

Chapter 2

Map Design

Nothing is more commonplace or easier than making maps. Nothing is as difficult as making them fairly good. A good geographer is all the more rare for needing nature and art to be united in his training.

—JACQUES-NICOLAS BELLIN (1744,
quoted in Mary Pedley, *The
Commerce of Cartography*, 2005)

WHAT IS MAP DESIGN AND WHY DOES IT MATTER?

When we speak of map design there are two meanings: *layout* of design elements and *planning* the map. Layout involves decisions such as “Where should I place the title, where should the legend and scale go?”; in art, this is called *composition*. Design in the sense of planning begins before a single line is drawn and includes deciding what information will be included and choosing a projection, the scale, and the type of symbols. It is at the heart of the map creation process. In this chapter we look at both aspects of design. The remainder of the book will assist you in making design decisions.

Map users form their spatial concepts of a place, in large part, from maps, whether it is a neighborhood, a region, the world, or the universe; maps are used in decision making, as we saw in Chapter 1. The information presented on a map can have far-reaching consequences, a reality that places heavy responsibility on the mapmaker. Objective mapmakers are obligated to make maps as clear and truthful as possible.

At the same time there is considerable leeway for creativity in new approaches and techniques. Otherwise there would be no changes in map design. New technology, whether the rise of lithographic printing in the 19th century (invented 1796) or the use of computers in the 20th introduced changes in designs and symbols on maps.

Design is a holistic process; language is a linear process. Although I can identify

certain steps that must be taken in mapmaking, they are not necessarily followed in a specific order, and, in fact, several may be taken simultaneously. However, I cannot, in a book, consider all aspects of design at once, but must break them into steps.

Goals of Design

Any design, whether of maps or buildings, has certain goals: clarity, order, balance, contrast, unity, and harmony. These must be kept in mind when planning a map.

Clarity

A map that is not clear is worthless. Clarity involves examining the objectives of the map, emphasizing the important points, and eliminating anything that does not enhance the map message. Although removing data can be carried to an extreme, as in the case of propaganda maps, putting the names of every river on a population map simply clutters the map and makes the thematic information hard to read (Figure 2.1).

Order

Order refers to the logic of the map. Is there visual clutter or confusion? Are the various elements placed logically? Is the reader's eye led through the map appropriately? Since the map is a synoptic, not a serial, communication, cartographers cannot assume that readers will look first at the title, then at the legend, and so on. Studies of eye movements show there is considerable shifting of view. Rudolph Arnheim has noted that the orientation of shapes seems to exert an attraction because the shape of

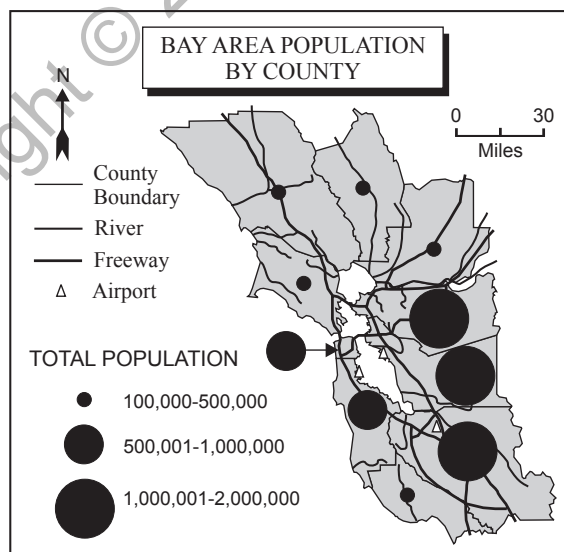


FIGURE 2.1. A map with too much “clutter” is unclear. The rivers, freeways, and airport do not add to the map topic, and, in fact, obscure it.

the elements on a page creates axes that provide direction. That is, vertical lines lead the eye up and down on the map; horizontal lines lead the eye left and right.

Balance

Every element of the map has *visual weight*. These weights should be distributed evenly about the *optical center* of the page, which is a point slightly above the actual center, or the map will appear to be weighted to one side or unstable (Figure 2.2). While this doesn't affect the readability or usefulness of the map, it is a factor in its appearance.

Generally, visual weight within a frame depends on location, size, color, shape, and direction. According to Arnheim (1969, pp. 14–15), visual weights vary as follows:

- Centrally located elements have less weight than those to one side.
- Objects in the upper half appear heavier than those in the lower half.
- Objects on the right side appear heavier than those on the left side.
- Weight appears to increase with increasing distance from the center.
- Isolated elements have more weight than grouped objects.
- Larger elements have greater visual weight.
- Red is heavier than blue.
- Bright colors are heavier than dark.
- Regular shapes seem heavier than irregular shapes.
- Compact shapes have more visual weight than unordered, diffuse shapes.
- Forms with a vertical orientation seem heavier than oblique forms.

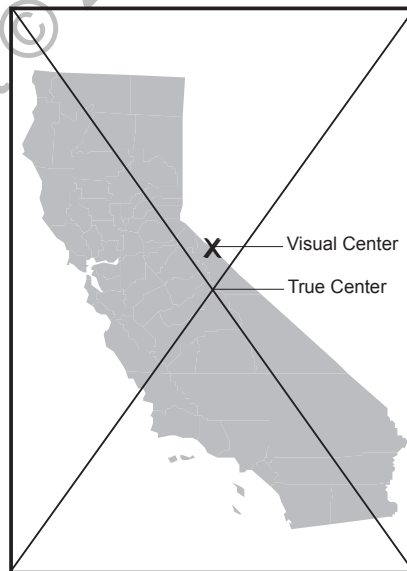


FIGURE 2.2. The visual center of the page is slightly above the actual center.

Closely tied to balance is white space. *White space* is any area within the map frame that is not taken by the map outline itself. A certain amount of white space is required to set the map off and not crowd the page, but usually one should put the largest map possible on the page while still leaving room for other required elements, such as title, legend, and scale. Too often, one sees a small map and the remainder of the page is filled with large north arrows, oversize bar scales, illustrations, and the like that fill the page but overshadow the map (Figures 2.3 and 2.4).

Contrast

A large part of the clarity of the map derives from contrast. *Contrast* is the difference between light and dark, thick and thin, heavy and light. A map created with only one line weight, one font size, and one font lacks contrast, is boring to look at, and is hard to read (Figure 2.5). Some early computer maps lacked contrast because the pen plotters used at the time had only one pen size available; line width could be varied only by cumbersome additional programming steps and commands. Now, of course, sophisticated software is available and today's printers allow a wide variety of fonts and lines so there is no excuse for lack of contrast.

Unity

Unity refers to the interrelationships between map elements. Lettering is not chosen in isolation; it must be legible over any background colors and shades, must not conflict with chosen symbols, and must suit the topic of the map (Figure 2.6). Unity

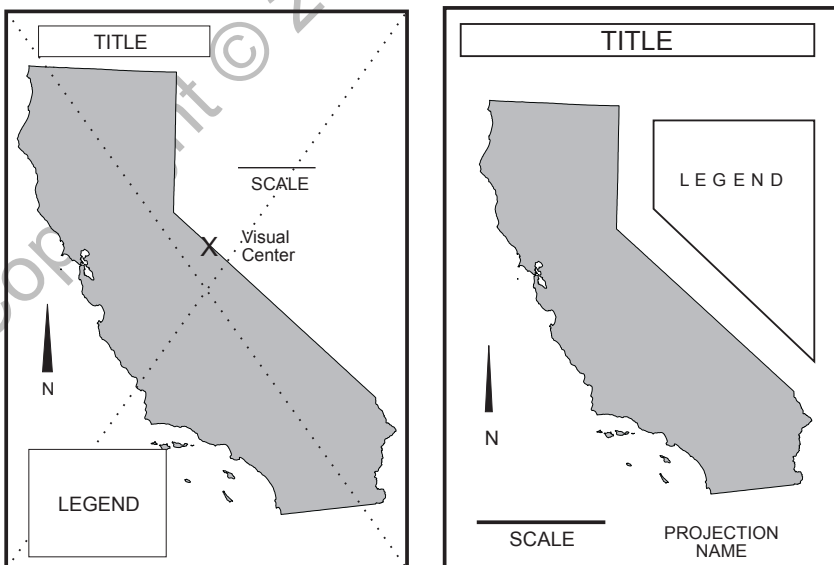


FIGURE 2.3. The layout on the left is poorly balanced. On the right, the page has many elements, but the subject area takes up too little of the available space.



FIGURE 2.4. This is a better layout and use of the available space.

means that the map appears to be a single unit, not a collection of unrelated bits and pieces.

Harmony

Do all of the elements work well together? Do the chosen colors clash? Are patterns jarring to the eye? Do the text fonts complement one another? Does the overall map

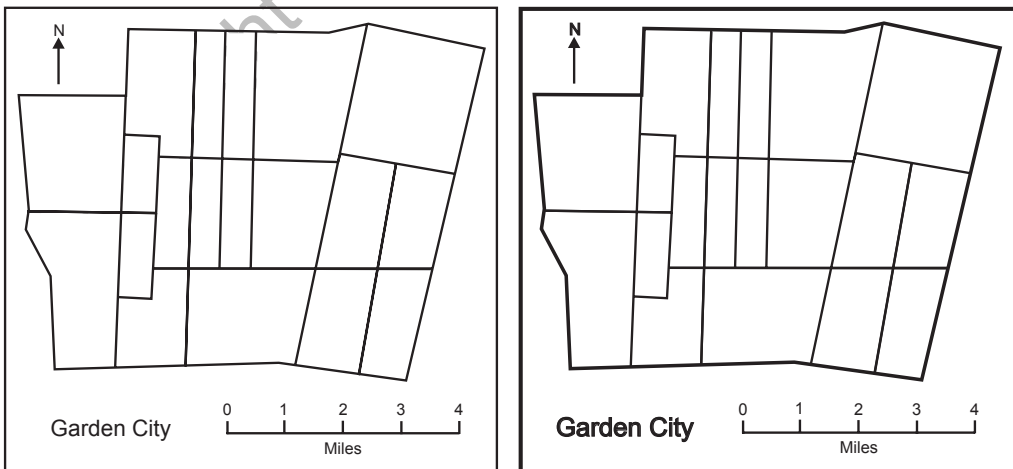


FIGURE 2.5. The figure on the left has no contrast and is bland; the figure on the right has better contrast.

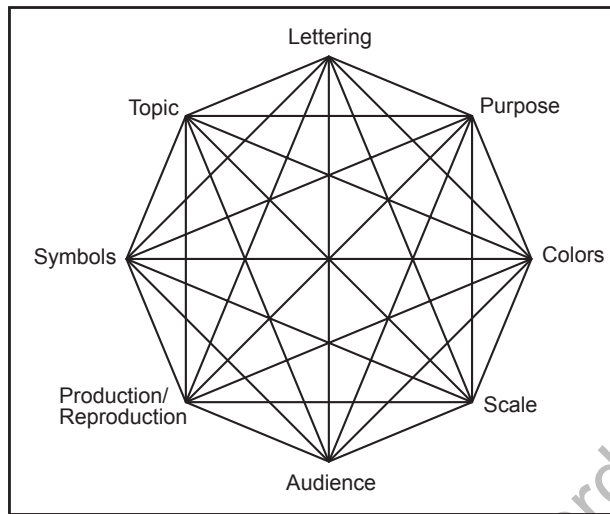


FIGURE 2.6. All of the elements of a map are interdependent.

have a pleasing appearance? While this might not be a problem for a map created for oneself to analyze a geographic problem, if the map is to be presented to a larger audience, it can mean the difference between acceptance of the map and its message or rejection. Simplistically, audiences prefer a pleasing map.

DESIGN AS A PLAN

Formulating the Plan

Design is a decision-making process. Many choices must be made in order to create an effective map whether for visualization or presentation. Before beginning, there are a number of questions to ask. The answers to these questions determine what projections, symbols, scale, colors, type, and all other components will be chosen.

Is a Map the Best Solution to the Problem?

Is a map the best product? There are times when a table or graph might be more appropriate. In general, if the subject has a spatial component, or if spatial relationships are important, then a map is a suitable solution.

What Is the Purpose of the Map?

How will this map be used? Is the map designed to show research findings, to store information, to teach concepts, or to illustrate relationships? The message will probably be unclear unless the cartographer has a definite idea of the purpose of the map. Figure 2.7 shows two maps of the same basic subject designed for different purposes. Note the variations in emphasis.

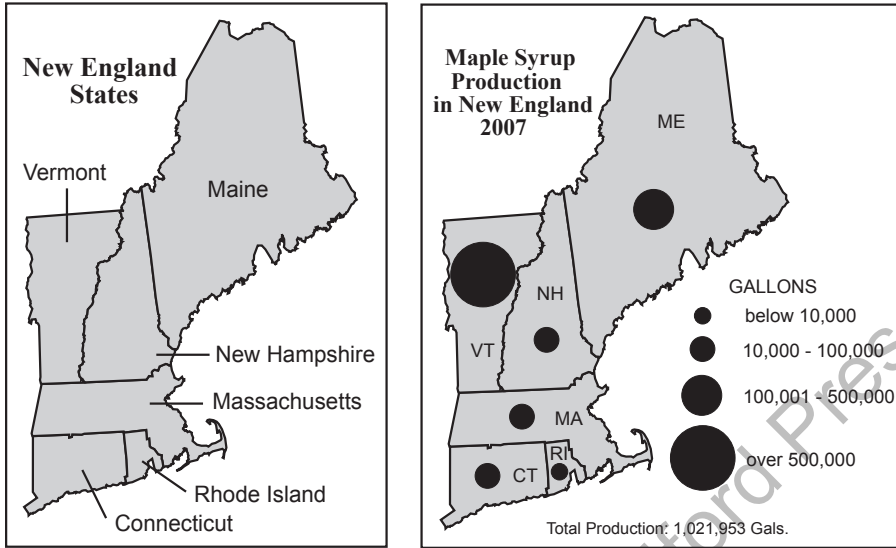


FIGURE 2.7. The varying purposes of these maps is reflected in the design. The map on the left is a simple location map, while the map on the right shows production of a product.

What Is the Subject or Theme of the Map?

A map for navigation has different requirements than a map that simply shows locations or one that shows population density. The theme and location have a bearing on the choice of projection, scale, and degree of generalization. Distribution maps require equal-area projections, a map of wheat distribution does not need a detailed coastline, and midlatitude areas are better represented on conic projections than on cylindricals, for example. Each of these topics is discussed more fully in the relevant chapters.

What Is the Intent of the Map?

Will it explain, will it tell a story, will it be used to persuade, or will it describe? Like writing, maps can be expository, narrative, persuasive, or descriptive. Maps included with research articles are normally used to explain; a map accompanying a story or history may explain or tell a story; a map in a political journal, advertisement, or newspaper may be used to persuade; and some maps simply describe, as in the sense of “you are here.” Each of these intentions has somewhat different requirements. Again, these topics will be dealt with in the chapters on color, generalization, and symbolization.

Obviously, purpose, theme, and intent are closely related.

Who Is the Audience?

What are the audience *characteristics*? What is the age of the audience? How familiar with the map subject are they? How map-literate are they? How is their eyesight?

Maps for the visually impaired have different requirements than maps for those with normal vision. Maps for elementary school textbooks have different requirements than maps in scholarly works (Figure 2.8).

What are the *user needs*? How will the readers use the map? Where will they use the map? What are the conditions for reading the map? Will the map be consulted while sitting at a desk, while driving, while on a bicycle tour, or as a reference? These maps will have different requirements because of the needs of the user. A map for a cab driver, which is consulted “on the fly,” has different requirements than one intended for a tourist walking along a nature trail.

Too often mapmakers lose sight of their audience. Who is going to use the map and for what should always be at the forefront of the mapmaker’s mind whether one is making a map of sewer lines, a newspaper map showing current events, or a map in a textbook. The needs of a city planner, a pilot, and a student are different.

What Is the Format?

Format refers to size and shape of the page or screen and whether color can be used. It ties to where the map will be reproduced. Most professional journals, such as the *Annals of the Association of American Geographers*, *The Professional Geographer*, and *CAGIS*, have a standard format; these standards are available from the editor. Many such journals publish illustration requirements in each issue. When books are designed, the art editor determines the page format. Maps for theses and dissertations have specific formats determined by the university, newspaper maps must conform to column sizes, and maps in business reports will conform to the page size of the printed report. Maps that will be viewed on a monitor or that will be projected onto

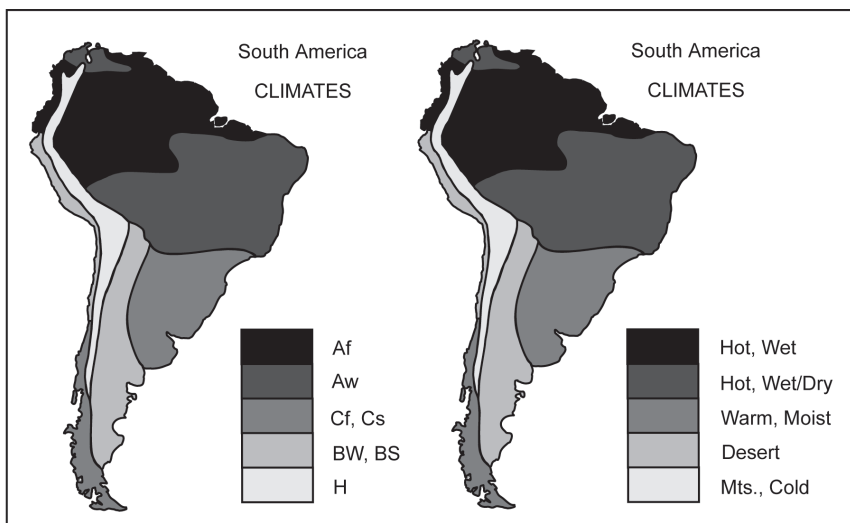


FIGURE 2.8. Map design varies with the audience. The map on the right is for elementary school children and identifies climates with descriptive terms; the map on the left is designed for college age and uses Koeppen climate designations.

a screen have different requirements from printed maps. New formats have become available, such as tiny monitors used on GPS screens, cell phones, and MP3 devices; these have different requirements than wide-screen computer monitors.

Since color is so ubiquitous on monitors and color printers, it is easy to forget that it isn't always an option. Color printing in journals and books is still expensive. Some scholarly journals may require an author to pay for color illustrations. Asking what the format is will save a great deal of grief and reworking. A map designed for color cannot simply be reproduced in black and white. This topic is discussed in Chapter 4.

How Will It Be Produced?

Most maps today are produced with a computer, although some maps are still hand-drawn. In some cases maps are drawn by hand because of lack of computer access; in other cases, such as maps for book illustrations, it is artist preference. The principles of design apply whether the map is drawn with pen and ink or a sophisticated computer, but one should have an idea of how the map will be made at the beginning.

Software for computer-produced maps is of four types: GIS, illustration/presentation, CADD (computer-assisted design and drafting), mapping, or some combination of these. GIS software is a powerful analytical tool with map presentation capabilities. With GIS, data can be linked to places and calculations can be made. As of this writing there are some design limitations and some types of symbol that are difficult or impossible to create using GIS. These problems will be solved at some point. By the same token, some symbols that are easy to produce with GIS cannot easily be created manually or with presentation software. Presentation or illustration software, such as Adobe Illustrator or CorelDraw, is used by graphic artists and allows for highly creative products. However, such software does not allow analysis, calculation, or linking of data to locations automatically. If these capabilities are not needed, a presentation program can be a good choice. Like illustration programs, CADD doesn't allow for analysis. There are some mapping programs, such as Microsoft MapPoint, that have limited GIS capability and allow simple analysis and creation of maps, but do not allow much flexibility in design and composition. Some recent mapping programs, such as Ortelius and Map Publisher, combine GIS and design (Figure 2.9). If one is using a dedicated GIS, combining it with a presentation program usually allows for the best analysis and presentation product.

How Will It Be *Reproduced, Disseminated, or Viewed*?

There are three main considerations here: Will the map be viewed on a monitor, projected on a screen, or printed on paper? The map's mode of presentation especially affects the colors used, but also affects the layout and format. A map designed to be viewed on a monitor usually cannot be printed on paper without some loss of color fidelity—the colors look different. Solutions to this problem are discussed in Chapter 4.

For paper maps, one needs to know if the map will be printed by an inkjet printer, a laser printer, offset lithography, or some other method. There are differences in



FIGURE 2.9. Ortelius mapping software. Courtesy of MapDiva.com.

costs and time. If the map will be produced in large numbers, as with offset lithography, the cartographer should consult with a printer early in the design process.

Rules and Conventions

In designing maps there are a number of *conventions* and guidelines, but few rules. Conventions are such practices as blue for water, red for hot, and blue for cold. For some of these conventions there are logical reasons. Using red for hot, for example, is based on the idea that reds, oranges, and yellows are *warm colors* and blue and green are *cool colors* (see Chapter 4). Other conventions are based on old practices and have been used for centuries. For example, using red for urban areas supposedly originated in areas where building roofs were made of red tile.

Conventions are not rules and can be ignored, but only for good reasons. To use blue for hot and red for cold invites confusion, and coloring the oceans orange will draw the ire of most map users. On the other hand, showing a polluted river as brown would be a reasonable “violation” of the blue-water convention.

Intellectual and Visual Hierarchy

Not everything on a map is of equal importance. In the planning aspect of design one establishes an *intellectual hierarchy*. This is governed by the purpose of the map and its function.

If all elements are given equal visual weight the map becomes hard to read; it

lacks contrast. As we have seen, maps are not linear and are not read in the way text is, from top to bottom and left to right. Establishing a *visual hierarchy* through size, boldness, and color helps lead the reader's eye (Figure 2.10). Thus, the mapmaker uses large type to attract the eye to the title and uses “heavy” colors such as red or black to emphasize areas.

One important aspect of the visual hierarchy is the *figure-ground relationship*. In a graphic communication, one area will stand out as the figure and another will be the ground or background. If the figure-ground relationship is not clear-cut, the communication will be ambiguous; this is the basis of many optical illusions (see Figure 2.11). If there is no clear visual hierarchy of color, an unclear figure-ground distinction can also result. For maps, the thematic information and the subject area are normally the figure and the base information is the ground.

The distinction between land and water is a special aspect of the figure-ground problem. Usually, the land is intended to stand out as figure, but if land and water have equal visual emphasis, readers have a very difficult time orienting themselves. Figure 2.12 illustrates coastal cities. Because the lettering is on both land and water areas, it is impossible to determine, without being familiar with the area, what is land and what is water.

Figure 2.13 shows several ways to establish a land-water distinction. *Water lining* was a customary way of symbolizing water on engraved maps for several centuries, but it is no longer an acceptable method unless one is attempting to create an antique feel. It is hard to read, and the lines are often mistaken for depth contours when, in fact, they have no numerical value.

Stippling is another conventional technique that was used primarily for manually drawn black-and-white maps. It was easy to do, and attractive when well done, but there is danger that readers might interpret the dots as representing sandy areas.

Line and *wave patterns* have also been used, but lines often create an unpleasant, vibrating effect that is hard on readers' eyes. The wave pattern is not desirable except



FIGURE 2.10. Visual hierarchy is established through size, boldness, and color.



FIGURE 2.11. A well-known optical illusion. Is the figure a vase or two profiles?

in very rare cases, such as cartoon maps or some pictorial maps. In addition to being hard on the eyes, wave patterns are considered childish and trite.

Color or tone are the best choices to distinguish land and water. Blue for water features is the most common convention, although even ochre has been used. Black oceans have been used effectively on maps, but there is risk that the water areas are given too much prominence and stand out as the figure when this is done. A gray tone applied to water areas is usually effective on black-and-white maps. *Drop shadows* appear to raise the land area and thus distinguish land from water or figure from ground.

The Search for Solutions

Creating a map is solving a spatial problem. How do I show these data most effectively or how do I tell this story? In fact, there are usually a number of different solu-

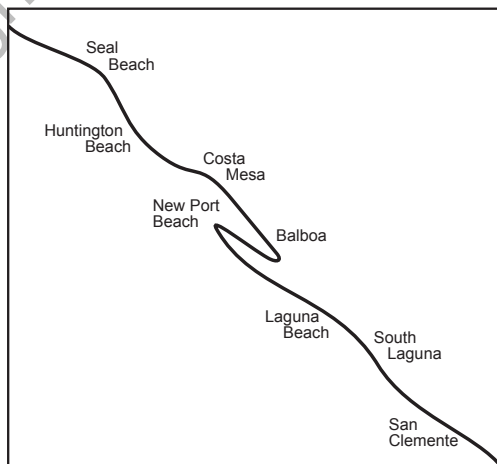


FIGURE 2.12. The land–water distinction is unclear on this figure.

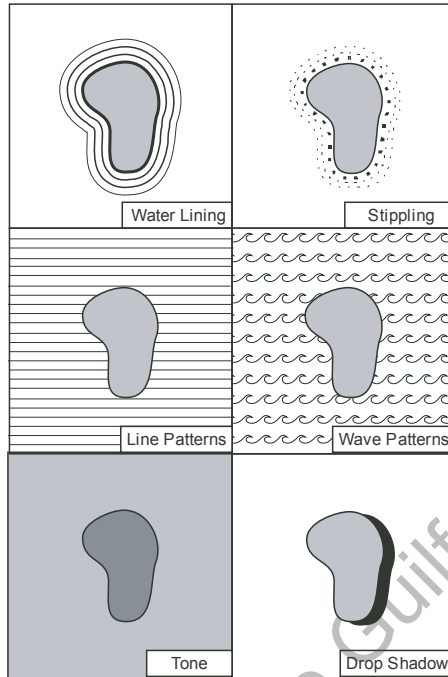


FIGURE 2.13. Ways of distinguishing between figure and ground (land–water).

tions that will work. In some cases, using two or more maps will be effective. For the Internet, one might create a multimedia or animated presentation. There is no single “best” map. If a single correct way to make a map existed, the topographic maps of all countries would look alike. An examination of these maps shows that while they share some features, there is a vast difference between Swiss, American, Dutch, German, and Mexican topographic maps, for example. Each country itself has determined what is most suitable for the maps of its area. While some might argue that one is more attractive than another, it doesn’t hold that a “less attractive” map is wrong, poorly designed, or unsuited to the task. Swiss topographic maps represent the mountainous terrain of Switzerland beautifully, but the same techniques would not work on the flat topography of the Netherlands.

Once the cartographic problem is identified and understood, the search for solutions can begin. Preliminary “thumbnail” sketches can be of great help, even when making maps with the aid of an illustration or GIS program. These sketches help to create a graphic outline for the map. In the earliest stage, they may appear to be nothing more than doodles, but as the plan takes shape, these doodles can be expanded to form the layout of the map. Such sketches are not a waste of time; they are visual thinking (Figure 2.14). Computers, of course, allow quick tryout of solutions since elements can be moved easily.

Decisions are made at this time not only about the positions of the various elements, but also about the kinds of symbols to be used, color, map scale, and style and size of type. Decision making does not end here. At each stage of the mapping process

it is worthwhile to analyze the design and fine-tune it if necessary to ensure that all elements are working harmoniously.

Design Constraints

Mapmakers do not have the freedom of design that other graphic designers do. The first constraint is the *shape of the area* represented. The shape of the United States cannot be altered to make it fit a given format. The area must remain recognizable. Different projections and orientations on the page provide some flexibility, but the projection used must still be appropriate for the map purpose.

Format and *scale* are also a constraint. Mapmakers are required to design maps to fit a specific format. A map that doesn't will be rejected by the editor. The mapmaker may also be required to make a map at a particular scale and this will govern how much area can be covered.

The amount of *text* required is also a restriction in map design. Some feel that maps would look much better without lettering, but place-names, legends, and explanatory text are usually necessary to clarify and identify features.

EXECUTION OF DESIGN (COMPOSITION)

Basic Elements

Once decisions have been made about projection, symbolization, and the like, the composition or layout of map elements can begin. The basic elements the mapmaker has to work with are the subject area, the title, the legend, the scale indicator, the graticule or north arrow, supplementary text, frame/border, and insets (Figure 2.15). Not all of these elements will appear on every map.

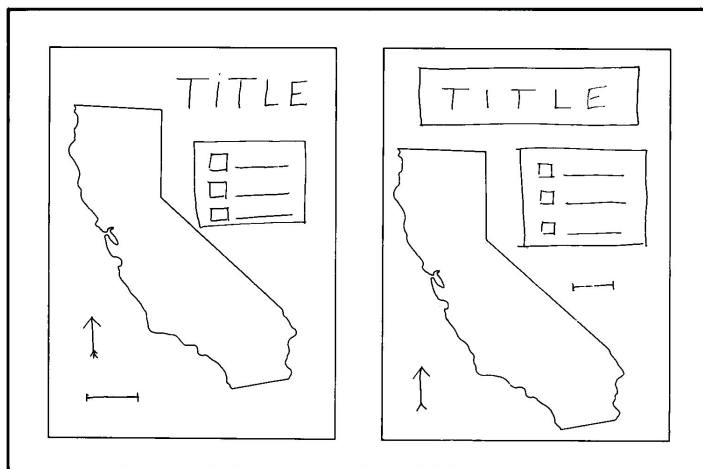


FIGURE 2.14. Thumbnail sketches are visual thinking.

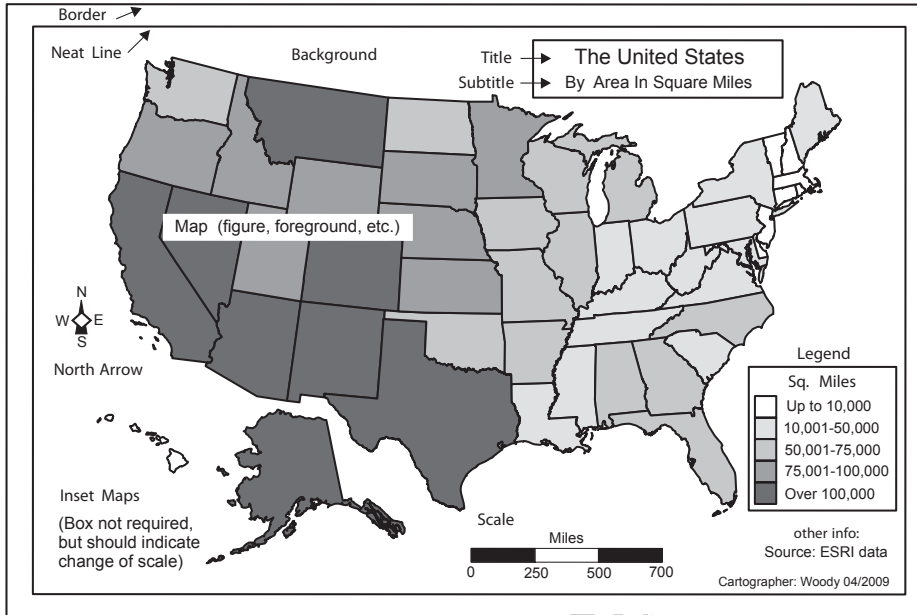


FIGURE 2.15. Generic map with the elements that can be used to make up a map design.

Subject Area

The subject area is normally the primary element of the visual hierarchy, it is the most important element on the page, and it is placed in the visual center of the page. It should also take up the most space within the frame. Often its place in the intellectual hierarchy is emphasized with graphic techniques such as drop shadows to raise the subject area above its surroundings, as in Figure 2.13. See also the figure-ground relationship above. The map should also provide a “sense of place” for the area.

Title

Most maps have a title. If the map is to stand alone, that is, printed on a separate sheet, not in a book, a title should appear on the map sheet; if the map is printed in a book, report, thesis, or dissertation, the title may appear on the map or as a caption below the illustration. The caption can explain or elaborate if there is a title on the map.

There are three things to consider with titles: wording, placement, and type style. The *wording* introduces the reader to the map subject just as the title of a book or article does. Wording and type style are covered in Chapter 3. *Placement* of the title is a part of the map layout. Contrary to what many believe, the title does not have to be at the top of the map. It can be placed anywhere on the page as long as it stands out in the visual hierarchy—the title is normally the most important wording on the map—and as long as it creates a balanced composition. The shape of the map area often provides a natural place for the title in the composition (Figure 2.16).

Legends

Legends present minidesign problems. Like title design, legend design has several parts: content, wording, placement, and style. First of all, any symbol in the legend must look *exactly* like the symbol on the map. Miniaturizing the symbol, for example, will cause reader confusion (Figure 2.17). It isn't necessary to title the legend space as "legend," although this is commonly done, especially on maps in children's textbooks, and was built into some early computer mapping programs. This is much like saying "a map of" in the title; it is redundant and a waste of space—although on children's maps it can serve as a teaching aid. The legend title can elaborate on the subject of the map and should explain the material in the legend (Figure 2.18). For example, if a map shows median income in the United States, by state, the legend could be titled "Income in Dollars." Or if the map title is simply "Income by State" the legend title can be "Median Income in Dollars." The goal is clarity (see Chapter 3).

Placement of the legend, like the other design elements, is governed by balance and white space. There is no general rule for where a legend should be placed although some companies and agencies may establish their own guidelines for a map series.

The lettering style of a legend does not have to be the same as that of the title, but the typefaces must complement one another. Some typefaces do not work well together (see Chapter 3).

Scale

In this section we are concerned with design and placement, not calculation and choice of scale; those topics are treated in Chapter 5. Scale can be expressed graphi-

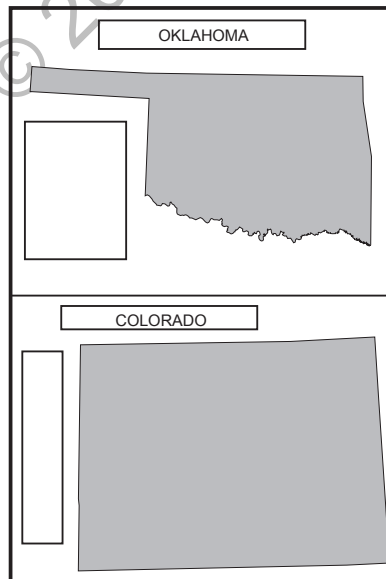


FIGURE 2.16. Some areas are easier to work with in design. Oklahoma provides a natural place for title and legend, Colorado does not.

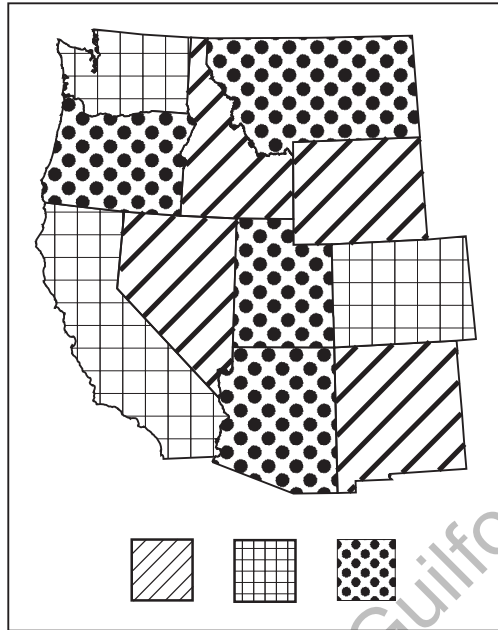


FIGURE 2.17. Symbols must look the same in the legend and the text or the map is confusing for the reader.

cally; as a bar or linear scale; as a verbal statement such as “1 inch represents 1 mile”; or as a fraction, such as 1:62,500. It is the graphic scale that most often causes design problems. First, one must remember that the scale is an aid to the reader, not the focus of the map. The scale serves one of two purposes: dimensionality or measurement. On a world thematic map, the scale indicates general size because the reader does not need to make precise measurements; on a large-scale map the reader might want to

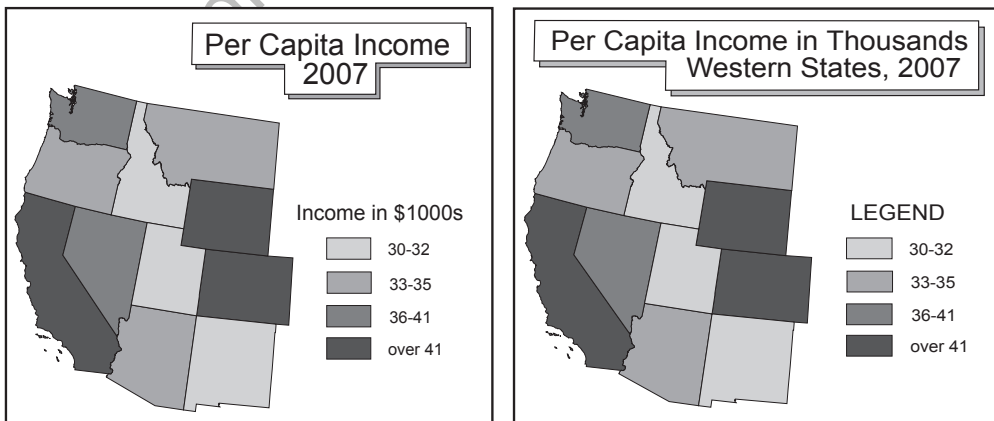


FIGURE 2.18. The word “legend” serves no purpose on the map on the right and it is better to replace it with a descriptive title.

know exact distances. Some computer software has a default scale that overwhelms the map and is the first thing the reader notices (Figure 2.19). The scale should be long enough to make necessary readings, but a 4-inch-long scale on a 6-inch map is overkill. Second, the scale should not be ornate. Ornate scales embellished with dividers were popular on 18th-century maps, but these maps also contained pictures of mermaids, sea serpents, and ships. Unless you are trying to imitate the feel of an old map, all such embellishments should be avoided. Figure 2.20 shows examples of acceptable scales.

The scale may be included in the legend area or it may be separate. As with title and legend, the scale is placed for balance and clarity.

Orientation

Orientation refers to showing direction, most commonly done by drawing the graticule (lines of longitude and latitude) or with a north arrow. Although it is a common custom, north does not have to be at the top of the map, and, in fact, sometimes cannot be. North has not always been at the top. European *mappae mundi* (world maps) placed the Orient (east) at the top and hence we have the term “to orient” the map. Early Chinese maps placed south at the top. The guideline now is that if there is no other indication, such as the graticule, north is assumed to be at the top and if it is not there must be some indication of orientation.

North arrows are a quick and easy way of indicating direction, but they must be used with caution. North arrows are not appropriate on all maps. For a small area like a city or neighborhood, they can be useful aids, but for maps of the world or large regions they may not be suitable. If the meridians on a map (true north–south lines) are curved or radiate, the north arrow is only correct for one point or along

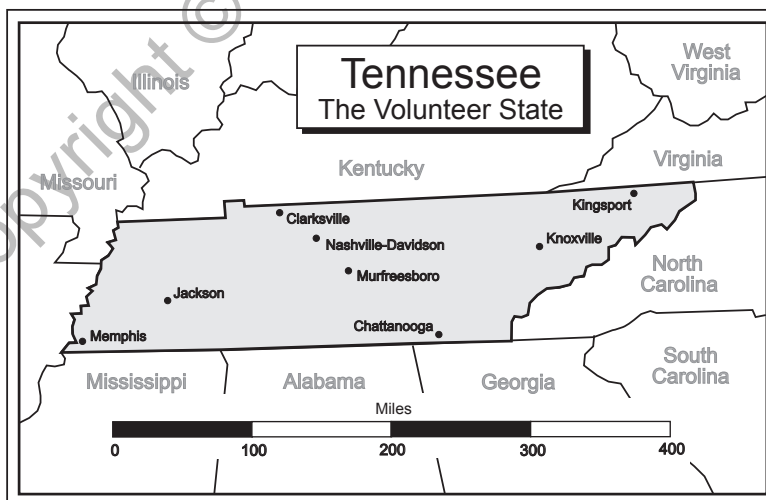


FIGURE 2.19. Oversize scales are common on many maps because of default options in the software. The scale is normally an aid, not the main focus of the map, and should not be a major element in the visual hierarchy.

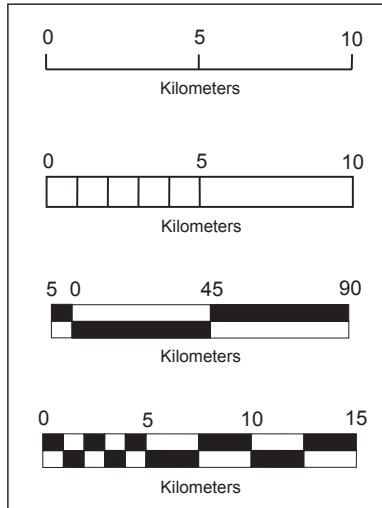


FIGURE 2.20. Graphic scales can be drawn in a variety of ways.

one line; on the conic projection shown in Figure 2.21, the arrow cannot be used. Unfortunately, improper use of a north arrow is a common error. Compass roses that show the cardinal directions (north, south, east, west) are generally used for navigation maps and are not usually appropriate for thematic maps.

If used, north arrows, like scales, are aids to the reader and shouldn't dominate the map. Many companies or agencies use a small logo for the arrow center and this can be effective, but still shouldn't overpower the map. Figure 2.22 shows a variety of north arrows and compass roses.

If parallels and meridians are drawn on the map a north arrow is redundant. The



FIGURE 2.21. North arrows should not be used if meridians radiate or curve. The arrow on this conic projection does not point north.

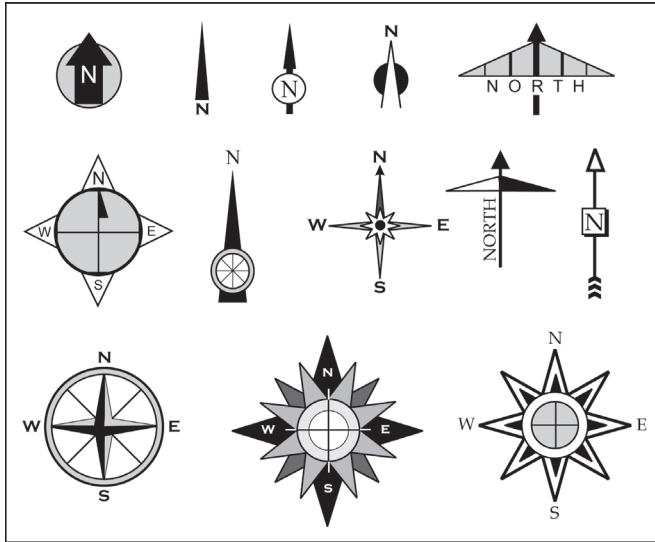


FIGURE 2.22. North arrows and compass roses can take a variety of forms; usually simple forms are best.

choice of number of parallels and meridians depends on the scale of the map and its purpose. A map for navigation will require a finer grid than a general atlas map. On an atlas map the graticule serves to help the reader locate places. On a thematic map, grid ticks can be used because the reader isn't trying to determine precise locations. If grid ticks are used, they must be shown on all sides of the map because this also gives a sense of the type of projection (Figure 2.23).

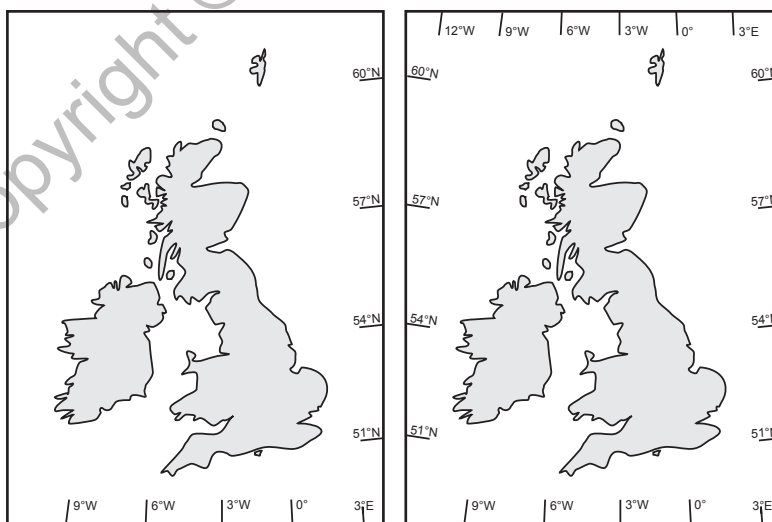


FIGURE 2.23. If grid ticks are used, they must be shown on all sides.

Inset Maps

An inset map is a small map used in conjunction with the main map and within the frame of the main map. Insets may be used to clarify, to gain scale, to enlarge or focus on a small section of the map, or to provide a setting for an area presumed to be unfamiliar to the reader. Inset maps can be quite helpful in solving difficult design and layout problems, but should not be overused (see Figure 2.24). Too many insets create a choppy, cluttered appearance and the design will not appear unified.

Some areas have irregular shapes that don't fit easily into a given format. Alaska is one such place. If the entire state of Alaska including the Aleutians is placed on a page in "portrait" format, the map is very tiny and it is difficult to show data; if an inset of the Aleutians is used, then the map can be larger. If the inset map is at a different scale than the main map, scales must be placed on both map and inset to avoid confusion about size.

Inset maps of Alaska and Hawaii are frequently used on maps showing the 50 United States. This sometimes creates a problem for children, who come to believe that Alaska and Hawaii are located to the south of the 48 contiguous states and that Alaska is an island. This problem can be solved by using an inset of North America and the Pacific with those two states highlighted. This type of inset is also used for any area that might be considered unfamiliar to the viewer (Figure 2.25).

In Figure 2.26 the detail of the center area cannot be distinguished; if the map is made large enough to show the detail area, it will no longer fit the format; if only the circled area is shown, the reader has no anchor for orientation. One solution is to enlarge the area and present it as an inset.

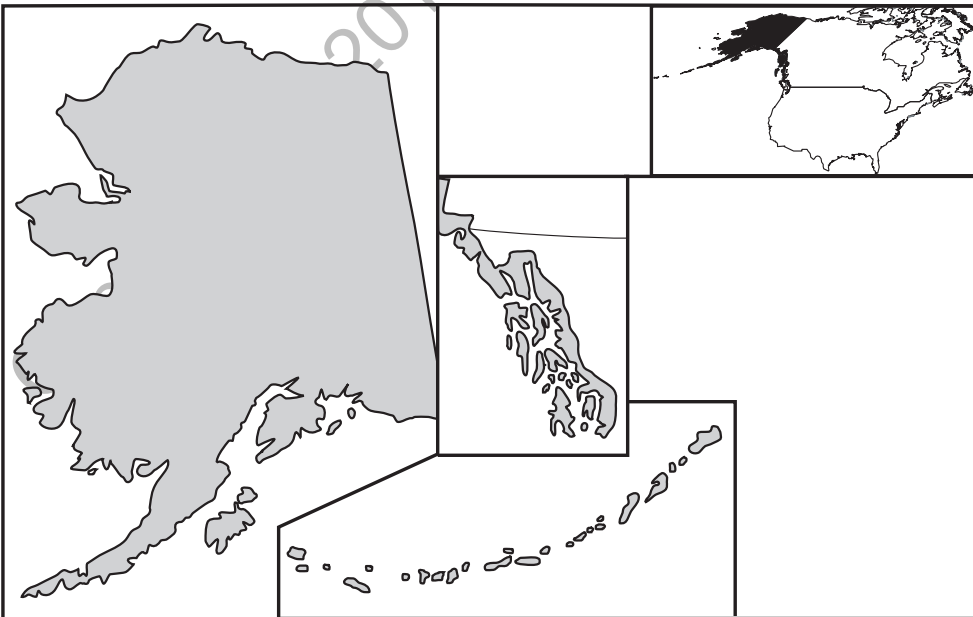


FIGURE 2.24. Insets are useful and information can be set off in boxes, but too many insets and boxes create a choppy, cluttered appearance.

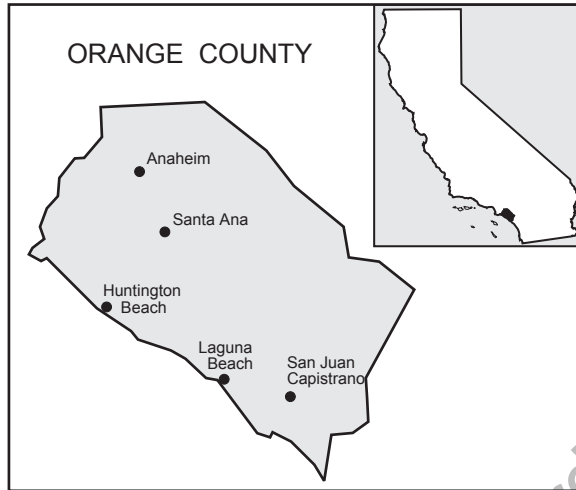


FIGURE 2.25. General location inset. The inset is used to provide the reader with the broad setting for an unfamiliar area.

Supplemental Text and Illustrations

There are elements of supplemental text that must be on the map. One example is a source statement, especially for quantitative maps or maps based on another’s work. This statement acts in much the same way as a footnote in a book. Ethics require that such statements be included. Another piece of supplemental text is the name of the projection; this is an aid to the reader and provides a key to where the map is most accurate and what its limitations are. As with other elements, they are placed to create a pleasing well-balanced composition.

With the ease of manipulating photographs and text by computer, it has become increasingly popular to add large blocks of text and photographs to maps and atlases.

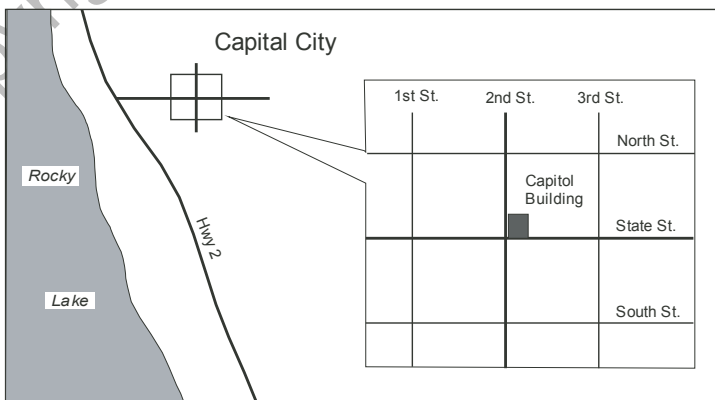


FIGURE 2.26. An inset can be used to focus on an area with an enlargement.

These can be effective, but should be used with care. The danger is including too much “stuff” on the page and losing the map in the process. Some modern atlases have pages containing more text than map. Viewers have mixed opinions on this practice. The key is to remember the focus and purpose of the map. Will the additional text add to the discourse or will it be visual clutter? Do the photographs illustrate the map subject or are they extraneous? There were other periods in cartographic history when decorative elements were included on maps. The seventeenth-century Blaeu atlases include drawings around each map page that showed dress styles for different cities or landmark buildings; other maps of the 17th and 18th centuries included allegorical figures. Nineteenth-century atlases frequently included vignettes showing historic events or local scenery. Figure 2.27 is a hand-drawn map with pen-and-ink sketches of buildings.

Frames and Neat Lines

The *neat line* is a line that frames and separates the map from other information; the *frame* is a border around the entire map. These lines are shown on the generic map in Figure 2.15. There is some debate about the use of frames and neat lines. Many like the “free” look a frameless map gives to the page, others feel that a frame adds stability to the page. To a large extent this is a personal preference, but is governed by

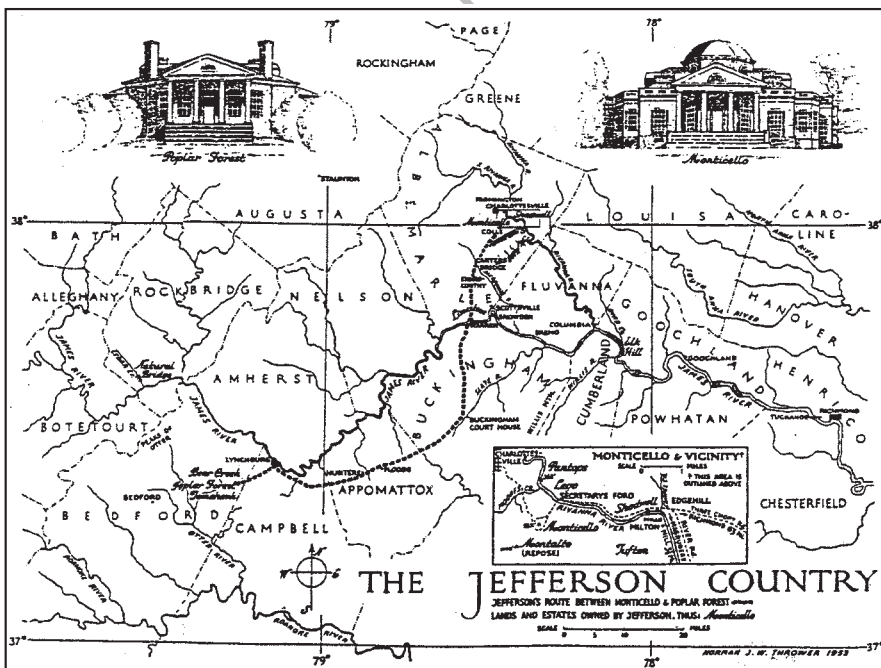


FIGURE 2.27. Drawings or photographs can add interest to a map if not overused. Hand-drawn map of part of Virginia with pen-and-ink drawings of Monticello. Courtesy of Norman J. W. Thrower.

where the map will be reproduced, who will use it, and the guidelines of the company or agency creating the map or map series.

Overall Appearance

Communication

The cartographer must consider the overall appearance of the map. It is easy to overload a map with so many symbols and topics that it becomes unreadable. It may be necessary to make more than one map to illustrate a given topic. On an overloaded map, the various themes and symbols fight for the reader's attention.

It is easy to overdesign graphics to the point where innovative technique or style dominates the graphics. A symbol on a map might be very eye-catching, but if the immediate reaction is to the appearance of a symbol instead of to its meaning, then there is a strong possibility that information has been lost. This is not to say that creativity and innovation should be avoided; an eye-catching map is more likely to be read than a humdrum one, but the goal of clarity must always be kept in mind.

Beauty

A significant aspect of the overall appearance that has often been overlooked or even considered unimportant in recent years is *beauty*. Old maps are often valued for their beauty and framed to hang on a wall, but it is hard to imagine an early computer map being treated in this way. Of course, beauty is hard to define and standards of beauty change, but readers still react to the aesthetics of maps.

We don't equate beauty in modern maps with ornate lettering, elaborate title cartouches, and drawings of mermaids and ships, but maps can still be attractive. Some maps are small, informal, and plain; they are devoid of ornament, because ornament would be inappropriate and distracting. These maps have elegance and beauty in their simplicity.

Other maps with a larger format, designed to show subjects of broad interest, such as many *National Geographic* special maps, benefit from the use of ornament. As we have seen, with restraint, ornament adds visual appeal, attractiveness, and pleasure—all worthwhile goals—as in good writing. Many maps are dull and sterile even if accurate. Good maps, like good writing, are enjoyable to view and satisfying to use.

Several organizations including the Cartography Specialty Group of the Association of American Geographers, the North American Cartographic Information Society, and Cartography and Geographic Information Science sponsor map design competitions each year. Consult their websites listed in Appendix B.

Spec Sheets

A useful habit (and standard practice with many companies and agencies) when creating a map is to keep a record of specifications: colors used, typefaces, line weights, statistical breakdowns. This can save hours of work when revisions or updates are needed.

Critiquing the Map

The last task in preparing a map is the critique. Even though you have checked every element at every step along the way, a final evaluation is in order.

SUGGESTIONS FOR FURTHER READING

- Arnheim, Rudolf. (1969). *Art and Visual Perception: A Psychology of the Creative Eye*. Berkeley and Los Angeles: University of California Press.
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