-name map is exactly what the mapmaker wants. For example, by manipulating the database and giving different names different values (Jones = 1, Smith = 2, etc.) a map can be made using only symbols or a combination of symbols and text to distinguish places instead of names (map 6).

Summary

Creating maps using computers makes it possible to make multiples of the same map, with slight changes in the information mapped, without the tedium of redrawing each map in ink (as in map 6). However, mapmakers are cautioned that, to be successful, the entire project must be thought through in advance and a list of the desired final maps must be compiled before the database is created.

Map 6. Several ways of plotting point data.



The database must be an ASCII or TEXT file containing the names, their locations and additional information as detailed above for the particular software used, formatted in tab-delimited columns with hard returns between each individual entry (as in the Springfield databases above).

Geographic coordinates in latitude and longitude will have to be transformed into decimal versions and entered with longitude as the X column and latitude as the Y column.

There is great versatility in terms of typefaces, text placement, and graphic enhancements; for example, names can be framed with various boxes to set them off from the rest of the map (as in map 5b). Other

graphic enhancements (such as arrows) must be introduced from a drawing program, with the map saved as a PICT file and opened in a drawing package.

Making maps using computers, when everything goes well, is useful and easy. Unfortunately, machines do only what we tell them to do, and if we do not tell them what we want in the way that they can understand, it can be a frustrating experience trying to get what we want out of them. I have spent hours making maps and trying to figure out why they were not coming out as I wanted them to. The initial maps of the Springfields for this article had two Springfields in central Illinois, even though the database included only one. I had to go through the entire set of geographic coordinates to find the one that was mistyped which placed a Springfield in Illinois instead of Arkansas, where it belonged. After the database was edited, the new maps were made correctly.

I recommend investing in a sophisticated mapping program if you are going to be making multiple maps with minor variations, from substantial databases. The resulting maps are capable of presenting information clearly and concisely.

References

- Vasiliev, Irina. 1988. "The Naming and Diffusion of Moscows Across the United States." Masters thesis, State University of New York at Buffalo.